MASTERS THESIS

ARE REMINDER STICKERS EFFECTIVE IN REDUCING IMMUNIZATION DROPOUT RATES ?

BY

Yemane Berhane, MD

March, 1992

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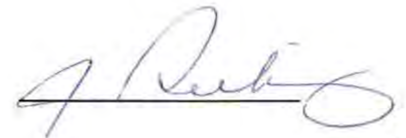

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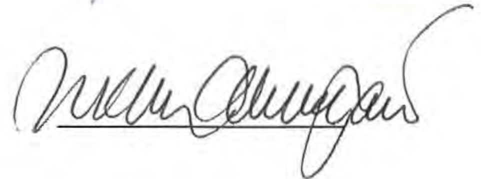

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ABSTRACT

A field trial to assess the effectiveness of a reminder sticker in reducing immunization dropout rates was conducted in two districts of Addis Ababa between October 14, 1991 and January 31, 1992. A total of 703 children were entered into the study. The study population was divided into intervention and control groups according to a randomly determined schedule. The intervention group received the reminder sticker and the control group did not receive the sticker. All other services were identical. A baseline interview documented the socio-demographic and maternal characteristics potentially related to immunization services utilization and revealed no statistically significant differences between the intervention and the control group. The dropout rates were 7.3% and 13.3% in the intervention and control groups respectively. The Relative Risk of being a dropout in the intervention group was 0.55(0.35,0.87). This difference is clinically and statistically ($p<.01$) significant. Therefore, it is concluded that the reminder sticker is effective in reducing immunization dropout rates. Further, large scale investigations under operational conditions are recommended prior to the routine introduction of stickers into the immunization services.

INTRODUCTION

Immunization is one of the most powerful, safe and cost-effective primary preventive interventions in public health practice. Immunization programs can greatly reduce the incidence of several infectious diseases. Smallpox, one of the most feared human diseases, was eradicated worldwide following a 10 year campaign of intensive vaccination and surveillance. Immunization service which was non-existent in most developing countries until the mid 1970's are now showing remarkable progress. A third dose of polio or DPT vaccine is now given to more than half of the children in the developing world. This is preventing over one million deaths associated with these diseases every year(1,2,3,4).

Measles, polio, diphtheria, and whooping cough are now rare in many developed countries where immunization is routine and universal. However, in many developing countries immunization services remain under utilized and diseases of early childhood preventable by vaccination are still a serious public health problem, claiming the lives of millions of children each year. Therefore, efforts must be continued to, 1) accelerate progress in countries which have not attained full coverage, 2) to sustain full immunization coverage in the remaining countries, 3) and to eliminate EPI's target diseases as public health problems from our planet(5,6,7,8).

In Ethiopia vaccine preventable communicable diseases are major public health problems. Accordingly, the prevention and control of these communicable diseases have received high priority. The Expanded Programme on Immunization (EPI) was launched in Ethiopia in 1980, as one of the activities included in the country's Primary Health Care (PHC) strategy. At that time the immunization coverage was estimated to be less than 1% . When the programme was launched the plan was to increase coverage by 10% every year in order to attain the goal of universal immunization coverage by 1990. In 1990, immunization coverage for under one children was reported to be 49% for DPT3 among accessible population (about 50% of the total) and the drop out rate from the schedule was 36% . In Addis Ababa the dropout rate was 30% . This shows that although the immunization coverage has improved substantially, the goal set to be attained by 1990 was not met(9,10,11,12).

Inaccessibility of the health services, missed opportunities to immunize eligible children coming to the health units and high dropout rates from the schedule are some of the reasons for under utilization(1,3,4,6).

To attain rapid improvement and high overall immunization coverage in this country every opportunity must be utilized to expand EPI in all existing health services, to educate the people, and to reduce the dropout rates. Otherwise, the dream of saving children from the suffering of vaccine-preventable diseases will not be realized in the near future.

This study addresses the problem of immunization dropouts. From a number of studies conducted in this and other countries the major reasons for a high dropout rate from the immunization services are well established. The major reasons are lack of adequate information, child illness and inconvenient service delivery(13,14,15). To date, there are no published intervention studies from Ethiopia designed to identify methods effective in reducing dropout rates. This study was designed to determine whether a reminder sticker given to the mothers at the time of the first vaccination session is effective in reducing the subsequent immunization dropout rate.

LITERATURE REVIEW

In the developing world vaccine-preventable diseases remain among the leading public health problems affecting young children. Each year, 3 million infants and young children die and another 3 million are left crippled, deaf, blind, or mentally retarded as sequelae of one of the six vaccine-preventable diseases; tetanus, tuberculosis, diphtheria, pertussis, poliomyelitis and measles. Of all deaths in children under 5 years of age, 20-30 % of deaths are associated with these six childhood vaccine-preventable diseases. In the developing world where under nutrition, diarrhoea, respiratory infections and malaria are highly prevalent, the consequences of contracting these diseases are even more grave(1,7,12).

EFFORTS MADE TO EXPAND IMMUNIZATION SERVICE

To increase the immunization coverage of the world the goal of universal child immunization by 1990 was set early in 1980 to help countries achieve the immunization coverage needed to interrupt disease transmission. Most national programs have made a significant effort to expand the immunization service in their countries mainly by improving accessibility and by improving their managerial capability to meet the program needs. International effort was also consolidated to provide the necessary logistic and financial requirements for the programs in most developing countries over the last decade(1,5,12,16,17).

To increase accessibility to the service, countries have adopted different vaccine delivery strategies. In addition to delivery from fixed facilities, outreach services, mobile teams and intensive immunization campaigns were utilized to reach more children in inaccessible areas and to boost coverage. In Ethiopia geographical accessibility to EPI services has grown from only 9.2% in 1980 to 45% of all the population in 1989 and to 75% of the population in non-conflict areas in 1990. Such high geographical coverage was achieved by expansion of service mainly through outreach delivery strategy. By 1990 there were 1389 static and 4606 outreach sites in the country. At the beginning of EPI in 1980 only 8% of the health units were participating in the national EPI programme. Now 74% of the health units participate in the programme(1,12,18).

The establishment of a static immunization service at fixed health units is the crucial step towards making immunization a permanent part of the basic health care and to the achievement of high coverage with less cost. Although other strategies, such as outreach services and mass campaigns, are very attractive politically and many have provided high rates of coverage there are considerable problems associated with such strategies. Problems include; 1) poor quality of services provided during mass campaigns due to the use of minimally trained volunteers, and 2) scheduling visits and adhering to schedules are difficult because of transportation problems and poor weather, plus higher costs due to perdiems, fuel and vehicle purchases. Furthermore the success

gained may be short-lived and the campaigns may divert resources and attention away from routine health services. Therefore , efforts should be concentrated on strengthening the static vaccination sites in every health unit in order to achieve long lasting programme success(1,19,20).

The effort to provide the immunization service integrated with other Maternal-Child Health (MCH) care services on a daily basis has also improved the utilization of the immunization service. Mass community mobilization, wide spread media propaganda, extensive health education and the political commitment obtained from the political leaders and from governments has substantially improved service utilization and immunization coverage in many developing countries(1,21).

Although the Expanded Programme on Immunization is showing progressive improvement in terms of coverage worldwide, the universal goal set for 1990 to immunize all children of the world could not be achieved. Coverage is still low in the least developed countries. Therefore, in these countries vaccine-preventable diseases are still major public health problems. In general, failure to utilize the immunization service and failure to comply with the immunization schedule are the main barriers to success(5,6,7,22).

A high overall coverage rate is the key outcome in an effective immunization programme. There are two major attributes to high immunization coverage. The first is initiation of service utilization by the community. This is to large extent dependent on

the accessibility of the service. The second is completion of the initiated immunization schedule. This is facilitated through the appropriate provision of adequate information and by the provision of the service at a convenient time and place for the mothers (23).

Accessibility and availability of health services are the most important factors to determine the utilization of health services by the population. But some studies have shown that even the basic primary health care services like immunization and treatment of diarrhoea were poorly utilized even in the population very close to a health facilities. This implies that utilization of health services may not be improved by just improving physical accessibility of the health services, at least in the developing world where ignorance and wide spread cultural and other barriers to utilization exist(24,25).

Therefore, consideration should also be given to social, economic and psychological factors affecting immunization, which include family size, parental age, education, income and race. An inverse relationship between family size and the immunization status of children has been observed, that is, as the family size increases, the immunization status of the children decreases. Infants of young, poor, and less educated parents tend to be inadequately immunized. Educating parents and the community about the schedule of immunization and improving the ability of the health units to identify and follow up children who are not immunized can greatly help to improve service utilization(26,27).

Reminders by mail and telephone, home visits, mass campaigns and mobile clinic service are some of the methods used to increase service utilization and accessibility in various countries with various degrees of success (8,14,23).

URBAN POPULATION AND IMMUNIZATION

The urban population in developing countries is increasing yearly, having population growth rates above the national rates. Hence, urban areas are considered to deserve priority for immunization programme. This is first, because disease transmission is potentiated by the high birth rate, crowded living conditions, and continuous influx of new susceptible from rural areas. The high density of susceptibles means that higher immunization coverage than the rural areas must be achieved to control transmission of disease spread by personal contact, particularly measles. Second, cities offer many advantages for the delivery of immunization services; the high population density provides the potential for cost effective services; the relative abundance of health facilities and personnel, smaller distance, and greater ease of communication facilitate logistics distribution and programme supervision; and the high school enrolment and level of education of the population facilitate information dissemination. The poor who represents 30-60% of the urban population also deserve special attention in terms of developing a delivery strategy which suit them best because of the special problems they face. Therefore,to improve urban immunization programmes requires inter

sectoral collaboration, use of all opportunities to vaccinate eligible children, identification of pockets of low coverage, reduction in dropout rates and community mobilization to identify and refer children for vaccination (28,31).

The immunization coverage attained by various administrative region in this country varies from 1% to 77% according to the 1990 report of EPI. This report indicates the immunization coverage for Addis Ababa, the capital, to be only 41% for the third dose of DPT. This finding may be surprising because Addis Ababa was free from the conflicts occurring in the country at that time, the facilities existing in the region are far better than those existing in most other regions and the majority of the population in the city have relatively easy access to the services. Despite these favorable conditions Addis Ababa ranked 13th in immunization coverage. This clearly indicate that much has to be done in the capital to improve its immunization coverage. Immunization coverage of 60-70% could have been observed by simply reinforcing the existing health services in the city. In addition, if every opportunity is taken to vaccinate children coming to the health units, if parents were educated about the necessity of repeated doses, and if programs directed to the urban poor could be designed, an even better coverage result could be expected(1,18).

IMMUNIZATION DROPOUT

Studies in Ethiopia have shown that at least a quarter of children who start immunization default from the schedule. The problem of dropouts is also observed in urban areas where access to immunization service is high and the service is provided daily. Lack of adequate information by the mother and lack of motivation were the major reasons cited for such high dropout rates (13,29,30,31).

Several studies on the failure to fully immunize children have indicated that lack of adequate information about the immunization schedule is the major cause of immunization dropout. Other reasons for dropping out include immunization time inconvenience, vaccination site being too far away, fear of vaccination side effects and child sickness (13,14,15).

With studies in various developing countries indicating that default from the immunization schedule is considerable, in some areas reaching 50% , attempts are being made to minimize the problem. Strategies include education of mothers about the need for repeated vaccine doses and provision of field tested immunization cards which contain information about the type and the number of doses needed and the recommended schedule which are given to mothers. These cards are written in a way understandable by both literate and illiterate women. These have been shown to be effective in helping mothers to follow through with the immunization schedule in Honduras(1).

In Suramin a callup system and home visits were among the methods used with success to reduce the immunization dropout rates for children who did not return to the clinic as scheduled. Young et al also demonstrated that a properly timed mailed reminder to families of selected high risk children, predicted by parental education and family size, was effective in reducing dropout rates. In areas where functional postal and telephone services are not available, a callup system will be impractical. The cost in terms of personnel, transport and management, needed to arrange home visits is unaffordable to many countries in the developing world (32,34).

A supplementary food ration system as an incentive to improve immunization attendance was evaluated under operational conditions in a rural area of Nicaragua. The evaluation of this program revealed that there was a substantial improvement in attendance at both mobile and stationary clinics, although distance from the stationary clinic affected attendance negatively. The need for a well established infrastructure, the cost, and the fear that it might leave families dependent on the food are major constraints to its wide spread implementation. Nevertheless it may be effectively utilized in areas where supplementary food distribution is necessary for other reasons (19,33).

Khanom and Salahaddin in an educational intervention study, found that knowledge of mothers about EPI diseases was good immediately after education and their awareness of the immunization schedule was raised, although less impressive compared to changes

observed in knowledge about the disease(16,35,36).

In this country among the major problems reported by the EPI division of the MOH, in 1990, high defaulter rate and missed opportunities are very important in terms of improving the national immunization coverage. Therefore, to overcome these problems the division has recommended the following : integration of EPI service with other PHC activities, to utilize every opportunity to immunize eligible children, to increase community involvement in EPI by reinforcing the ongoing social mobilization and through wide spread health education at every level, and to strengthen operational research in EPI to find practical solutions for the problems hindering the progress of EPI achievements in Ethiopia (2,12).

Because of the high economic demand and lack of facilities to implement the intervention methods used in other places we decided to test a relatively simple and inexpensive method to reduce the dropout rate in our situation. Therefore, a reminder sticker was chosen, which was given out to mothers at the time of the first DPT vaccination. Reminder stickers have been shown to be effective in modifying other health behaviours; particularly among people with external health locus of control(37,38).

OBJECTIVES OF THE STUDY

To determine whether reminder stickers are effective in reducing immunization dropout rates among children 6 weeks-23 months of age.

HYPOTHESIS

Children of families receiving a reminder sticker, when compared to those who do not, will show a significantly lower dropout rate.

METHODS

STUDY DESIGN

An experimental field trial to test the effectiveness of a reminder sticker in reducing immunization dropout rates was conducted in Addis Ababa between October 14, 1991 and February 1,1992.

POPULATION

Source Population

All children coming for immunization against the six childhood diseases targeted in EPI at four static vaccination centers, which provide daily immunization service, in Lideta and Nefas-Silk districts, Addis Ababa.

Study Population

All children between 6 weeks and 23 months of age who received their first DPT dose were included in the study. A total of 703 children were enrolled in the seven weeks recruitment period. Children were assigned into sticker or no sticker(control) group according to a randomly prepared time- table. In the time-table, intervention days and non-intervention days were selected randomly using micro-computer generated random numbers. A separate time

table was prepared for each vaccination centre using the same procedure. The study was conducted in four static vaccination centers in Lideta and Nefas-Silk districts, in the southern part of Addis Ababa, Ethiopia.

Exclusion Criteria : Children coming from areas which do not border Lideta or Nefas-silk districts were excluded from the study.

A historical cohort of 508 children who received the first dose of DPT in the study area in the month of July, 1991 were followed for 8 weeks from the registration book using the same criteria to determine the dropout rate from DPT_1 to DPT_2. This historical control was chosen because the short time available for the conduct of this trial did not allow us to get the required sample size for the third control group, a group with neither sticker nor interview.

To determine the actual application of the sticker at home 35% of children in the intervention group were selected randomly to be visited eight weeks after receiving the first DPT dose.

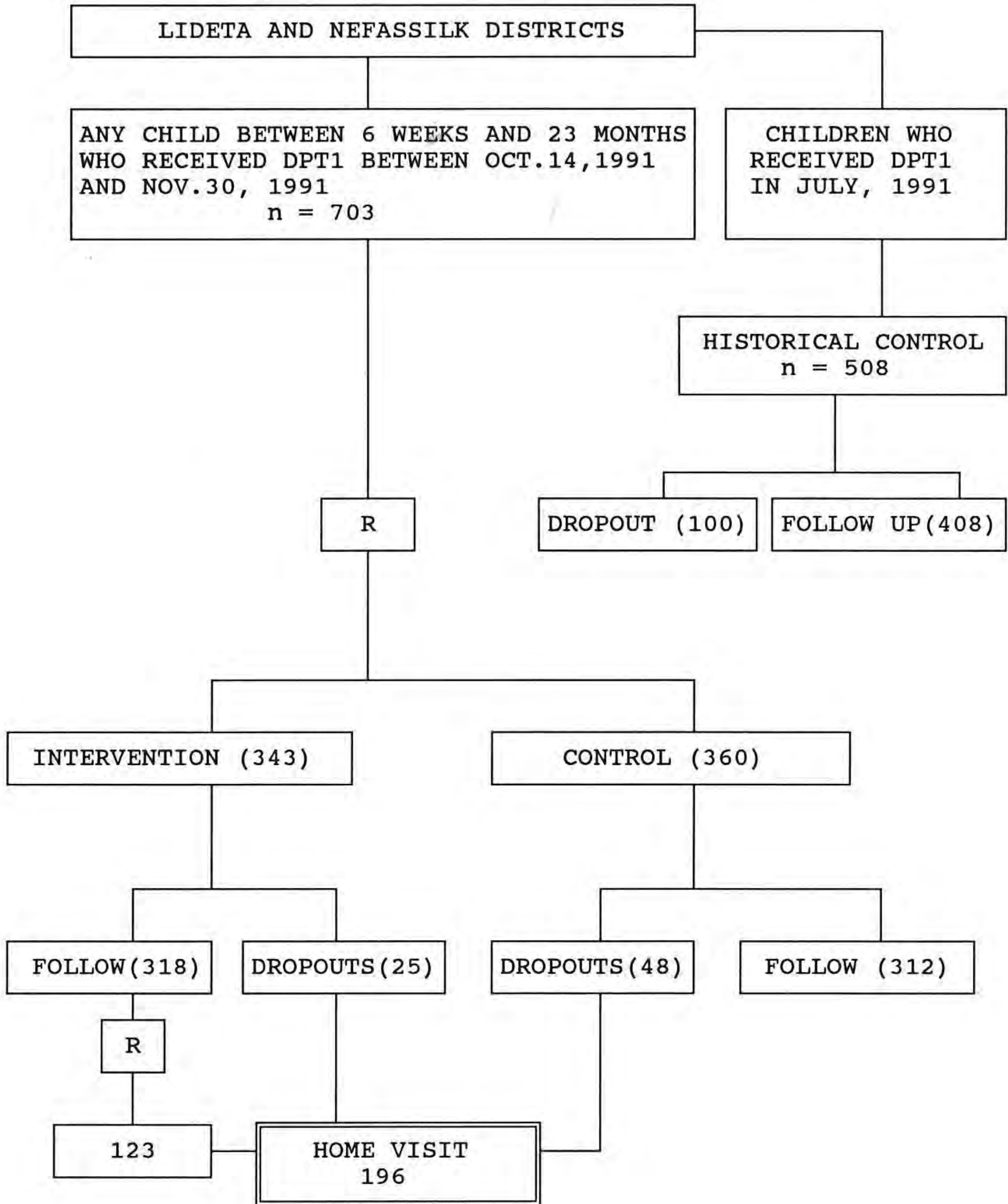


Figure 1 Study architecture and enrolment.

Sample Size Calculation

The sample size calculation was based on the detection of difference in dropout rate between the intervention and control groups of 10%, with a power of 80% and 95% certainty.

Alpha = .05 Beta = .2

$(Z\ alpha/2 + Z\ beta)^2 = 7.849$

overall dropout rate (p) = .3

Ratio exposed to non exposed (r) = 1:1

Expected difference between the 2 groups = .1

$$n = \frac{(Z\ alpha/2 + Z\ beta)^2\ p\ (1-p)\ (r+1)}{(d^*)^2\ r}$$

$$= \frac{(7.849)\ (.3)\ (.7)\ 2}{(.1)^2}$$

$$= 330$$

Total sample size = 330 x 2

= 660 + 10% contingency

= 726 children between 6 weeks and 23 months.

INTERVENTION

The intervention was provision of a reminder sticker to the mothers whose child received DPT1. The sticker was circular with a picture of a child receiving vaccination and an appointment date on it, with the name of the month written in words(Appendix 7). The mothers were instructed to apply the sticker on the inside of their home front door.

The sticker was designed with the help of the Health Learning Material (HLM) production section, Ministry of Health and pretested with a group of mothers who viewed the design and chose the color.

Both groups received health education including the information that repeated doses of vaccine were necessary. The health education took approximately 10 minutes for both intervention and control group. Explanation of the uses of the sticker took additional one minute in the intervention group only.

MEASUREMENT

Variables :

exposure : sticker application .

outcome : dropout rate .

DEFINITION

Dropout : child who does not come for the next immunization within four weeks after the actual scheduled date.

Criteria to measure attitude:

Mothers were asked to give any comment they might have about the sticker. Those who made comments such as they liked it, or found it useful to remind them of the follow up appointment were classified as having positive attitude. Those who said it wasn't useful for reminding mothers were classified as having negative attitude. Those who did not comment or said I don't know were classified as indifferent.

DATA COLLECTION

An initial interview, using a closed ended questionnaire, was completed at the vaccination centres. At that time baseline demographic, social, maternal, and health data potentially relevant to successful immunization were collected.

All children who entered the study were registered in a separate book, in addition to the routine registration, and were followed for eight weeks to differentiate dropouts from non-dropouts. Both groups were registered on the same book so that interviewers were not aware which group a child belongs to during the determination of child immunization status after eight weeks. Dropouts from both groups were identified and visited at their home to inquire about the reason for not following up. Those found vaccinated during home visit were included in the follow up group in the analysis. Reasons for dropout in both groups were obtained during the home visit using a standard questionnaire.

The actual application of the sticker in the home was verified by visiting randomly selected intervention group homes, after the

child's follow up status has been determined.

Both questionnaires were initially prepared in English and then translated into Amharic with back translation (appendices 1- 4). All personnel involved in the study were trained for two days. Students who completed 12th grade were recruited to be interviewers. All interviewers used a standard questionnaire. The principal investigator closely supervised the overall research activity at each vaccination centre.

DATA ANALYSIS

Data was entered into EPI INFO 5 version statistical computer programme for analysis. Distribution frequencies for all independent/predictor variables were computed. Baseline characteristics of subjects in the two groups were compared to assess the quality of the randomization. Dropout rates in the two groups were calculated and compared using a chi-square and t-tests.

EPI INFO 5 and SAS-PC statistical computer programmes were used to analyze the data.

RESULTS

A total of 703 children were entered and all were followed over the eight week study duration. Random assignment resulted in three hundred sixty (51.2%) children in the control group and three hundred forty three (48.8%) in the intervention group.

The majority of the children lived in the study districts and most of them are children under one year. Most of the children's mothers were married, housewives and Christians. Only a small proportion of mothers were totally illiterate. About 67% of mothers had had three or more antenatal care visits and about 50% had received two doses of tetanus vaccination during their last pregnancy. No significant difference was observed between the intervention and control subjects in any of the measured baseline variables. Tables 1 and 2 summarize the baseline finding by study group.

Table 1 Basic characteristics of the study population

Variable	Category	Control	Intervention
Residency	Within study districts	290(80.6%)	275(80.2%)
	Neighboring districts	70(19.4%)	68(19.8%)
Age of child (in weeks)	Median Mean(S.D)	7 9.2(6.3)	7 8.9(5.4)
Sex of child	Male	183(50.8%)	178(51.9%)
	Female	177(49.2%)	165(48.1%)
Marital status	Never married	37(10.3%)	34(9.9%)
	Married	315(87.5%)	300(87.5%)
	Others	8(2.2%)	9(2.6%)
Mother education	Illiterate	38(10.9%)	48(14.2%)
	Read & Write up to grade 2	47(13.4%)	35(10.4%)
	Grade 3-8	150(42.9%)	149(44.2%)
	Grade 9 & above	115(32.9%)	105(31.2%)
Occupation	Housewife	273(76.0%)	270(78.7%)
	Job outside the home	86(24.0%)	73(22.2%)
Family monthly income	0 - 100 Birr	123(34.6%)	111(32.5%)
	101-400 Birr	175(49.2%)	168(49.0%)
	401 & above	58(16.3%)	64(18.7%)

Table 1 (cont.)

Variable	Category	Control	Intervention
Religion	Christian	329(91.4%)	313(91.3%)
	Muslim	30(8.3%)	29(8.5%)
	Others	1(0.3%)	1(0.3%)
ANC visits	None	65(18.1%)	61(17.8%)
	1 or 2	49(13.6%)	50(14.6%)
	3 +	246(68.3%)	232(67.6%)
TT vaccination	None	101(28.1%)	89(25.9%)
	One	52(14.4%)	50(14.6%)
	Two	183(50.8%)	184(53.6%)
	Don't know	24(6.7%)	20(5.8%)
Delivery place	Home	114(31.8%)	110(32.3%)
	Health units	245(68.2%)	232(67.8%)
Time taken to reach vaccination site (one way)	< 15 min	61(16.9%)	58(16.9%)
	15-30 min	92(25.6%)	99(28.9%)
	> 30 min	207(57.5%)	186(54.2%)

No statistically significant differences was observed in any of the variables between the control and intervention groups.

Table 2 Knowledge About EPI at enrolment.

Variable	Category	Control	Intervention
Vaccination days at the near by health unit	don't know	317(88.1)	303(88.3)
	Yes,specific days mentioned	21 (5.8)	14 (4.1)
	yes, daily	22 (6.1)	26 (7.6)
Believe EPI diseases are dangerous	No	227(63.1)	229(66.8)
	Yes	123(34.2)	101(29.4)
	Don't know	10 (2.8)	13 (3.8)
Number of EPI diseases known by the mother	None	107(29.7)	111(32.4)
	1-2	117(32.5)	114(32.2)
	> 2	136(37.8)	118(34.4)
Sessions needed for full immunization	one	2 (0.6)	1 (0.3)
	Repeated	149(41.4)	150(43.7)
	Five	122(33.9)	100(29.2)
	Don't know	87(24.2)	92(26.8)
Do vaccines make child sick	Yes	4 (1.1)	2 (0.6)
	No	351(97.5)	336(98.0)
	Don't know	5 (1.4)	5 (1.5)
Do you bring sick a child for immunization	No	217(60.3)	185(53.9)
	Yes	121(33.6)	138(40.2)
	Don't know	22 (6.1)	20 (5.8)

No statistically significant difference observed in any of the variables between the control and the intervention groups.

DROPOUT RATE

There was a significant difference ($p < .01$) in the dropout rate between the intervention group , 7.3%, and the control group, 13.3% . The sticker was effective in reducing by one-half the immunization dropout rate in this study. These results are presented in table 3.

The results show an exceptionally low rate of dropout, even for the control group. It was thought that this might be due to both groups having been interviewed and given health education. Therefore, they were also compared to the historical cohort of children followed from July to September, 1991. The comparison between the study control and the historical cohort showed that there may well have been a "Hawthorne" effect. The results are presented in table 4.

Table 3 Comparison of dropouts occurring in controls and intervention groups.

Study group	Dropout		Relative		
	Yes	No	Risk	95% CI	p-value *
study control	48	312			
Intervention	25	318	0.55	0.35,0.87	.01

* Chi-square

Table 4 Vaccination status of children in the study control and in the historical cohort.

Study group	Vaccination status		RR	95% CI	p
	drop out	follow up			
Historical cohort	100	408			
Study control	48	312	0.68	(0.49,0.93)	.01

COMPLIANCE

In general there was very low non-compliance. Only 7 (4.7%) of the 148 intervention subjects who received a home visit did not apply the sticker. Of those who did not apply the sticker, 2(30%) were dropouts, but this was not statistically significant. It is to be noted that only 2 mothers gave no reason for not applying the sticker at home. The rest did not apply the sticker either because they were living in a shared house or they were expecting soon to move from the house they were living. The home visit findings are seen in tables 5 & 6.

ATTITUDE TOWARDS THE STICKER

Most (89.2%) of the mothers who received the sticker had a positive attitude towards it. About 10.1% of them were indifferent and only 0.7% had a negative attitude. This clearly indicate that the sticker received very high acceptance by the mothers. Table 5 presents the attitude of the mothers towards the sticker.

REASON FOR DEFAULTING

Reason for defaulting was identified by visiting the homes of all children who failed to come for the next immunization schedule within 8 weeks after the first dose. The major reasons were child sickness and unawareness of the time for the next dose. The finding revealed that none of the mothers in the intervention group were unaware of the need for the next dose as opposed to 11 of the mothers in the control group who said they were unaware. Table 7 presents the reasons for defaulting.

Table 5 Sticker Application at Home and Mothers Attitude Towards the Sticker.

	Attitude			
Sticker Applied	positive	negative	indifferent	Total
No	3	1	3	7 (4.7%)
Yes, past	57	0	5	62 (41.9%)
Yes, present	72	0	7	79 (53.4%)
Total	132 (89.2%)	1 (0.7%)	15 (10.1%)	148 (100.0%)

Table 6 Vaccination status of children in relation to sticker application.

Sticker applied	Vaccination status		p-value
	dropout	follow up	
Yes	23	118	
No	2	5	NS
Total	25	123	

Table 7 Reasons for defaulting from the immunization schedule.

Reason	Intervention	control	Total	p*
Unaware about the need for next dose	0	11	11(15.1%)	.01
Child illness	10	23	33(45.2%)	ns
Vaccination time inconvenient	3	1	4(5.5%)	ns
Vaccination site too far	0	4	4(5.5%)	ns
Lost vaccination card	4	2	6(8.2%)	ns
Others	7	5	12(16.4%)	ns
could not be traced	1	2	3(4.1%)	ns
Total	25	48	73(100.0%)	

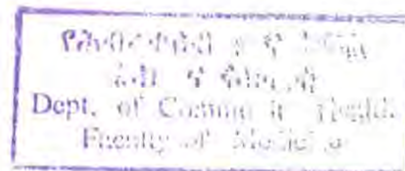
* Fisher exact test, 2-tailed

DISCUSSION

This study demonstrated that stickers were effective in reducing immunization dropout rate.

The results of the study are assumed to be internally valid since the study population had an equal chance to be assigned in either group. Both groups were informed about the need for repeated vaccination, and accessibility to vaccination centers were comparable. Bias was minimized by random allocation of children to either group. The observed characteristics of the two groups showed no significant differences, confirming that the randomization worked effectively.

The study population overall had a low dropout rate, the dropout rate being 7.3% in the intervention group and 13.3% in the control group. The dropout rate in the historical control was 19.7% . The relatively low dropout rates could be due to the fact that both study groups were interviewed and both were provided with similar information. Therefore, the interview and the health education done by the interviewers appeared to have had an impact on the vaccination status of the child. Emphasis was given to all subjects to provide adequate information about the need for repeated doses of vaccines, because lack of adequate information was repeatedly cited as the major reason for not being fully immunizing. This indicates that we should pay more attention to improving the communication methods in order to promote parents' awareness about the importance of completing the immunization schedule.



In Ethiopia many health beliefs have been observed to be at the external end of the Health Locus Control(HLC) scale. These people hold expectancies for events as mainly due to chance or forces more powerful than them. Studies have shown that better change in health behavior could be achieved by providing information/educational message which fit the HLC belief of the people(37). It is also shown that reminders have a significant effect in changing health behaviors, particularly in people with high external HLC, mainly by facilitating knowledge accessibility(38). The results of this study are consistent with this interpretation. The group who initially received a message to bring their child for repeat immunization and later received a reminder sticker had a lower dropout rate.

The distribution of the reasons given for defaulting in the two groups were different. The most striking finding is that none of the mothers in the intervention group had given unawareness of the time for the next dose as a reason for their child's defaulting status. This is believed to be mainly due to the sticker, since there were no significant differences observed in the baseline characteristics of the two groups and otherwise similar interventions. Therefore , it is concluded the sticker was effective in its intended purpose; to remind mothers that their children need a repeat dose at a specific time.

Longer intervals between doses is believed to result in a better immune response. But for children in the developing world the problem with waiting for a long time for a subsequent dose is

that children in these areas tend to contract the disease at a very young age, when serious complications are most likely to occur. So the national EPI programme recommended that the first doses of DPT and polio be given at 6 weeks of age and subsequent doses at 4 week intervals in order to protect children early in their lives (1,4,7,11). In this study we used an eight week interval between doses to differentiate the dropouts from the follow ups, allowing an extra 4 weeks between doses for the children to comply with the schedule.

This study was done in the capital city where there exist some favorable situations to follow the immunization schedule. That is, in relative terms, the majority of the population has easy access to the health services. There are 1 to 3 static vaccination centers in every district. The general education level of the population is high in the city, which is assumed to have a positive impact on the follow up of the immunization programme by mothers. For these reasons, in general, the dropout rates are low in the city. This observation is consistent with other studies here and elsewhere (13,29,39,40).

We used 500 stickers for the purpose of this study, and the cost of the sticker was 2.50 Birr (1.2 US dollar) each. This cost can be reduced to 0.20 Birr (0.10 Us dollar) each if ordered in bulk. So, if the sticker gets accepted and is ordered in bulk, the cost added to the immunization programme can be justified in view of its contribution.

Reliability of the data was maintained by prior training of supervisors and interviewers, by using a standard, pretested questionnaire, and by regular supervision.

The results of this study are generalizable to urban areas where there are easily accessible vaccination centres which provide daily immunization services. Accessibility and educational level limit generalizability to the rural areas.

We have followed the children in our study very closely to monitor that procedures are followed strictly. This was important for us to demonstrate the real effectiveness of the sticker in reducing the dropout rate in a well controlled situation, that is to show the efficacy of the sticker. But in actual practice the procedures followed in this study may not be easy to implement, because interviewing mothers and providing information on an individual basis is time consuming. The interview, health education and the provision of the sticker with explanation of its application on average took 10 to 15 minutes. Therefore, an effectiveness study should be done using the sticker as part of the routine immunization services.

This study did not compare the sticker with other potentially effective interventions to reduce dropout rates. This is necessary to know the relative cost-effectiveness of the sticker.

Another limitation to this study is that we studied dropout rates only from DPT_1 to DPT_2. Therefore, further follow up study is recommended. Although the factors for dropouts are likely to be similar for other points in the immunization schedule, it would be useful to verify this by having the sticker used at all points requiring a repeat visit.

CONCLUSION

The study was intended to find a solution for a long standing barrier to improve immunization coverage, dropouts from the schedule. A reminder sticker was tested for its effectiveness in reducing the dropout rate from the immunization schedule in this study. A statistically and clinically significant difference was observed in the dropout rate between the control group and intervention group. Therefore, the sticker was proved to be highly effective in reducing the dropout rate from the immunization schedule. Provision of adequate information about the immunization schedule to the mothers may also have had an influence on the dropout rate.

RECOMMENDATIONS

Further studies should be carried out under normal operational conditions and in other parts of the country before recommending the use of the reminder sticker in the national immunization programme.

The sticker should be compared to other methods thought to be effective in reducing immunization dropout rate in other places.

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APPENDIX 1

QUESTIONNAIRE

Instruction : obtain all the information in this questionnaire from the child's mother or guardian.

Child name :______________________________________

Mother name:______________________________________

Address :Kefitgna____ Kebele_____ House no._____

Please fill all of the following information

Date ____/_____/______

Interviewer _______________ __________________

1. Subject No. ____ ____ ____ [ ] [ ] [ ]

2. Sticker 1= no ___ 2= yes _____ [ ]

3. child birth date ____/____/____ day/month/year [ ] [ ] [ ]

4. child sex 1= male ___ 2=female ____ [ ]

5. No. of child's older siblings ____ ____ [ ] [ ]

6. Mother's age ____ ___ [ ] [ ]

7. Mother 's marital status

 1=never married___ 2=married___ 3=separated ____
 4=divorce____ 5=widow______ [ ]

8. Mother educational level
 1= illiterate____
 2= read & write and upto grade 2_____
 3= Grade 3-8____
 4= Grade 9 and above______ [ ]

9.No. of ever born children by the mother __ ___

10.No. of alive children ___ ___

11. What is your occupation ?

1= housewife _____ 2=gainful job ______

12. What is your family monthly income ?

1=less than 50 ___ 4=401 - 500 ____
2=50 - 100 ___ 5=500+ ____
3=101 - 400 ___

13. What is your religion ?

1=Muslim ___ 3=other Christian __
2=Orthodox Christian ____ 4=others _____

14. Have you attended antenatal care during your last pregnancy ?

0= no ___ yes ____
if yes, how many times did you attend ?
1= less than 3 times ____
2= 3 or more times ____

15. Have you received tetanus vaccination during your last pregnancy ?

0= no ____ yes ____ 17= don't know
if yes, how many injections did you received?
1= one ____ 2= two _____

16. Where did you deliver your last baby ?

1= home ______
2= health institution _____

17. Do you know the days of vaccination service in the health institution in your area ?

0= no _____
1= yes,specify days ___________________
2= yes,daily ___

18. How long did it take you to arrive here ?

    0=less than 15 min. ___
    1=15-30 min. ___
    2=+30 min. ___

19. Do you think that EPI diseases are dangerous or kill ?

    0=no ___ 1=yes ___ 17=don't know ___

20. What vaccine preventable diseases do you know ?

    0= no_____ 1=1-2 diseases____ 2=+2 diseases____

21. How many vaccination sessions are needed for a child to be fully protected ?

    0=one ____
    1=repeated ____
    2=five ____
    17=don't know _____

22. Do you think vaccination will make your child sick ?

    0= yes ___ 1= no ____ 17= don't know ____

23. Do you bring a sick child for vaccination ?

    0= no ____ 1= yes _______

APPENDIX 2

QUESTIONNAIRE FOR DROPOUT

DATE ____________

Instruction :

- Explain to the mother the importance of filling this questionnaire.
- If the reason given is one from the list just put a mark (X).
- If the reason given is outside of the list write it in front of others.
- encourage the mother to take the child for repeat immunization.

1. Did you know your child was supposed to go back to the clinic to get another shot ?

   0= no _____ yes ______
   if yes, did you take the child ?

   1= no ____ 2= yes _____
   if yes, is it filled in card ?(see the card)
   3= yes _____ no __________

2. If no , Why did you miss the last immunization appointment ?

   1=child sick _________

   2=Lack of information about repeat vaccination _______

   3=Vaccination time inconvenience _______

   4=Vaccination site too far _________

   5=Fear of immunization side effects _______

   6=Child already had the vaccine preventable disease ______
   specify the disease _______________________________

   7=Lost the child vaccination card ___________

   8=Last session received poor service :
   1=waited too long ___________
   2=vaccinators unsympathetic _______
   3=other ____________________________

   9=Others _______________________________
   ____

3. Do you have plan to continue with immunization ?

   0=no ____ 1= yes ______

4. Did you get sticker from the health unit ?

   1= no ________ 2= yes _____

If yes continue the following questions.

5. Did you applied the sticker ?

   0= no _______ yes _______
   if yes
   1= applied in the past ______
   2= still applied ______

6. Where did you applied the sticker ?

   1= on the front door _______
   2= other place (specify) _______

7. Any comment about the sticker (write it in the space provided)
   ____
   ____

NDIX 3

AMHARIC QUESTIONNAIRE
(IN

የህፃናት ክትባትን አስመልክቶ የተዘጋጀ መጠይቅ 1

የህፃኑ/ኗ ስም : ________________________________

የእናት ወይም የአሳዳጊ ስም : ________________________

አድራሻ : ከፍተኛ ____ ቀበሌ _____ የቤት ቁጥር __________

መመሪያ : በዚህ መጠይቅ ላይ ያሉትን መረጃዎች በሙሉ ህፃኑን/ኗን እናት ወይም አሳዳጊ በመጠየቅ ብቻ መሞላት አለበት::

: የሚሰጡት መረጃዎች በሙሉ በከፍተኛ ጥንቃቄና በሚስጥር እንደሚጠበቅ ገለፀ::

ቀን ___/___/___ ኮድ ቁጥር ______

1. የተጠያቂ ቁጥር ___ ___ ___ [ ] [ ] [ ]
2. ተለጣፊ ማስታወሻ ተሰጥቶአል?
   1. አልተሰጠም ___ 2. ተሰጥቶአል ___ [ ]
3. ህፃኑ የተወለደው መቼ ነው? ___ቀን ___ወር ዓመት [ ] [ ] [ ]
4. የህፃኑ ፆታ ምንድነው?
   1. ወንድ ____ 2. ሴት ____ [ ]
5. ከህፃኑ በላይ ስንት ልጆች አሉ? ___ ___ [ ] [ ]

ከዚህ ቀጥሎ ያሉት ጥያቄዎች እናትን የሚመለከቱ ናቸው::

6. ዕድሜዎ ስንት ነው? ___

7. የጋብቻዎ ሁኔታ እንዴት ነው.
   1. ያላገባ ___ 4. ፈት ___
   2. ያገባ ___ 5. ባል የሞተበት ___
   3. ተለያይተው የሚኖሩ ___

8. የትምህርት ደረጃ
   1. መሀይም ___
   2. ማንበብና መፃፍ እና ሁለተኛ ክፍል የጨረሰ ___
   3. ከ3–8ኛ ክፍል የጨረሰ ___
   4. ከ8ኛ ክፍል በላይ የጨረሰ ___

9. በአጠቃላይ ስንት ልጆች ወልደዋል? ___ ___

10. አሁን በህይወት ያሉ ስንት ልጆች አልዎት? ___ ___

11. ሥራዎ ምንድነው?
   1. የቤት እመቤት ___ 2. ገቢ ያለው ሥራ ___

12. የቤተሰብ አጠቃላይ የወር [illegible] ነው?
   1. ከ50 ብር በታች ___ [illegible]01–500 ብር ___
   2. ከ50–100 ብር ___ 5. [illegible]500 ብር በላይ ___
   3. ከ101–400 ብር ___

13. ሃይማኖትዎ ምንድነው?
   1. እስላም ___ 3. ሌላ ክርስቲያን ___
   2. ኦርቶዶክስ ክርስቲያን ___ 4. ሌሎች ___

14. በመጨረሻ እርግዝናዎ ጊዜ የነፍሰ ጡር ህክምና ክትትል ያደርጉ ነበር?

0. አላደረግም ____ አዎ ____

አዎ ከሆነ፣ ለስንት ጊዜ ታይተዋል/ተከታትለዋል?

1. ከሦስት ጊዜ በታች ____

2. ሦስት ጊዜ ወይም ከዚያ በላይ ____

15. በመጨረሻ እርግዝናዎ የመንጋ[illegible] ክትባት ተከትበው ነበር?

0. አልተከተብኩም ____ አዎ ____ 17. አላውቅም ____

አዎ ከሆነ፣ ስንት ጊዜ ተከተቡ?

1. አንድ ጊዜ ____ ሁለት ጊዜ ____

16. የመጨረሻ ልጅዎን የት ነው ወለዱት?

1. ቤት ____ 2. በጤና ድርጅት ____

17. በአካባቢዎ በሚገኘው የጤና ድርጅት ክትባት መቼ መቼ እንደሚሰጥ ያውቃሉ?

0. አላውቅም

1. አዎ: ቀኖቹን ይገልፁ ____

2. አዎ: በየቀኑ ይሰጣል ____

18. ወደ እዚህ ክትባት ጣቢያ ሲመጡ ምን ያህል ጊዜ ወሰደብዎት/ፈጀብዎት?

0. ከ15 ደቂቃ በታች ____ 2. ከ30 ደቂቃ በላይ ____

1. ከ15-30 ደቂቃ ____

19. ክትባት የሚሰጥባቸው በሽታዎች ለልጅ በጣም አደገኛ ናቸው ወይም ሊገድሉ ይችላሉ ብለው ያ[illegible]

0. አይደለም ____ 1. አዎ ____ 17. አላውቅም ____

20. በክትባት መከላከል የሚ[illegible] በሽታዎች የሚያውቋቸውን ቢገልፁልን?

0. ምንም አላውቅም

1. አንድ ወይም ሁለት በሽታዎች ____

2. ሦስትና ከሦስት በላይ ____

21. ልጅዎ በክትባት መከላከል በምንችላቸው በሽታዎች እንዳይያዝ ስንት ክትባት የሚያስፈልገው ይመስልዎታል?

0. አንድ ____ 2. አምስት ____

1. ተደጋጋሚ ____ 17. አላውቅም ____

22. ክትባት ልጅዎ ላይ በሽታ የሚያመጣ ይመስልዎታል?

0. አዎ ____ 17. አላውቅም ____

1. አይደለም ____

23. የታመመ ህፃን ለክትባ[illegible]

0. አይደለም ____

1. አዎ ____

17. አላውቅም ____

/ላደረጉልን ትብብር በጣም እናመሰግናለን /

መጠይቁን የሞላው ስም ______________

PPENDIX 4

AMHARIC QUESTIONNAIRE
(FOR DROPOUTS)

የህፃናት ክትባትን አስመልክቶ የተዘጋጀ መጠይቅ 2
/ክትባታቸውን ላልተከታተሉ ብቻ/

ቀን ___/___/___

የህፃኑ ስም ________________ ________________

የእናቱ ስም ________________ ________________

አድራሻ : ከፍተኛ ______ ቀበሌ ______ የቤት ቁጥር ____________

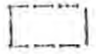
መመሪያ :

- የመጠይቅን መሞላት አስፈላጊነት ለእናቶች በቂ መግለጫ ስጥ ::
- ድጋሚ ያልተከተቡ ህፃናትን እናቶች ልጆቻቸውን ለድጋሚ ክትባት ወደ ጤና ድርጅት እንዲወስዱ ምክር ስጥ ::

1. ልጅዎ ለተጠማሪ ክትባት ወደ ጤና ድርጅቱ መመለስ እንዳለበት ያውቁ ነበር?

   0. አላውቅም ____ አዎ ____

   አዎ ካሉ : ህፃኑን ለክ. ት ወስደውት ነበር?

   1. አልወሰድኩትም ____ 2. አዎ ____ 

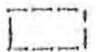
   አዎ ካሉ : የክትባት ካርዱ ቷል? /ካርዱን አይ/

   3. አዎ ____ አልተሞላም ____

   የተከተበበት ቦታ ______

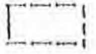
2. ድጋሚ አልተከተበም ካሉ፣ ለምን የክትባት ቀጠሮውን አሳለፉ?

1. ህፃኑ/ኗ ታሞ/ማ ______
2. ድጋሚ ክትባት ማስፈለጉን ስለአላወቅሁ ______
3. የክትባት የሚሰጥበት ጊዜ አመቺ ስላልሆነ ______
4. የክትባት ቦታው ሩቅ ስለሆነ ______
5. የክትባቱን የጎን ጠንቅ በመፍራት/ክትባቱ ልጁን ስለአሳመመው/ ______
6. በሽታው ልጁን ስለያዘው ክትባቱ አይጠቅምም ብዬ ______
   ምን በሽታ እንደያዘው ይገለፁ ______
7. የክትባት ካርዱ ስለጠ[illegible] ______
8. ባለፈው የክትባት ጊ[illegible]ቱ ስለአበሳጠኝ ______
   1. በጣም ረጅም ጊዜ ስለጠበኩኝ ______
   2. የሚከትቡት ባለሞያዎች ስለአመናጨቁኝ ______
   3. ሌላ ምክንያት ______
9. ሌሎች ምክንያቶች ______



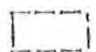
3. ወደፊት የልጅዎን ክትባት ለመቀ[illegible] ሀሳብ አለዎት?

0. አልቀጥልም ______ 1. አዎ ______



4. ልጅዎን ካስከተቡበት ጤና ድርጅት የሚሰጥ ማስታወሻ አግኝተው ነበር?

1. አላገኘሁም ______ 2. አዎ ______



የሚለጠፍ ማስታወቂ ያ[illegible] የሚከተሉትን ጥያቄዎች ጠይቅ

5. የተሰጥዎት ማስታወቂ ለጥፈውት ነበር?

0. አለጠፍኩትም ______ አዎ ______

አዎ ካሉ

1. ቀደም ብለው ነው የለጠፉት __________

2. አሁንም ለጥፈዋል /እራስዎም አዩ/ ______

6. ተለጣፊው ማስታወቂ የለጠፉት የት ነው?

1. ወደ ቤት መግቢያ በር ላይ __________

2. ሌላ ቦታ /ቦታውን ግለፁ/ __________

7. ስለ ተለጣፊው ማስታወቂ የሚሰጡን አስተያየት ካለ ቢገልፁልን።

____

____

____

/ስላደረጉልን ትብብር በጣም እና[illegible]ን/

መጠይቁን የሞላው ስም ______________

APPENDIX 5

RANDOMIZED OVERALL RESEARCH TIME TABLE

S. No.	Date	Kef.23	Kef.18	Lideta	Kef.19
1.	14/10/91	0	0	1	1
2.	15/10/91	0	1	1	1
3	16/10/91	1	1	1	0
4	17/10/91	1	0	1	0
5	18/10/91	1	1	0	1
6	19/10/91	0	0	1	1
7	21/10/91	0	0	1	0
8	22/10/91	0	0	1	1
9	23/10/91	1	0	0	0
10	24/10/91	1	1	0	0
11	25/10/91	0	0	0	1
12	26/10/91	0	1	1	0
13	28/10/91	0	1	1	1
14	29/10/91	0	0	0	1
15	30/10/91	0	0	1	1
16	31/10/91	1	1	0	1
17	1/11/91	1	1	0	0
18	2/11/91	1	0	0	1

NOTE :

0 = NO STICKER

1 = GIVE STICKER

Continued

S.No.	Date	Kef.23	Kef.18	Lideta	Kef.19
19	4/11/91	1	1	1	1
20	5/11/91	1	0	0	0
21	6/11/91	1	0	0	0
22	7/11/91	1	0	0	0
23	8/11/91	0	1	1	0
24	9/11/91	1	1	0	0
25	11/11/91	1	1	1	1
26	12/11/91	0	1	0	1
27	13/11/91	1	0	1	1
28	14/11/91	0	0	0	0
29	15/11/91	0	1	0	0
30	16/11/91	1	1	1	1
31	18/11/91	1	0	0	1
32	19/11/91	1	1	0	0
33	20/11/91	0	1	1	0
34	21/11/91	0	0	1	1
35	22/11/91	0	0	0	0
36	23/11/91	0	1	1	0

NOTE :

0 = NO STICKER

1 = GIVE STICKER

Continued

S.No.	Date	Kef.23	Kef.18	Lideta	Kef.19
37	25/11/91	1	0	1	1
38	26/11/91	0	1	0	0
39	27/11/91	1	0	1	0
40	28/11/91	0	1	0	0
41	29/11/91	0	0	1	1
42	30/11/91	1	1	0	1

KEY

Kef. 23 = Kefitegna 23 Health Centre
Kef. 18 = Kefitegna 18 Health Centre
Lideta = Lideta Clinic
Kef. 19 = Kefitegna 19 Health Centre

APPENDIX 6

RESEARCH WEEKLY TIME TABLE

HEALTH INSTITUTE : ____________________

WEEK ____________________

DATE __________ **to** __________

INSTRUCTION :-

- GIVE STICKERS ONLY ON THE DAY MARKED WITH (X).

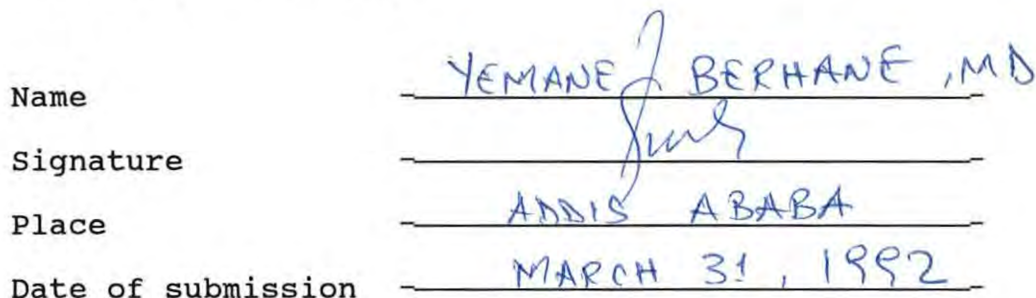
DAY	STICKER	DPT1	DPT2
Monday			
Tuesday			
wednesday			
Thursday			
Friday			
Saturday			

PENDIX 7

THE STICKER

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in this or any other university and that all sources of materials used for this thesis have been duly acknowledged.



This thesis has been submitted for examination with my approval as the university advisor.