Explorative assessment of factors affecting child immunization in Wonago district, Gedeo zone, South Ethiopia

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Abstract

Introduction: Immunization provides protection from infectious diseases, including some potentially life threatening diseases such as measles, whooping cough, and tetanus. However, factors affecting child immunization were not well studied in Ethiopia. The objective of this study was to explore factors associated with child immunization in Wonago district, South Ethiopia.

Material and methods: A cross-sectional qualitative study employed both focus group discussions and in-depth interviews using focus group discussion and in-depth interview guides. A total of 6 focus group discussions and 22 in-depth interviews were carried out with community representatives in Wonago district. Thematic analysis of transcripts of focus group discussions and in-depth interviews was made and the data were transcribed verbatim. Also, overall interpretation was performed by relating thematic areas to each another and explaining how the various concepts related to the study questions.

Result: Most of the in-depth interviewees and focus group discussants were knowledgeable regarding vaccines and vaccination. However, a few of the mothers and traditional healers do not know about vaccines, its benefits and side effects. Some of the focus group discussants explained that fear of side effects of vaccines could prevent mothers from having their children vaccinated. Most of the interviewees of in-depth interviews and focus group discussants raised different obstacles to vaccination in children. Of these, lack of awareness about immunization, misunderstanding of side effects, absence of electricity in the presence of refrigerators, few immunization sites on an outreach basis, misunderstanding of health extension services (more preventive services though the community demand is curative) and seasonal events especially during the time of coffee collection.

Conclusions: In summary, the results of this study demonstrated that knowledge regarding vaccination, its benefits and side effects and help of health professionals at immunization sites are closely related to child vaccination behaviours in women or immediate care takers in rural districts of Ethiopia. All of these factors should be considered fully when developing strategies for child vaccination.

Key words: immunization, Wonago district, Gedeo zone, explorative assessment, qualitive design.

Introduction

The Expanded Programme on Immunization started in 1974 and widened the range of vaccines routinely provided, from smallpox, bacillus

Calmette-Guerin (BCG) and diphtheria, tetanus and pertussis (DTP) to include polio and measles. Since then immunization has saved the lives of millions of children in the three decades. It set out to increase coverage in line with the international commitment to achieving the universal child immunization goal of 80% coverage in every country. The 1980s did indeed see a huge increase in coverage. Thanks to sustained efforts to promote immunization, deaths from measles decreased by 39% between 1999 and 2003; compared to levels in 1980, measles mortality has declined by 80%. Efforts continue to increase coverage and widen the range of vaccines provided. The vaccination schedule is under constant revision as new vaccines become available, for example those against hepatitis B and *Haemophilus influenzae* type b, and, in the near future, rotavirus (diarrhoea) and pneumococcus (pneumonia) (Table I) [1].

Children are at the heart of the Millennium Development Goals, for they are the most vulnerable in society and their needs are often the greatest. Yet, for all the progress that has been made in our world of ingenuity and innovation, it is unconscionable that there are still 10.6 million children who die each year, mainly of preventable causes. However, few things yield greater benefits for the health, well being and survival of children than immunization [2]. Yet, every year, more than 2 million children die from diseases that could have been prevented by inexpensive vaccines [3].

Immunization provides protection from infectious diseases, including some potentially life-threatening diseases such as measles, whooping cough and tetanus, and crippling diseases such as poliomyelitis. Epidemiological investigations of recent outbreaks of vaccine-preventable diseases have indicated incomplete immunization as a major reason for the incidence of these diseases. Additionally, low immunization rates have been blamed for many of the epidemic outbreaks of infectious diseases in the past two decades [4].

Table I. The national recommended vaccination schedule of Ethiopia; for children in the age group less than 11 months

S. No	Vaccines	Schedule*
1	BCG	Immediately after birth
2	$Polio_0$	Immediately after birth
3	$Polio_1$/$Pentavalent_1$	6 weeks after birth
4	$Polio_2$/$Pentavalent_2$	10 weeks after birth
5	$Polio_3$/$Pentavalent_3$	14 weeks after birth
6	Measles	9 months

**Children have the chance to complete the schedule up to 23 months Source: Vaccination Service Extension package. Federal Democratic Republic of Ethiopia, Ministry of Health July 2003 Addis Ababa, Ethiopia*

Eastern/Southern Africa immunizes 71 per cent of its children against measles through routine services in 2004; coverage has increased at an average annual rate of 0.7% points between 1990 and 2003. A long distance remains if the goal of 90 per cent coverage is to be met. The average rate of increase will need to rise by 2.6% points each year until 2010 [2].

In 1980, the Ministry of Health of Ethiopia initiated the Expanded Program on Immunization (EPI), with the objective of reaching 90% coverage among children under one year of age by the year 1990. The vaccination schedule since then has been in accordance with that recommended by WHO for developing countries [5]. A cross-sectional study conducted in a rural district of the northern part of Ethiopia in 2000 has shown that the fully valid immunization coverage for age assessed by card plus history was 51%. And BCG to measles defaulter rate was 23.9% According to the national health survey of Ethiopia 2006, the total DPT3 and measles coverage was 38.5 and 37% respectively. Coverage residence setting, total coverage for urban DPT3 and measles was nearly half of the eligible age group (50.5%) and approximately two thirds (72%) respectively [6].

Studies have shown that five categories of maternal factors are associated with immunization use: competing priorities, low motivation, socio-economic constraints, perceived accessibility of services, fears about health or social consequences, and knowledge and folk beliefs related to vaccines [7-9].

Following the recommended immunization schedule not only makes children less susceptible to debilitating and fatal diseases, it also reduces health care costs. Studies have shown that the cost to treat a vaccine-preventable disease is 30 times more than the cost of the vaccine. On average, every $1 spent on vaccinations saves US $14 ± $25 in health care costs [10]. Hence, universal immunization of children against the eight vaccine-preventable diseases is crucial to reduce infant and child mortality. Identifying differences in vaccination coverage among subgroups of the population is useful for programme planning and targeting resources to areas most in need [2]. Additionally, information on immunization coverage is important for the monitoring and evaluation of the Expanded Programmes on Immunization (EPI).

Generally, the child immunization completion rate was lower (29.4%) in Gedeo zone and much lower (35.2%) in Wonago district in particular [11]. Nevertheless, there was no empirical evidence in the study area regarding child immunization.

The objective this study was to explore factors associated with child immunization in Wonago district. Therefore, this study explored pertinent factors of child immunization completion in Wonago district.

Material and methods

Study area

The study was conducted from February 15 to March 15, 2008 in Wonago district, Gedeo zone, Southern Nations, Nationalities and People's Regional State (SNNPR), Ethiopia. Wonago is one of the densely populated districts in Ethiopia (1050 people per sq. km). The district town Wonago is located 375 km southwest of Addis Ababa, and 105 km south of Hawassa (the capital of SNNPR state). According to the 1994 census, the estimated total population of the district in 2007 is 127,839 and the total number of households is 25,568. About four percent of the total population are children at the age of 12 to 23 months. The district has 18 kebeles (the smallest administrative units of the Ethiopian Governance system), one urban and 17 rural *kebeles*. The district has one health centre, one upgrading health centre and 15 health posts with a potential primary health care coverage of 72.2%. The 2000 child immunization annual plan of the district is 100% for BCG and 95% for pentavalent 3 [11].

The study design was qualitative cross-sectional methods employing both focus group discussions (FGDs) and in-depth interviews (IDIs). The study units were the representatives of the community comprising different community groups; such as mothers, traditional healers, kebele administrators, and health professionals.

Those mothers or immediate care takers with index children who have not completed the recommended child immunization schedule at the age between 9 and 23 months and permanent residents of the kebele were included in the study. Those mothers or immediate care takers with index children who were not permanent residents and those mothers or immediate care takers with index children who have never taken vaccines according to the recommended child immunization schedule were excluded from the study.

Sample size encompassed six FGDs; three with mothers or immediate caretakers whose children have not completed the immunization schedule and three with children in whom a complete immunization schedule was conducted. The FGDs were continued until the redundancy of information observed. An in-depth interview was carried out with key informants including eight kebele administrators, ten health professionals and eight traditional healers.

The kebeles in the district were stratified to urban and rural settings. One urban kebele, Wonago, and five rural kebeles were randomly selected by lottery method. For the focus group discussion both mothers whose children completed and those whose children did not complete recommended child immunization in the country were recruited to the study purposefully. In addition key informants from different community representatives were recruited to the study using the judgmental method. There were two EPI coordinators, one in the district health office and one in the health centre. Hence both of them were recruited to the study. Each kebele administrator, health extension worker, and traditional healers from the selected kebeles were included in the study.

The principal investigator and two health professionals who had experience in focus group discussions conducted the FGDs. FGD and IDI guides were used for the data collection. Eight up to eleven discussants were recruited for each FGD. One facilitator moderated the FGD while another person took notes and tape recorded the discussion. The principal investigator conducted the in-depth interviews. Both FGDs and in-depth interviews were undertaken with key informants in a quiet room for periods of 30-90 min.

Thematic analysis of the transcript of the focus group discussion and in-depth interview was performed. The data were transcribed verbatim. Each of the terms or "clusters" was broken down to discrete concepts and coded. Finally, overall interpretation was performed by relating thematic areas to one another and explaining how the various concepts related to the study question.

Vaccination

The administration of a vaccine to stimulate a protective immune response that will prevent disease in the vaccinated person if contact with the corresponding infectious agent occurs subsequently.

Immunization

If vaccination is successful, it results in immunization: the vaccinated person has been immunized.

Result

Socio-demographic characteristics of the focus group discussions discussants and in-depth interviewee

Focus group discussions (FGD) were conducted with mothers who had immunized their children fully and partially. A total of six FGDs were carried out at the six selected kebeles. Half of the FGDs

were with mothers whose children were fully immunized and from urban residences. Each FGD encompassed a group of women ranging from six to eleven participants. All of the discussants were married and attended education up to high school level. The mean age of the respondents was 31.5 years, ranging from 20 to 41 years. In-depth interviews were carried out with eight health professionals consisting of two nurses working in health centre and six health extension workers working in health posts. Most (7) of them were females with mean age of 21.4 years (minimum 18 years and maximum 26 years). Four traditional healers were interviewed and most of them (3) were from the rural kebeles. The majority of the traditional healers (3) were males. The mean age of the interviewees was 49.1 years (range 38-61 years). All of them had more than 15 years' experience in traditional healing. None of them attended formal education. Both EPI coordinators of the district health office and health centre were diploma holder nurses. A total of eight IDIs were conducted with one urban and seven rural kebele administrators. All of them attended formal education from elementary to certificate level. As described by the kebele administrators, the average number of households in the kebeles was 1,414 (minimum 846 to maximum 2163 households). Most of the interviewees were from rural kebeles and indicated the presence of immunization service in their kebele.

Focus group discussion with mothers whose children received complete vaccination

The majority of the discussants knew about vaccines and vaccinations, while very small numbers of participants had the wrong knowledge. Almost all of the participants described vaccines as drugs which are used as a means of preventing diseases. A 35-year-old participant elucidated, *Vaccines are drugs which prevent diseases, promote health, and improve growth of the children*. Another women added, *Vaccines are drugs supplied by the government for the better health of children and they protect children from various diseases like poliomyelitis, tuberculosis* (*TB*), *measles, tetanus, and helminths*.

Nearly every one of the participants could describe at least one vaccine-preventable disease. One of the discussants from a rural kebele said, *There are around seven vaccine-preventable diseases. Vaccine-preventable diseases are poliomyelitis, tetanus, TB, measles, diphtheria, pertussis and helminths*, said a fourth grade attained women. However, none of the mothers described newly added vaccines, namely *hepatitis B* and *Haemophilus influenza* type B.

The majority of discussants believed that vaccination would give different benefits for mothers and children. One of the discussants explained: *Vaccines have a lot of benefits, like preventing different illnesses, promoting growth and better health of the children*. Another woman also added, *Vaccines could prevent illnesses like diarrhoea and strengthen cure of children from different illness*. One of the urban discussants said that, *Previously most of our children died of measles and tetanus, but after using vaccination services those illnesses and deaths were prevented*. As said by a twenty-five year old married participant, *Previously children stood and walked after two or three years, but now, due to expansion of vaccination services to the community level, they have better health, and can stand and walk after just twelve months*. Also one of the discussants, a thirty-nine year old woman, said, *Vaccination could also prevent eye diseases*.

A good number of the FGD discussants reported that health professionals who had been providing vaccination services were helpful. Health professionals provide information regarding benefits of vaccination, they give health education, encouraged us to vaccinate our children timely. One of the discussants from a rural kebele said, *We do not have to pay for the health extension workers for vaccination services. They visit our households often. They convinced our husband who refused to vaccinate our children. They do not perform tasks easily – they lack transport facilities for example – but they figured out different problems and supported us to vaccinate our children fully*. A similar idea was raised by another woman: *Health extension workers in our kebele are very helpful, and I want to pass many thanks to them, on this occasion*.

A number of women believe that some problems in vaccination services will inhibit mothers from obtaining full immunization of their children. *Lack of knowledge, poor understanding of health education, and misperception of side effects of vaccines are some of the reasons that discourage mothers from seeking full immunization of their children*, said an eighth grade accomplished woman. The proposed solutions for the above problems by the discussant were strengthening health education, notification of the day of immunization at the outreach site before two or three days, and construction of additional health posts.

Focus group discussion with mothers who did not get their children vaccinated fully

Most of the FGD discussants of this group did not know about vaccines and vaccination. One of the discussants stated, *Vaccination will help for ease of labour, and promote the health of children*

and mothers. Only a few of the FGD participants could tell correctly about vaccination. *Vaccinated children are stronger, have better health and are fast in development*, said one of the discussants from a rural kebele.

A small number of the participants could name vaccine-preventable diseases. A thirty-year-old woman replied, *Vaccine-preventable diseases include poliomyelitis and measles*. Similarly, a discussant of this group elucidated after probing that, *poliomyelitis, common cold, and diarrhoeal diseases could be prevented by immunization*.

Most FGD participants opined that immunization has a lot of benefits for the health of their children. One of the member FGD discussants said that, *Immunized children will be protected from diseases, have better health and development. Hence, our investment in curing illness will be minimized*. Some of the discussants also described the drawback of not immunizing or defaulting on the recommended vaccination schedule. *I have had three children vaccinated fully, but the last one was not immunized for measles, because she had developed signs and symptoms of measles and was seriously sick. Owing to my lack of knowledge, I thought the cause of poor growth of my child, who could not even stand up till twenty months, was vaccination. However, the child had a measles attack last month and led me to higher cost of treatment*, said one the discussants from a rural kebele.

The majority of discussants agreed that health professionals at health institutions were helpful. One of the discussants said, *Previously our father and mothers were seriously treated for different health problems which could be prevented by immunization. Nowadays, the government sends us the health extension workers* (*HEW*) *who have been educating us at household level*.

The commonest problems, which will inhibit completion of vaccination, mentioned by the discussants were: social problems, forgetfulness, side effects, cultural factors and the opinion of others. One of the discussants stated, *After the third immunization shots on the thigh of the child, she became febrile and swollen at the site of immunization; for this reason, my husband was angry at me since I took a well child and brought her back sick following vaccination. Therefore I did not bring the child for the last immunization*.

The participants proposed different solutions to overcome the above problems. Some of them were health education, encouragement, and continuous follow-up child immunization at household level. They also recommended the participation of kebele administrators and mothers in vaccination services.

In-depth interview with kebele administrators

A total of eight IDIs were conducted with one urban and seven rural kebele administrators. The average number of households of the kebeles was 1414 (minimum 846 to maximum 2163 households). Most of the interviewees were from rural kebeles and reported the presence of immunization services in their kebele. The majority of immunization sessions carried out were at outreach sites on a monthly basis. The interviewees demonstrated that the average time to reach the immunization site was 38 min. In the majority of kebeles there was one up to three health extension workers who were undertaking immunization services at the outreach site monthly. Some of the kebeles, one urban and one rural, did not have HEW. Nearly all kebeles mobilize the community before immunization days. Most of the community mobilizers were community health agents and health extension workers. Most kebele administrators had a birth registration system. They use the birth registration for mobilization of new infants for immunization and tracing of defaulters of immunization. Usually community health workers and kebele administrators partake in defaulter tracing. The majority of kebele administrators participated in immunization programme planning and evaluation at the district level yearly. Most kebele administrators raised different problems that hindered children from obtaining complete immunization. Some of the discussed problems were lack of transportation, lack of health professionals, absence of electricity, lack of drugs in the health post, and lack of advanced health institutions such as health centres. The suggested solutions were obtaining transportation, training of additional health promoters and health extension workers, obtaining drugs and materials in the health post, and construction of health centres. One of the kebele administrators said that, *...the neighbouring kebele has electricity but we do not have it; hence the government should make it available in our kebele too. The district health office should train additional health extension workers and community health promoters. There is only one health extension worker in the kebele, and she could not cope with the health service in the kebele*...

In-depth interview with traditional healers

The commonest childhood illnesses in the community are malaria, diarrhoeal diseases, helminthiasis, "buta", a disease characterized by "chin stock" breathing, diseases of muscles, joint, and neck, and "bo'a", an abdominal disease. Means of prevention of the above diseases were personal and environmental hygiene, massaging by traditional healers and modern therapy at health

institutions, as reported by the majority of traditional healers. However, traditional healers depicted some of the mentioned childhood illnesses as inevitable, in which "God let the illnesses occur and brings the cure by himself so how can we prevent them?" The majority of the traditional healers do not have awareness regarding vaccines and vaccination. Some of the traditional healers sent their children to immunization sessions even though they do not know which diseases vaccines could prevent. They also do not refer children to vaccination immediately after traditional therapy they give for different illnesses. The assumption is that modern treatment, especially that of invasive type, could kill children who are ill with some specific diseases, "bo'a" for example. Traditional healers believe that such kind of illnesses could only be cured by traditional therapy. Besides, very few of the traditional healers support child immunization completion services. *I took my children to immunization services at the health centre believing the children could benefit from the services... I suggest that mothers and the community immunize children; they could benefit from vaccination in terms of wellbeing and development...* mentioned one of the traditional healers from a rural kebele.

In-depth interview with health professionals

All of the health professionals at health posts and health centres correctly described what vaccines and vaccination are. According to most of the interviewees, an immunization service is one of the most acceptable services for the community. One of the health extension workers said, *...before I came here, the immunization service was totally delivered by health centre professionals and because of poor mobilization they could not vaccinate target children as a monthly plan, ...acceptability of the immunization services was questionable. However, after intensive training of mothers at household level, children began to be immunized fully...*

There are some problems that deterred the community from achieving full immunization of children. Of these, lack of awareness about immunization, misunderstanding of side effects, absence of electricity in the presence of a refrigerator, shortage of immunization sites on an outreach basis, misunderstanding of health extension services (more preventive services though the community demand is curative) and seasonal events, especially the time of coffee collection.

A health professional from one upgrading health centre mentioned that, *We do have two functional fridges in the health centre but no energy sources (electricity) have been established though six months have passed since the kebele had electricity... Because of this, we bring vaccines from Wonago health centre. It takes two to three hours on foot. So we carry out vaccination services in the afternoon, in which we could miss some cases because of inconvenience of time....*

The suggested solutions, to make vaccination favourable for mothers and children, were forwarded toward three parties: the community, health professionals, and the government. Health professionals should provide intensive training at household level, trace immunization defaulters, provide immunization services timely, and strengthen the model household training. The health professionals are also expected to launch and expand new immunization sites. The government at district level has responsibility for establishing electricity or making available kerosene for refrigerators, training additional health extension workers and volunteer community health promoters, and making available adequate vaccines (particularly BCG) timely. Moreover, the government should integrate community health workers, NGOs, GOs, and kebele administration to the achievement of immunization.

In-depth interview with Expanded Program on Immunization coordinators

Vaccination is a system of protecting children from a wide range of fatal and disabling illnesses. In Wonago district immunization services are well known preventive health services. More than five thousand children were planned to be vaccinated in the district yearly. However, children have not been immunized fully for different reasons. The most commonly given reasons were seasonal factors usually in the first quarter of the year in which most mothers engaged in coffee collection and processing in coffee processing industries. The second reason for default of child immunization was misunderstanding of the side effects of immunization. Mothers often did not bring their children to the next immunization schedule if their children faced fever, chills, or swelling at the site of immunization. The third reason contributing to default of child immunization was problems at the programme level. Lack of means of transportation prevented the health centre from expanding to an additional outreach site. *...we have only one old motorbike... there are nine kebeles under the catchment area of the health centre, because of lack of transportation means we hardly supervise HEW in the kebeles...* said an EPI coordinator of a health centre. The fourth is budget shortage for implementation of different activities per plan. Project support by various NGOs in terms of money is not paid to the immediate implementers. One of the EPI coordinators reported: *We run the immunization services at static and outreach basis the whole year, the per diem we have been paid so far is not more ten days...*

The EPI coordinators suggested different solutions to minimize child immunization defaulters. To mention a few, transportation should be facilitated, and adequate budget should be allocated to immunization services, IEC and BCC using mass media and local set-ups.

Discussion

This study investigated the problem of childhood immunization from a socio-behavioural perspective. The results are significant in terms of obtaining an understanding of the behavioural processes underlying mothers' childhood immunization-seeking behaviour. Childhood immunization is a preventive health behaviour that is directed toward the child by the parent [12, 13]. The results of this study provide useful information on the influence of factors such as immunization related beliefs, perceptions about the immunization health institution, and the perceived threat of infectious diseases on childhood immunization.

As evidenced by various literature and confirmed by these findings, knowledge regarding benefits and side effects of the vaccine were decisive for vaccination. A qualitative study conducted in rural China found that mothers who had been informed regarding the benefit of vaccination were willing to vaccinate their children [14]. Similarly, the majority of mothers in this study whose children are fully vaccinated were more knowledgeable than the mothers whose children are never vaccinated or vaccinated partially. Almost all of the participants of FGDs whose children are fully vaccinated described vaccines as drugs which are used as a means of preventing diseases. However, most FGD discussants whose children were partially vaccinated or never vaccinated did not know about vaccines and vaccination. Similarly, most traditional healers do not know about vaccines and vaccination, though a few of them send children to modern therapy including vaccinations.

In a community where education is not well attained traditional views and attitudes could directly affect the health status and utilization of health services [15]. Though the traditional healers could be one of the opportunities for vaccination of children, the knowledge gap regarding vaccination could affect the attitude and practices of mothers or care takers toward vaccination. In this study, the view of traditional healers might avert women from seeking modern health care. This finding has been demonstrated in previous studies. One study showed that women with no education were more likely to deliver a baby at home. Another study suggested that women's decision making power and autonomy were relevant to maternal and child health outcomes [15].

The majority of focus group discussants agreed that health professionals at health institutions were helpful. This finding is consistent with a previous study conducted in rural Canada; the study found that health professionals need to make parents comfortable asking questions; to adequately address each parent's questions and concerns; to instil confidence when talking to parents; to be clear on where their professional allegiance lies; to understand that parents may be affected by their attitude [16].

In conclusion, the results of this study demonstrated that knowledge regarding vaccination, its benefits and side effects and the help of health professionals at immunization sites are closely related to child vaccination behaviours in women or immediate care takers in a rural district of Ethiopia. All of these factors should be considered fully when developing strategies for child vaccination.

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References

1. World Health Organization. World Health Report, Geneva, Switzerland 2005.
2. UNICEF. Immunization Remains Vital to Child Survival. September 2005. A report card on immunization number 3.
3. United Nations Children Fund. Global Immunization Report. 2005.
4. Gore P, Madhavan S, Curry D, et al. Predictors of childhood immunization completion in a rural population. Soc Sci Med 1999; 48: 1011-27.
5. Berhane Y, Masresha F, Zerfu M, Birhanu M, Kebede S, Shashikant S. Status of expanded program on immunization in a rural town – south Ethiopia. Ethiop Med J 1995; 33: 83-93.
6. Asefa M, Tessema F. Ethiopian National Health Survey; a collaborative study. Jimma University and World Health Organization, 2006, Jimma, Ethiopia.
7. Millman ML. Access to health care. Institute of Medicine. National Academy Press, Washington, DC 1993; 69.
8. Coreil J, Augustin A, Holt E, Halsey NA. Use of ethnographic research for instrument development in a case – control study of immunization use in Haiti. Int J Epidemiol 1989; 18 (4 Suppl 2): S33-7.
9. Orenstein WA, Atkinson W, Mason D, Bernier RH. Barriers to vaccinating preschool children. J Health Care Poor Underserved 1990; 1: 315-29.
10. Waisbord S, Larson HJ. Why invest in communication for immunization? Evidence and lessons learned. A joint publication of the Health Communication Partnership based at Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (Baltimore) and the United Nations Children's Fund (New York). June 2005.
11. Gedeo Zone Health Department. Annual performance report of 2007/08. Gedeo Zone. Southern nation and nationalities people's regional state. Ethiopia 2008.

12. Becker MH, Maiman LA. Models of health-related behavior. In: Mechanic D (ed.). Handbook of health, health care, and the health professions. The Free Press, New York 1983; 539-68.
13. Kim SS, Frimpong JA, Rivers PA, Kronenfeld JJ. The impact of maternal characteristics on immunization status of U.S. children. Under review for publication.
14. You X, Kobayashi Y, Yang J, Zhu X, Liang X. Qualitative study of knowledge and behaviours related to tetanus toxoid immunization among women of childbearing age in rural China. Public Health 2007; 121: 227-30.
15. Navaneetham K, Dharmalingam A. Utilization of maternal health care services in Southern India. Soc Sci Med 2002; 55: 1849-69.
16. JA Forder consultant of PATH and AIHI. Attitudes Towards Immunization in Cambodia: A Qualitative Study of Health Worker and Community Knowledge, Attitudes and Practices in Kompong Chhnang 2002.