

Impacts of accelerated measles elimination activities on immunisation services and the health system in Ethiopia

Mitike Molla¹, Sergio Torres-Rueda², Sandra Mounier-Jack², Yayehyirad Kitaw³

Abstract

Background: Ethiopia introduced accelerated measles elimination activities (AMEAs) as part of the global effort to eliminate the disease. However, the impact on immunisation and other health services has not been previously examined.

Objectives: The overall aim of the study was to evaluate the impact of AMEAs on routine immunisation services and on the health system at large.

Methods: A mixed-methods approach was used, combining key informant interviews, a staff profiling survey and relevant document reviews. Data were collected at the national level and in two districts: Kolefe-Keranyo sub-city in Addis Ababa city administration and Wegera district in North Gondar.

Results: Supplementary immunization activities (SIAs) tended to increase community demand for vaccines through social mobilization. Add-ons such as distribution of vitamin A, de-worming drugs and insecticide-treated nets improved the efficiency of SIAs. Improving staff capacity through planning and strengthening of the health management information system and cold chain management were felt to be added advantages of SIAs. On the other hand, SIAs caused interruptions to the delivery of the Expanded Program for Immunizations (EPI) and other services (except emergency services).

Conclusion: SIAs impacted the routine EPI and other health services both positively and negatively. While maintaining the positive impacts, strategies to minimize negative impacts, including disruption of routine immunization and other health services, need serious attention. [*Ethiop. J. Health Dev.* 2015; Special Issue 1:23-30]

Background

Despite a long-standing global commitment to vaccinate children for measles worldwide, many continue to die from the disease in developing countries (1). There is strong evidence indicating measles eradication could avert an estimated one million deaths every year and save \$1.5 billion currently being spent annually in treatment and prevention of the disease worldwide (2). The World Health Organization (WHO) has set a target of measles pre-elimination by 2012 and elimination by 2020 (3). In addition, earlier calls for measles eradication have been strengthened by a World Health Assembly decision (4-6) where the technical feasibility of measles eradication was established (2,6,7).

Ethiopia has a very high infant and under-five child mortality rate. Although measles is one of the leading causes of childhood illness and death, cases are often not well reported by health services (8-10). The Expanded Programme for Immunisations (EPI), one of several international initiatives adopted in the country to tackle measles, was introduced in 1980 (11).

Ethiopia introduced Supplementary Immunisation Activities (SIAs) from 1999 to 2001. SIAs are usually large scale vaccination campaigns and are conducted nationally or sometimes in specific regions. Initially SIAs targeted children younger than five years of age, and in 2002 they were followed by catch up measles SIAs which aimed to vaccinate children between 6 months and 15 years of age. This was a response to drought and high rates of malnutrition. From 2005-2006, measles follow-up SIAs were carried out in two

year intervals, increasing coverage significantly (12). This is believed to have facilitated the pre-elimination activity by bringing the national routine measles immunisation coverage to 90% and to at least 80% in all districts (3, 12-14).

Accelerated measles eradication activities involve high routine measles coverage, regular supplementary immunisation activities and case based surveillance. It has been reported previously that SIA delivered in a campaign mode may have adverse effects on routine health systems (15, 16). The objective of this study was to evaluate the impact of accelerated measles elimination activities (AMEAs) on immunisation services and health systems in Ethiopia, as part of a larger multi-countries study carried out in Bangladesh, Brazil, Cameroon, Ethiopia, Tajikistan, and Vietnam. This paper will report the specific results of the study for Ethiopia (12).

Methods

The study adapted the WHO health system framework and the framework proposed by Atun et al. for rapid assessment of disease control programmes in relation to health systems (17, 18). The health system was described as having eight interlinked components. A toolkit explaining the methods in detail was developed for the fieldwork (19). Methods for collecting primary data included key informant interviews, focus group discussions (where appropriate) and staff profiling surveys.

¹School of Public Health, College of Health Sciences, Addis Ababa, University;

²London School of Hygiene and Tropical Medicine;

³Independent Consultant.

Study Area:

This study was conducted at a national level and in two selected districts: Kolfefe sub-city (Addis Ababa City Administration) and Wegera district (North Gondar Zone, Amhara Regional State), representing urban and rural districts respectively. Data were collected from Kolfe-Keranyo Health Centre in Addis Ababa, Wogera Health Centre, Workedemo Health Post, Wogera District Health Office and North Gondar Health Department. At a national level, key informants from the Federal Ministry of Health (MOH), United Nations agencies, and bilateral organisations and two hospitals were interviewed.

Study Design:

As part of a six country study in Bangladesh, Brazil, Cameroon, Ethiopia, Tajikistan and Vietnam, this research project used a mixed-methods approach, combining a quantitative staff survey and semi-structured interviews. An additional documentary review was also carried out.

Sample size and selection: Thirty-five key informants were interviewed selected purposively because of their position in the health facilities (see Table 1). Professionals responsible for EPI or related activities and were selected to participate in the study. Thirty-four health professionals participated in the staff profiling survey (see Table 2).

Districts were selected to represent various immunisation coverage levels and degrees of rurality and urbanisation, in consultation with the national WHO EPI team. Wogera district was selected as it included hard-to-reach areas. Of note was the Kolfefe-Keranyo sub-city district, which had experienced a measles epidemic outbreak a few weeks prior to the start of the study. Policy makers and EPI programme leaders were selected using the MOH and regional health bureau structure. A snowball sampling technique was used to access key informants who could provide additional necessary information.

Data Collection and Instruments:

Qualitative study: We conducted in-depth interviews based on the Toolkit described earlier. In total interviews were conducted with 14 individuals at national, regional and local level. Five small group interviews took place with a total of 21 participants who had different roles in EPI services. Each

interviewee was asked questions directly linked to his or her work experience and responsibilities (Matters related to laboratory were presented only for people who had experiences in laboratory, etc). Interviews were mostly conducted in English. A few were conducted in Amharic, and a member of the research team was used as a translator.

Staff survey: In the study districts, a structured self-administered English questionnaire was distributed to health care workers, mainly nurses and health officers, who had direct experience working in EPI-related activities. The questioners used simple and short questions which could be easily understood by anybody who has a diploma level training.

Analysis:

All interviews were recorded and transcribed. Additional field notes were taken to enhance the transcription process. Transcripts were shared among the team members to validate the quality of the data. Data were analysed thematically based on the WHO health systems building blocks. Staff survey data were and entered into SPSS to be quantitatively analysed.

Ethical Considerations:

Ethical clearance was obtained from the London School of Hygiene and Tropical Medicine and the Ethiopian Public Health Association. All interviewees were given an information sheet explaining the aims of the project, indicating that their participation was voluntary, and offering assurances that the researchers would follow strict rules of confidentiality. Written consent was obtained from all participants.

Results

The findings of this study are presented using the WHO framework for health systems, which include: governance and planning, financing and resource generation, human resources, logistics and procurement, information system, surveillance and laboratories, and service delivery (17).

A total of 69 people participated in this study, 34 in the staff survey and 35 in the qualitative study. (Please see Table 1 for the characteristics of participants in the staff profiling survey and Table 2, for the qualitative interview participants).

Table 1: Number of key informants who participated in the qualitative study stratified according to their organisational affiliation (n=35).

Organisational affiliation	National	Kolefe	Wegera
Government:			
Policy makers/managers	6		5
Health service provision at primary level (doctors, nurses)		3	6 (1 community volunteer)
Health service provision at hospital level (doctors, nurses)	5		
NGOs	1		
Bilateral or multilateral partner organisations	5		
Other international organisations	1		
Academia	3		
Total	21	3	11

Table 2: Characteristics of staff profiling survey participants in West Gondar and Addis Ababa (n=34).

	Addis Ababa health facilities (Keranyo Health center hospital)	Wegera health facilities (Kolefe- Yeakitit 12 health center and health post)
Age group		
20-24	2	11
25-29	4	3
30-34	1	1
35-39	2	2
40-44	1	2
45+	5	-
Sex		
Male	3	7
Female	12	12
Position		
Director (Health officer)	-	1
EPI Staff	7	4
Health officer	1	1
Health extension		
Workers (HEW)	-	6
Staff nurse	7	5
HEW Coordinator	-	1
Other	0	1
Profession		
Nurse	13	9
Midwife	1	2
Health officer	1	1
HEWs	-	6
Environmental health professional	-	1

Governance and Planning:

Key informants indicated that SIAs promoted involvement of other sectors in health system governance at kebele (the smallest administrative unit comprised of a population of 5000 inhabitants) and woreda/district levels, enhanced collaboration across partners, particularly within the Inter-agency Coordinating Committee (ICC). SIAs also were reported to contribute to increased involvement of communities and community leaders in health system governance.

"EPI is the most important programme for local government ... they are also member of the local ICC. It is one of the marker[s] for their community leaders' performance and hence followed strictly ..." (R1 Table3)

On the other hand, the earmarked funding for SIAs was felt to have undermined national governance in resource allocation decisions and thus ownership of the

activities. However, informants indicated that the government's contribution to the costs of immunisation services was growing and more needed to be done to lead it as intended.

"Government financial support is growing... but it's not always sufficient... when it comes to practice there are many competing priorities..." (R9Table3)

Results from the qualitative and staff survey indicated that SIAs had generally contributed to developing skills in EPI strategies and planning from national to local levels. One particular area of strengthening was in identifying and mapping of target and hard-to-reach populations for other EPI outreach activities in the remote (emerging) regions, Afar and Somali in particular. In addition, measles SIAs were reported to have been instrumental in stimulating inter-departmental and inter-sectoral planning and implementation including within local administrations, agriculture and education.

Financing & Resource Generation:

Key informants indicated that SIAs increased opportunities in fundraising from partners for other interventions to be delivered together with measles or EPI, such as distribution of vitamin A supplementation, de-worming drugs and insecticide-treated nets (ITNs). SIAs interlinked EPI funds were also released more quickly and spent more efficiently.

“Measles vaccine is usually integrated with de-worming, and Vitamin A supplementation among children 1-59 months of age ...”
(R1Table3)

On the other hand, perceptions of increased financing for SIAs tended to reduce motivations to strengthen the routine system. This was felt more strongly at the district level where budgetary allocations to sectors and routine programmes were decided. There were reports that when priorities were set, EPI tended to be downgraded on the assumption that external funds would be available for immunisation activities.

“Because of the funding ... the nature of the project ... because of GAVI we are now involved in more routine activities...”(R11-Table-3)

Table 3: Participants of the in-depth interview from Central and regional organizations who are quoted out of the 35 informants

Respondent	Organization
1.	UNICEF
2.	UNICEF
3.	USAID
4.	MOH
5.	MOH-
6.	DACA
7.	PFSA
8.	WHO
9.	WHO
10.	Wogera Zonal Health Bureau
11.	NGO
12.	AAU
13.	AAU
14.	Health Centre

Human Resources:

A large amount of in-service training on planning, preparation, implementation, monitoring and evaluation of SIAs had been provided to most of the health workforce. This was said to have contributed to improved skills of EPI staff across all components of immunisation and surveillance activities. The training organised in preparation for SIAs was also deemed to have had beneficial effects on health workers' motivation in general and to have contributed indirectly to improved quality of other services (Table 4).

Table 4: The impact of measles-specific training on different EPI activities among professionals who took measles related training (n=9)

Attitude towards measles related training during SIAs	Addis Ababa	HC	Wegera Woreda HP	Total
Helped in campaign planning				
Disagree	-	-	1	1
Agree	2	5	1	8
Improved community mobilization capacity				
Disagree	-	-	1	1
Agree	2	5	2	9
Improved injection safety				
Disagree	-	-	-	-
Agree	2	5	2	9
Increased knowing about side effects				
Agree	2	5	2	9
Disagree	-	-	-	-
Improved waste management				
Agree	2	5	2	9
Disagree	-	-	-	-
Improved registration and reporting				
Agree	2	5	2	9
Disagree	-	-	-	-
Improved case detection ability				
Agree	2	5	2	9
Disagree	-	-	-	-
Introduced interruption of work				
Agree	1	3	2	5
Disagree	1	2	0	3

“SIAs provide support for strengthening routine immunisation by providing training, documentation, monitoring charts, registration book[s], cold chain management etc ... and joint supportive supervision” (R1—Table 3)

Health workers received per diems for participating in SIAs. WHO/UNICEF per diem rates for SIAs are much higher than the government’s regular salary when paid for the campaign period. WHO/UNICEF per diems, reportedly, motivated the health workforce as these were perceived as highly attractive sources of income compared to their low salary levels.

“The per diems that we get [from SIAs are] an important incentive for us, the payment from WHO is very high. We pay everyone equally even for those who stayed back to run the regular works.” (R10 Table 3).

However, the differences in remuneration systems between those in regular public service employment and those seconded by partners were also said to have negative consequences. The latter are given much higher remuneration for what is perceived as similar work, creating dissatisfaction among regular staff. EPI and other staff also felt overloaded with additional work during SIAs related to covering for those on campaign activities, as well as completing additional forms not related to their routine work.

One of the informants indicated that people will give more emphasis to programmes which have incentives:

“I can say now more emphasis to polio not to measles. If you are a surveillance officer, your subordinates (district level surveillance officers) will bug you to achieve the polio indicators, they will not even mention measles....” (R3-Table 3)

Logistics & Procurement:

SIAs seemed to have had little impact on the drug and medical supplies system; they were carried out as vertical, standalone programmes. The increase in measles vaccine volume was reported to have had no impact on the logistics and procurement system.

“It [the measles vaccine] does not introduce any additional load in the logistic system; it would just change sampling procedures. In addition, vaccines are first priority for inspection, they will be cleared first because of cold chain conditions” (R6Table 3).

On the other hand, the expansion undergone by both the Drug Administration and Control Authority (DACA) and the Pharmaceutical Fund and Supply Agency (PFSA), particularly increases in human resources, was thought to have raised the institutions’ capacity to handle SIA related vaccines and supplies. A recent shift towards integration of the logistics system

with health services reportedly contributed to improvement of logistics management and vaccine quality in general.

On the other hand, SIAs were also reported to have strengthened the cold chain system:

“We believe that the campaigns are important for strengthening the health system. For example cold chain assessment is carried out before campaigns: if it’s not ok, we take measures to improve” (R1-Table 3)

Information system: SIAs reportedly improved reporting, monitoring and evaluation of other EPI activities. Key informants underscored the potential for scaling up of the newly introduced Family Folder (a folder used to contain the family medical history usually kept at local health facilities) and consequently strengthening the registration and follow up of births.

However, some key informants felt that multiple forms and systems of reporting the same data created the possibility of duplicated reporting and, therefore, errors in coverage calculations. Vaccination cards were not completed during SIAs, which led to incomplete records for individuals and created problems during vaccination coverage assessments. Information collected during SIAs was transmitted to higher levels of the health system and not utilised at kebele and woreda levels for planning and management. In addition, the information provided to mothers was reported to be insufficient.

Surveillance & Laboratories:

SIAs tended to have a reinforcing effect on Integrated Diseases Surveillance and Reporting (IDSR) because of additional focus and funding. As indicated by respondents from the surveillance system, training undertaken during SIAs was said to have improved surveillance skills among EPI staff. It also reinforced the surveillance system and contributed to enhance reporting of other diseases, especially those related to case-based surveillance such as polio, tetanus and yellow fever.

Service Delivery and Impacts on Routine Immunization:

Through social mobilization activities, SIAs were said to have increased community demand for vaccines. Add-ons such as delivery of vitamin A, de-worming drugs and ITNs improved the delivery of co-delivered services. However, SIAs caused interruptions in EPI activities and other services at health centres and hospitals during the campaigns. Almost all health services were closed, except for emergencies, during Enhanced Outreach Strategy (EOS) days, a total of 5 to 10 days (depending on local factors) due to staff shortages.

*“We usually mobilize 50% of our staff during SIAs. We let at least one person work in each
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program like TB [tuberculosis], ART [antiretroviral therapy], FP [family planning] and delivery. But in the outpatient service, we handle only emergencies during campaigns ... if it is a planned campaign we inform the community to use other health facilities" (R14Table3)

Changes in workload as a result of SIAs were also mentioned by both the key informants and the staff. Even though respondents tended to minimise the effect on other services, some felt disruptions were inevitable.

"We [hospital staff] are not usually involved in SIAs, we know that there is SIAs going on when parents who sought immunisation and other child health services overload our hospital as the health centres are closed on those days" (Group discussant, staff nurse from Hospital)

Some informants suggested that a solution for the increased workload could be involving nurses currently available for hire on the labour market during SIAs to alleviate the problem. However, concerns were raised about potential negative consequences to the permanent MOH staff in relation to remuneration and about the skills of private graduate nurses.

Impact of SIAs on Measles Morbidity and Mortality:

Document review indicated that measles elimination activities have had positive effects on children's health. The routine measles vaccination coverage (administrative) increased from 37% in 2000 to 76% in 2009. The SIAs coverage was 92% for the catch-up SIAs, 88% for the first follow-up SIAs, and 92% for the second follow-up SIAs (12). Interviewees observed that very few cases of measles and even lower number of deaths were being reported by the hospitals and health centres.

However, some informants questioned the impact of SIAs on measles morbidity and mortality as there were several outbreaks immediately after SIAs which were hypothesized to have been due to the cold chain system.

"Despite having done a number of campaigns, we still see seasonal outbreaks from December (2009) to March (2010). If campaigns were very good you shouldn't see spikes –so campaigns are just not reaching enough children" (R2Table 3)

Discussion

This study suggests that supplementary immunisation activities (SIAs) of measles had both negative and positive impacts on the health system. Strengthening routine immunisation especially the cold chain, skill development, additional funding, and staff motivation were some of the positive effects, while interruption of

the routine EPI and other health services during SIAs were some of the negative impacts.

All stakeholders interviewed indicated a commitment to participate in global measles eradication activities. Most governance prerequisites for measles eradication, such as participatory planning, implementation, and monitoring and evaluation systems already exist but require further strengthening. The current decentralisation process could eventually be an advantage towards the elimination activities as a means of strengthening local ownership (20).

A high dependence on external funding for measles SIAs, and to a lesser extent to routine immunisation, is a major policy issue in financing measles elimination. Accelerated elimination activities are bound to exacerbate the situation. Although seemingly unavoidable in the short-term, ways of alleviating the problem in the long-run should be seriously embedded in the design of the programme.

Currently, SIAs are now being integrated into the national 'one plan, one budget, one report' strategy (20). The challenge will be to creatively incorporate accelerated elimination activities into this process while meeting the effectiveness and efficiency requirements of an eradication effort.

The staff profiling survey suggested measles-related training had improved staff skills in immunisation-related activities. Key informants also stated that SIAs provided benefits in human resource development. However, a concern about a possible distraction from routine services was expressed. As most of the health care providers were mobilised for SIAs for 5 to 10 days at a time, all other services (except emergencies) were suspended, due to the need to call upon a large number of qualified vaccinators to meet SIAs requirements. This could have major consequences for an already weak health system (limited access, poor quality). Some key informants suggested the possibility of using unemployed or not-fully-employed health workers (nurses in particular). However, the quality of training of most of these health workers and long-term sustainability implications (post-SIA employment status) would require further analysis (21).

Unlike in other interventions, increasing the number of volunteers would not alleviate the problem. While volunteers can administer polio drops, only qualified staff can administer measles injections. In addition, health workers' per diems from the SIAs are important incentives in the public sector and therefore their role, implications and alternatives need to be carefully assessed. From the current view of the key informants, it appears that these financial incentives play a role as a short-term strategy to motivate health workers until elimination is achieved. Studies in other countries also showed similar findings (22).

Impacts related to logistics, in particular the cold chain system, quality control and surveillance seem to be of

less concern to the MOH in light of current trends towards integration and expansion of PFSA. The same could be said about financing as long as the current trend towards alignment and harmonisation are implemented effectively during the acceleration of elimination activities. A recent study on measles eradication suggested three main requirements for eradication of measles to be successful: first, focus should be placed on strengthening routine vaccination; second, integration of measles eradication with multifunctional health services is required; and lastly, efforts should be made to change traditional donor behaviour that give priority to campaigns and use differential staff incentives (23).

Despite the large investment required to conduct national measles SIAs, it is possible that the quality of SIAs risked undermining the measles elimination target. It was noted earlier that outbreak reports came out just after SIA was conducted (24) along with the shift of the outbreak pattern to children aged over 5 years. This raised some concerns and doubts on the effects of measles SIAs on the reduction of measles mortality and morbidity and subsequent measles elimination activities. The comparative advantage of strengthening routine immunisation in terms of cold chain and capacity of health work force remains critical - as has also been highlighted in other places (22).

Our study had some limitations. The small number of participants in the staff profiling survey is one factor, since the sample was calculated for the six countries. Despite its limitation, we believe that many of the benefits and concerns resulting from an acceleration of measles elimination activities are applicable to other countries with weak health system. Lessons from this study should be used to reflect on the overall strategy towards elimination, notably its impact on financing and staff motivation.

Conclusions:

SIAs helped Ethiopia to become familiar with measles elimination activities. The relatively conducive governance environment, including the decentralisation process to the woreda level and a working coordinating mechanism (ICC) were favourable, although low health workforce density and problems with cold chains remain serious obstacles towards elimination. Our study showed that there were some benefits from AMEAs primarily to the immunisation programme such as enhanced skills and strengthened surveillance. However, there were broader sustainability concerns both in terms of potential impact on routine immunisation services of repetitive campaigns and the financial sustainability of all the AMEA. Overall, it appeared that measles elimination activities were framed more in terms of short-term support through ad hoc training sessions than genuine strengthening such as sustainable pre-service training

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