International Journal of Health Services Research and Policy
www.dergipark.org.tr/ijhsrp

IJHSRP

e-ISSN: 2602-3482

Research Article

EVALUATION OF THE SOCIAL MOBILIZATION COMPONENT OF THE SECOND YEAR OF LIFE (2YL) PROJECT ON IMMUNIZATION COVERAGE IN ADAKLU DISTRICT, GHANA

***Justice Kwesi BAAH*[1] *Justice NONVIGNON*[1] *Moses AIKINS*[1]**
Genevieve C. ARYEETEY*[1]

[1]School of Public Health, College of Health Science, University of Ghana
*Corresponding author: gcaryeetey@ug.edu.gh

Abstract: *Ghana has had relatively high immunization coverage of more than 85% for infant antigens in the first year of life. However, there is a decline in immunization coverage for vaccines provided during the second year of life (2YL) of the child. As part of the 2YL project implemented in Ghana to strengthen the 2YL immunization platform, social mobilization strategies were utilized to help improve coverage for vaccines provided in the 2YL of a child. This study aims to evaluate the impact of social mobilization components of the 2YL project on immunization coverage in Adaklu district, Volta region, Ghana. In a pre-experimental design; a single-group pretest-posttest design was utilized to assess whether there was a significant change in immunization coverage pre-and post-intervention. Data on health facilities' immunization coverage were collected from DHMIS II (District Health Management Information System) before, during, and after the intervention. The Pearson chi-square, fisher's exact, Wilcoxon sign rank test, and paired t-test were used to evaluate the impact of the intervention implemented in 2017 on identified outcomes mainly Penta3, MR1, MR2, and MenA. The results indicated a significant improvement in the dropout rate between the first and second dose of Measles-Rubella vaccines in health facilities within the district. The number of health facilities that recorded a negative rate increased to 70% in 2018 from 25% in 2016. Also, the annual district immunization coverage for the Second dose of Measles (MR2) increased from 73% in 2016 to 84% in 2017 and 82.5% in 2018. In addition, Penta 3 coverage increased from 90.6% in 2016 to 100 plus % in 2017. The implementation of the social mobilization had a positive effect on immunization coverage in the district. The intervention resulted in increased immunization coverage and significantly reduced the measles Rubella dropout rate.*

Keywords: *Immunization coverage, Social mobilization, Second Year of life (2YL), Evaluation*

Received: October 22, 2021 *Accepted: March 30, 2022*

1. Introduction

Children under five years are most vulnerable to Vaccine-Preventable Diseases (VPD) which are major causes of morbidity and mortality in the world. Studies have shown that about 2.5 million annual global child mortality is attributable to vaccine-preventable diseases [1]. According to the European Public Health Alliance, widespread immunization introduced in the 1950s significantly reduced the prevalence and incidence of these diseases. Empirical data indicate that in Europe alone, 28,500 children were paralysed every year between 1951 and 1955 due to polio, however with the introduction of mass immunization, the polio disease was eliminated completely by 2002 [2]. Currently, polio in its wide form is recorded in only three of the world's countries namely; Nigeria, Afghanistan, and Pakistan [3].

Ghana has had relatively high immunization coverage of more than 85% for infant antigens and has been a leader in vaccine introduction in the African Region [4]. Ghana was one of the first countries to introduce the pentavalent vaccine in 2002, pneumococcal Conjugate Vaccine (PCV), rotavirus vaccine, and a second dose of Measles-Rubella (MR2) (first non-infant vaccine) on its immunization schedule in 2012 [4]. Prior studies have demonstrated that Ghana has achieved significant success in immunization, observing an increase from 69% in 1988 to 89.9% in 2014 using the third dose of the Penta valence (Penta3) vaccine as a proxy [5]. However, the biggest challenge is sustaining the gains made, because there is an indication of stagnation of national immunization coverage. There are significant disparities that exist in the national figures of immunization coverage which are associated with differences in urban/rural place of residence, wealth and education status, gender, and remoteness. For instance, according to the Ghana Health Service report, in 2014 about 69% of 216 districts in Ghana achieved 80% and above for the third dose of Penta3 vaccine and the remaining districts fell short of the 80% target [6]. The stagnated immunization coverage in Ghana is also seen in vaccines specifically delivered in the second year of life (2YL) of the child. Irrespective of the efforts that were put in at the introduction of the second dose of the Measles-Rubella (MR2) vaccine in 2012, coverage remains below 70% [4].

Further, caregivers have become accustomed to a single routine dose of the Measles-Rubella (MR1) vaccine. Many caregivers were unaware of the need for a second dose of Measles-Rubella (MR2), did not know the recommended age for the vaccine, or did not see MR2 as equally important as vaccines in the child's first year of life [4]. These reasons have led to a dropout rate greater than 10% in three regions (Northern Region: 32%, Volta Region: 14%, Greater Accra Region: 31%) that were part of the study. This implies that there is a needed shift in messaging to caregivers from public health professionals to cause a behavior change among caregivers [4].

To help address the challenges to improve and sustain high immunization coverage for MR2 and to strengthen the 2YL service delivery, the Centers for Disease Control and Prevention (CDC) supported the implementation of the second year of life (2YL) project. The 2YL was to help identify and address health facility and community level barriers contributing to low MR2 coverage.

The CDC in collaboration with Ghana Health Service partnered with Civil Society Organizations (CSOs) to embark on social mobilization in selected districts in Ghana. Social mobilization and community participation have been identified as key in immunization provision and other health service provisions in communities. Similar studies have assessed an urban slum immunization intervention that had a social mobilization component. The study used the pre-posttest design and found improvement in immunization coverage - 33% drop-out rate at baseline reduced to 1% drop-out after the intervention [7]. Likewise, a study in India on urban immunization outreach intervention which included social mobilization was assessed and found 100% improvement in all primary vaccines of the Universal Immunization Program. The study concluded that with fully planned strategies, it is possible to quickly improve immunization coverage through opportunities beyond the regular health system [8]. Monitoring of routine immunization data indicated that about 64% of children missed routine immunization as a result of insufficient information or understanding of immunization. However, through social mobilization strategies, these missed out children were reached and immunized [9]. Another study on immunization coverage in Nigeria found that immunization coverage in rural communities was higher compared in urban areas. This was attributed to better mobilization and participation in the delivery of immunization services in rural communities [10].

In immunization literature, many of the studies focus on estimating the coverage and factors that influence immunization performance. However, immunization performances are mainly influenced by some form of interventions that have been put in place to ensure performance is improved. However, studies that evaluate the contribution of social mobilization to immunization performance is limited in

the literature. Therefore, this study employs a statistical approach to evaluate the social mobilization components of the 2YL project on immunization coverage in Adaklu district of the Volta Region, Ghana. In the Adaklu district, immunization coverage before 2016 was low. Quarterly Penta 3 coverage in the district was less than 30% before 2016. This was similar to other vaccines including Measles-Rubella. Immunization coverage in the district improved from 2016 such that in the first quarter, Penta 3 coverage was 100% and that of Measles-Rubella was 65% [11]. The objectives of the study were to; evaluate the difference in immunization coverage in the district before, during, and after the social mobilization intervention and assess the difference in dropout rate between MR1 and MR2 before, during, and after social mobilization intervention.

1.1. The social mobilization intervention

The social mobilization intervention was part of a larger second-year life (2YL) intervention implemented in Ghana to strengthen the second-year of life platform. The larger 2YL project had a focus on six components namely; Program Integration, VPD Surveillance, Special innovations to reach the unreached, training and supervision data recording and reporting, and social mobilization. Except for the Social mobilization component that was implemented in targeted districts, the other five components were national in nature.

The social mobilization intervention was implemented in 2017 with activities including 2YL communication messages (which went through the drafting stage, pre-testing, and validation stages), production of 2YL jingles, training of frontline health workers in different topical areas on social mobilization, engagement of stakeholders, and media lunch of the 2YL campaign. The community-based activities namely; community durbars, church/mosque outreaches, market/lorry station outreaches, radio/information center and/or mobile van education, community video shows, door-to-door sensitization, defaulter tracing and referrals, etc. were to raise awareness and demand for 2YL services was implemented between September and December 2017.

Civil Society Organizations (CSOs) were an integral part of the social mobilization component of CDC 2YL immunization project. CSOs were charged to engage communities and local actors through social mobilization strategies to raise community awareness on vaccination services (MR2 and MenA vaccines) provided during a child's 2YL and to promote awareness of other services provided during the 2YL including catch up vaccination, growth monitoring, bed-net distribution, and vitamin A supplementation.

For the purpose of this evaluation, social mobilization as a variable is categorized as before intervention – that is the year 2016 where there was no 2YL social mobilization, during the intervention – that is the year 2017 where social mobilization activities were carried out in the Adaklu district and After intervention – the year 2018. Data on coverage and dropout rate will be compared across the years to identify any statistical differences.

2. Materials and Methods

2.1. Study design

The study used the single group pre and post-test design to evaluate the outcome of social mobilization on immunization coverage. This design allows a single group to be observed before and after an intervention presumed to influence a change. The single-group pretest-posttest is used such that a single group (for this study Health facilities in the district) can be observed at two points in time – before and after an intervention. This design allows for changes in outcome (immunization coverage) to be attributed to the social mobilization intervention.

2.2. Study area

The study was conducted in Adaklu district of the Volta Region of Ghana. Adaklu district is one of the 25 Administrative districts in the Volta Region. The District capital is located at Adaklu Waya. The District Health Directorate (DHD) is located at Tsrefe. Adaklu is bordered on the North and West by Ho Municipal, South by Central Tongu district, and to the East by Agortime-Ziope district. The economic activities in Adaklu District include farming 50% (the main crops grown in the area are yam, tomatoes, and maize), bee rearing 10%, livestock rearing 30%, and others 10%. The rest are formal sector workers and in construction. Based on the 2010 Population and Housing Census, Adaklu district as of 2018 had a total projected population of 43,311 with an estimated growth rate of 2.5% per annum and a national per capita income of USD 2260.8. The district has no district hospital to take care of the major health needs of the citizens in the district. However, the district has 20 health facilities (health centers (4) and Community-Bases Health Planning Services (CHPS) that offer preventive and promotive services (15) and 1 clinic, which is a mission facility. The district was reported as one of the low-performing districts on coverage for the second dose of measles-rubella and one of the districts with a high measles-rubella dropout rate [4].

2.3. Childhood immunization schedule in Ghana

The expanded program on Immunization (EPI) of the Ghana Health Service employs about four strategies namely; static, outreach, campaign, and Supplementary Immunization Activity (SIA) in the delivery of immunization service. The static and outreaches are strategies used in the delivery of routine immunization services throughout the year and follow Ghana's childhood immunization schedule (Table 1) while the campaigns and SIAs are periodic depending on the issues of public health concern in the country or in a particular locality within the country. During the static and outreach delivery of immunization services, data on the number of children immunized are captured into the DHMIS which is used to compute immunization coverage. The data used for the study covers static and outreach immunization service delivery recorded in the DHMIS for the years 2016, 2017, and 2018.

Table 1. Childhood Immunization Schedule in Ghana

Child's age	Vaccines required
At birth	BCG, OPV0, Hepatitis B
6 weeks	OPV1, DPT/HiB/HepB1, Rotavirus1, Pneumococcal 1
10 Weeks	OPV2, DPT/HiB/HepB2, Rotavirus2, Pneumococcal 2
14 weeks	OPV3, DPT/HiB/HepB3, Pneumococcal 3, Inactivated Polio vaccine (IPV)
6 months	Vitamin A
9 months	MR1, Yellow fever
12 months	Vitamin A
18 months	MR2, MenA

Source: Child welfare card, Ghana Health Service

Table 1 shows childhood immunization in Ghana starts at birth (age 0) until the child is 18 months. According to the immunization schedule, a child at the age of 18 months is expected to have been fully immunized with one dose of BCG, Hepatitis B, IPV, Yellow fever, and MenA; two doses of rotavirus and Measles-Rubella (MR); three doses of DPT/HiB/HepB and Pneumococcal; and four doses of Oral Polio Vaccine (OPV). However, children that mix any of the vaccines within the recommended period have the opportunity to take the vaccines until age five.

2.4. Study variables

2.4.1 Dependent variable

The study examined the outcome of social mobilization on two dependent variables namely,

***Immunization coverage*:**

Overall immunization coverage in the country is determined using Penta 3 as a proxy variable, although specific antigen coverages are also calculated. Immunization coverage was calculated per facility for antigens - penta3, MR1, MR2, and MenA. Immunization coverage was obtained as; (number of children immunized with specific antigen/Targeted population of children under-five)*100

***Measles-Rubella (MR) dropout rate*:**

For each health facility, the coverage for MR2 was deducted from the coverage of MR1, and based on WHO recommendation the difference should not be more than 10%, the difference was categorized as; >10 – high dropout rate; 6% - 10% - moderate dropout rate; 1% - 5% - low dropout rate; 0% - no dropout rate; and < 0% - negative dropout rate.

2.4.2 Independent variable

The independent variable for this study was the social mobilization intervention implemented in the Adaklu district.

The study assumed that all other factors that influence immunization coverage and dropout rate be constant before intervention and after the intervention. The only factor that changed was the implementation of 2YL social mobilization strategies in 2017.

2.5. Data source and collection approach

The study obtained data on health facility immunization coverage specifically on 2YL vaccines (MenA and MR2), the first dose of Measles-Rubella, and Penta3. Data on health facility immunization coverage was collected through the mining of existing administrative data in DHIMS into an excel template. Health facilities' recording of immunization coverage reported in the District Health Information Management System II (DHIMS II) before, during, and after the social mobilization intervention were extracted for analysis.

2.6. Data processing and management

Data obtained was cross-checked and edited to ensure consistency and accuracy. After data have been edited, it was coded and entered into the statistical analysis package, STATA IC version 16 for analysis.

2.7. Data analysis

The study employed descriptive and inferential analysis of data. Descriptive statistical analysis included the use of percentages presented in graphs to indicate the distribution and trend in immunization coverage over the period of 2016 to 2018. The inferential analysis essentially examined whether social mobilization influenced immunization coverage. The Pearson correlation was used to assess the outcome of the social mobilization on health facility dropout rate while paired t-test and Wilcoxon sign rank test was used to assess the outcome of the social mobilization on immunization coverage. The fisher's exact test was used for sensitivity analysis. The paired t-test and Wilcoxon sign rank test compared the immunization coverage before the intervention and coverage of the same vaccines during and after the intervention. The use of the paired t-test or the Wilcoxon sign rank test was based on the type of distribution of data on variables which was determined using the Shapiro Wilk W test of normality.

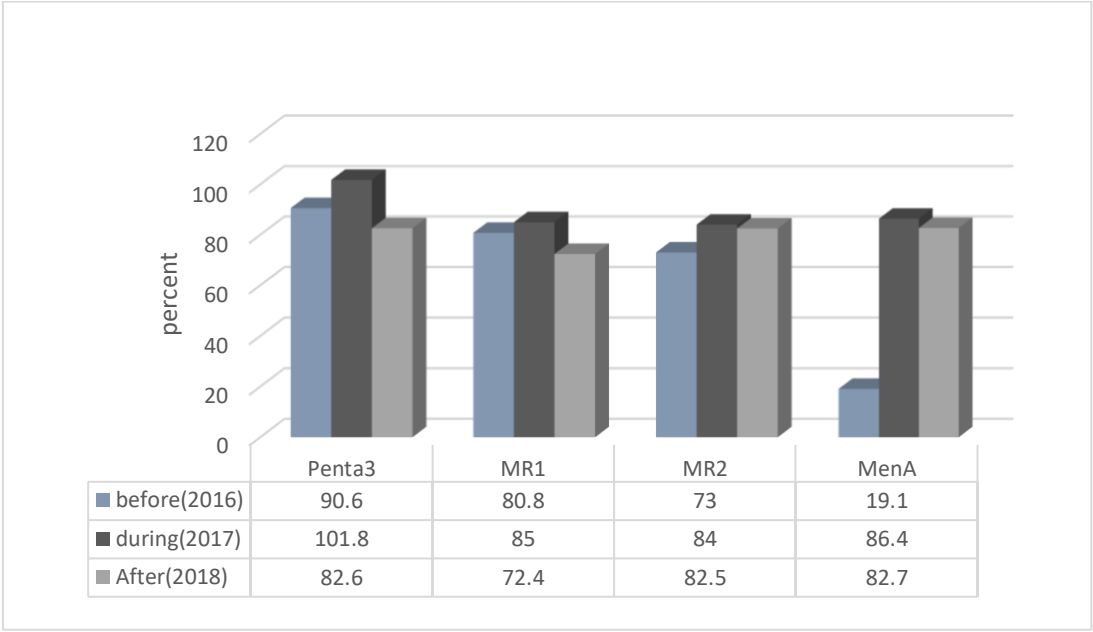
2.8. Ethical considerations

This study was reviewed and approved by the Ethics Review Committee (ERC) of the Ghana Health Service (GHS-ERC) with approval number GHS-ERC 027/06/20. In addition, permission to conduct the study was solicited and obtained from the District Director of Health Service in the Adaklu District and organizations that implemented the project.

3. Results

The district immunization coverage is presented for the three years (before, during, and after social mobilization) and covers the first dose of Measles-Rubella, Penta 3, the second dose of Measles-Rubella, and MenA vaccines.

From Figure 1, annual Penta 3 coverage increased from 90.6% in 2016 to 100 plus % in 2017. However, this reduced to 82.6% in 2018. Similarly, annual coverage for MR1 was higher in 2017 compared to the years before and after the implementation of social mobilization. Thus, MR1 coverage increased from 80% in 2016 to 85% in 2017 and reduced to 72.4% in 2018. There is an observed 5 percentage point and about 12 percentage point difference in MR1 coverage between the year of social mobilization implementation and the years before and after social mobilization respectively.



	Penta3	MR1	MR2	MenA
before(2016)	90.6	80.8	73	19.1
during(2017)	101.8	85	84	86.4
After(2018)	82.6	72.4	82.5	82.7

Figure 1: District Immunization coverage for four antigens for 2016 – 2018

Again, figure 1 indicates that a comparison of annual MR2 coverage shows an increase in coverage from 73% in 2016 to 84% in 2017. In the year (2017) of social mobilization, there was an improved MR2 coverage above the 80% minimum required coverage while coverage, before the intervention was below the minimum, recommended coverage. In 2018 after the social mobilization, coverage for MR2 reduced to 82.5% although it was above the 80% minimum required coverage. Further, there is an observed 67.3 percentage point difference between annual coverages for MenA vaccine wherein 2016 MenA coverage was 19.1% compared to the coverage in 2017 which was 86.4%. The wide difference in MenA coverage before and during social mobilization intervention may be attributed to the intervention due to its mobilization and education of communities and individuals for vaccines. However, the very low coverage in 2016 was because MenA vaccine was introduced into the immunization schedule in Ghana in the fourth quarter of 2016. Therefore, hesitancy on its introduction

may have been high contributing to the very low coverage on its introduction. In 2018 after the intervention, MenA coverage was still above the minimum 80% required coverage although there was about a 3.7 percentage point reduction in coverage.

3.1. Evaluating coverage for 2YL Vaccines in the District before and after Intervention

The descriptive analysis of the coverage for the various antigens of interest indicates an improved immunization coverage in the implementation year (2017) compared to the year before (2016) and the year after (2018). Assessing the statistical significance of the difference in coverage, the Shapiro Wilk W test of normal distribution was used to help determine the appropriate statistical test to use for each outcome variable.

The result of the Shapiro Wilk W test of normal distribution displayed in Table 1, indicates that two of the outcome variables (MR2 coverage and Penta3 coverage) were normally distributed.

Table 2. Shapiro Wilk W test for normally distributed data

Variable	Obs	W	V	z	Prob>z
MR1 coverage	60	0.89703	4.07	2.954	0.00157
MR2 coverage	60	0.96639	1.329	0.598	0.27494[a]
MenA coverage	60	0.89673	4.082	2.96	0.00154
Penta3 coverage	60	0.97552	0.968	-0.069	0.52747[a]

[a]Variable is normally distributed (p value for the W score >= 0.05)

For variables that were normally distributed, the paired t-test was conducted to compare means for each of the years. The result in Table 2 shows that there is an observed difference in the mean which are mostly positive. However, these differences were not statistically significant (i.e., P-values > 0.05). The result implies that social mobilization intervention implemented in the district was not effective in significantly improving coverage for Penta3 and MR2.

Table 3. Paired t-test for normally distributed variable

Antigen	Social Mobilization	Mean	Mean diff	Std. err. Diff	95% Conf. Interval (p-value)
Penta3 coverage	Before (2016)	87.155	-16.28	10.52172	-37.63743- 5.077428 (0.1308)
	During (2017)	103.435			
	During (2017)	103.435	24.01	11.97242	11.97242- 24.01 (0.0521)
	After (2018)	79.425			
	Before (2016)	87.155	7.73	10.56891	-13.72577 - 29.18577 (0.4694)
	After (2018)	79.425			
MR2 coverage	Before (2016)	75.55	-5.34	9.709936	-25.00408 - 14.32408 (0.5856)
	During (2017)	80.89			
	During (2017)	80.89	2.935	9.833148	-16.98204 - 22.85204 (0.7670)
	After (2018)	77.955			
	Before (2016)	75.55	-2.405	10.33182	-23.32103 - 18.51103 (0.8172)
	After (2018)	77.955			

The statistical significance of variables that were not normally distributed was tested using the Wilcoxon sign rank test. The result of the Wilcoxon signed-rank test as presented in Table 3 indicates that the observed difference in the median for MR1 coverage in 2016 and 2017 was not statistically significant. For MenA coverage, the difference in median coverage between 2016 and 2017 was

statistically significant. However, the difference in median coverage for 2017 and 2018 and for 2016 and 2018 was statistically significant. The Wilcoxon sign test revealed Z-socre of 2.02 with a probability value of 0.044 < 0.05 significant level for MR1 coverages for 2017 and 2018 and for 2016 and 2018 coverages, a Z-score of 2.50 with a probability value of 0.011 < 0.05 significant level was obtained. The result implies that social mobilization intervention was effective in improving the coverage for MR1 in 2017 and 2018 compared to 2016.

Table 4. MR1and MenA - Wilcoxon signed-rank test

Total obs = 210		**Obs**	**Total sum rank =210**		**Adjusted forties**	**Unadjusted variance = 717.5**		
Variable	Sign		Sum rank	Expected		Adjusted for zeros	Adjusted variance	Z-score (p-value)
MR1(HF)								
2016 – 2017	Positive	8	106.5	105	-0.13	0	717.38	0.06 (0.964)
	Negative	12	103.5	105				
	Zero	0	0	0				
2017-2018	Positive	14	159	105	0	0	717.5	2.02 (0.044)*
	Negative	6	51	105				
	Zero	0	0	0				
2016-2018	Positive	15	172	105	0	0	717.5	2.50 (0.011)*
	Negative	5	38	105				
	Zero	0	0	0				
MenA (HF)								
2016-2017	Positive	1	19	105	0	0	717.5	-3.211 (0.0006)**
	Negative	29	191	105				
	Zero	0	0	0				
2016 -2018	Positive	1	18	105	0	0	717.5	-3.248 (0.0005)**
	Negative	19	192	105				
	Zero	0	0	0				
2017 -2018	Positive	11	127	105	0	0	717-5	0.821 (0.4304)
	Negative	9	83	105				
	Zero	0	0	0				

*p<0.05; **p<0.01

Again, Table 3 indicates that the observed difference in median coverage for MenA in 2016 and 2017 and 2016 and 2018 were statistically significant. Thus, the difference in coverage before the social mobilization intervention and during the social mobilization intervention is statistically significant with a probability value of 0.0006 < 0.05 significance level. Similarly, the difference before and after the intervention was also statistically significant with a probability value of 0.0005 < 0.05 significance level. The result implies that social mobilization intervention was effective in improving the coverage for MenA before and after the implementation of the social mobilization and even during implementation, the effect of social mobilization was seen on MenA coverage.

3.2. Dropout rate between MR1 and MR2

Health facility dropout rates were compared on annual basis (2016 vs. 2017; 2016 vs. 2018; and 2017 vs. 2018) using a chi square test. Descriptive analysis as presented in table 5 reveals that about 25% and 10% of health facilities in the district in 2016 recorded negative dropouts and no dropouts respectively. However, in the year (2017) of the social mobilization intervention, about 65% (60% recording negative dropout and 5% recording no dropout) of health facilities in the district recorded

either negative dropout or no dropout. The negative dropout rate recorded by health facilities further increased to 70% after the implementation of the intervention in 2018. The annual difference in health facilities' dropout rate before (2016) and after (2018) the intervention is statistically significant at 0.05 alpha level based on Pearson chi-square value of 13.3844 and probability value of 0.010< 0.05 alpha level. The use of Fisher's exact test also revealed statistical significance with a p-value of 0.004< 0.05 alpha level. This implies that the activities of the social mobilization implemented in the year 2017 had made some contribution to reducing the annual dropout rate in the district and improved uptake of the second year of life immunization at the various health facilities.

Table 5. Dropout rate between the first dose of MR and second dose of MR

Year	Negative dropout %(N)	No dropout %(N)	Low dropout %(N)	Moderate dropout %(N)	High dropout %(N)	Pearson chi (P- value)
2016	25% (5)	10% (2)	10% (2)	10% (2)	45% (9)	6.3585 (0.174)$^{!+}$(0.164)
2017	60% (12)	5% (1)	0	10% (2)	25% (5)	
2016	25% (5)	10% (2)	10% (2)	10% (2)	45% (9)	13.3844(0.010)$^{!}$ *$^{+}$(0.004) *
2018	70% (14)	0	20% (4)	0	10% (2)	
2017	60% (12)	5% (1)	0	10% (2)	25% (5)	8.4396(0.077)$^{!+}$ (0.051)
2018	70% (14)	0	20% (4)	0	10% (2)	

$^{+}$Fisher's exact test; $^{!}$Pearson Chi Square test;*p<0.05

4. Discussion

The study revealed that social mobilization contributed to improved coverage for Penta 3, MR1, MR2, and MenA. However, in terms of the statistical effect of social mobilization on immunization coverage, the study revealed that social mobilization was only statistically significant in contributing to improving the coverage for MR1 and MenA vaccines. Further, the study found that the implementation of social mobilization contributed to improving the dropout rate at the facility level. Thus, as a result of social mobilization, the measles-rubella dropout rate at the facility level significantly reduced with the majority of the health facilities in the district recording either no dropout rate or a negative dropout rate.

In immunization service provision, the target is to reach every child. However, there are situations that lead to missed opportunities. For instance, Hanson et al reported that children with missed opportunities are not given vaccines missed in their first year even though they come in contact with health services in their second year of life [12]. The findings of the current study revealed that in the year of social mobilization and after, immunization coverage recorded was higher for all antigens of interest (Penta 3, MR1, MR2, and MenA) compared to the year before the implementation of social mobilization. This confirms the claim that social mobilization strategies contribute to missed out children being reached with immunization services, improving immunization confidence, and having fully immunized children [9, 13]. In addition, similar findings where higher coverage of immunization in communities in Nigeria was attributed to better social mobilization and community participation in the delivery of immunization services [10, 14]. Similarly, a community engagement project, the "Fifth Child" implemented in Ethiopia is taught to have enhanced immunization performance and increased utilization of immunization and selected perinatal health services [15]. Further, it also contributes to increased immunization knowledge, coverage, uptake, and other health services including antenatal care, and a decrease in maternal, infant, and under-5 mortalities [14]. Social mobilization has contributed to improving immunization coverage in communities where vaccine hesitancy is very high [14, 16].

Communication and social mobilization strategies are considered to be a major component in changing the behavior of communities to accept vaccines and improve immunization coverage. India is deemed to have achieved polio eradication mainly through revising it strategies for communication and social mobilization [17, 16]. The effectiveness of social mobilization in improving immunization coverage and health services in communities can be attributed to the involvement of communities in the implementation of health campaigns, where they take ownership of the process, help contextualise activities of the campaign and relate the program to the needs of their local communities [18].

The descriptive analysis of the coverage for the various antigen of interest indicates that the year during and after the social mobilization activities was undertaken had improved coverage compared to the years before. However, a statistical test of the significance of the difference for Penta3 and MR2 coverages were not statistically significant, although there were observed difference in mean coverage. Implying that the implementation of the social mobilization did not have any statistically significant effect on the coverage for Penta3 and MR2. However, for MR1 and MenA, there was a statistical difference in median coverage before and after the implementation of social mobilization, Implyingthat social mobilization was effective in improving the coverage for MR1 and MenA vaccines. Supporting the effectiveness of social mobilization on MR1 and MenA, Haldane et al concluded in their study that community participation has a positive impact on health service delivery, particularly when substantiated by strong organizational and community processes [19]. Thus, social mobilization as an intervention in the provision of primary health care may not be effective in improving the uptake of all health services. Social mobilization may contribute to improving uptake levels of some primary health services, it is not a panacea for improving all levels of public service delivery, it can, however, be effective in improving aspects of service delivery [20].

The dropout rate is one key challenge of immunization services. Multiple-dose vaccines administered at different ages of the child record high coverage for those provided in the early ages than the dose administered in the later ages. The WHO recommends that if there should be a dropout rate at all for vaccines with multiple doses administered at different ages, the rate should be less than 10%. This implies that at least 90% of all children that receive the first dose should also receive the subsequent doses of the vaccine. In Ghana, a study by Nyaku et al. revealed that the dropout rate for Measles-Rubella 1 and 2 were above the 10% WHO recommendation [4]. For instance, three regions; Northern, Volta, and Greater Accra recorded a dropout rate of 32%, 14%, and 31% respectively. The high dropout rate also necessitated the implementation of the 2YL social mobilization. This is because social mobilization has been identified as contributing to the reduction in the dropout rate. For instance, a UNICEF report indicated a diphtheria-containing vaccine campaign in Bangladesh reach 80% of the targeted population which fell short of the projected 95% coverage [21]. The shortfall was attributed to suboptimal social mobilization [22]. With an improvement in social mobilization in the subsequent campaign, coverage for diphtheria vaccination increased >90% [21]. An assessment of social mobilization for immunization in an urban slum found improvement in immunization coverage - 33% drop-out rate at baseline reduced to 1% drop-out after the intervention [7]. Consistent with the finding of Uddin et al and UNICEF, the result of this study on social mobilization indicates that the majority of the health facilities in the district recorded a negative dropout rate in the year after social mobilization activities were implemented. This implies that in the year after project implementation, the number of children immunized for the MR2 vaccine in health facilities exceeded the number immunized for MR1 vaccine. An indication that there were under-five children within the district that had defaulted on MR2 vaccines in previous years but through the social mobilization activities, these children were either referred for immunization or were taken for missed vaccines by caregivers as a result of some form of education or information caregivers have received. A study by Baguune, Ndago, and Adokiya that found lower dropout rates attributed the success in lower dropouts to the health system decentralization efforts,

establishment of Community-based Health Planning Services (CHPS) that provided static and outreach immunization services, and community involvement through health volunteers and defaulter tracing [23] which are major activities of CSO's social mobilization campaigns in communities. On the contrary, high immunization dropout rates in DRC were attributed to unavailability of seats, non-compliance with the order of arrival during vaccination in health facilities, as well as the lack of a reminder system on days before the scheduled vaccination [24]. This situation can be averted by integrating social mobilization in the immunization service provision at the community level to help lower the immunization dropout rate as established in this current study.

The CSOs social mobilization activities significantly contributed to a reduction in the dropout rate at the health facility level. There is improved uptake of MR2 vaccines at the facility level and sustained mobilization will ensure a minimal dropout rate. This is because, social mobilization is taught as a community engagement approach that empowers communities, work with volunteers, and develops solutions to be overcome barriers to assessing health services at the local community level such as strengthening governance at the community level to increase the availability and quality of health services [13]. CSOs social mobilization contributing significantly to reducing the facility dropout rate and statistically improving coverage for MR1 and MenA is evidence that improving health outcomes including immunization indicators is not linear progress, it rather involves complex processes influenced by an array of social and cultural factors [19].

A few issues are important in the interpretation of the study findings. First, the study area – Adaklu District has 20 health facilities serving the population of the district. This limited the sample size (number of health facilities) used for the study with possible of affecting the external validity of data. Second, the method for the evaluation was designed after the implementation of the intervention placing a limitation on the use of a control or comparison group raising the questions of validity. However, the use of the single group pre and post-test design allows pre-intervention data to be used as baseline and post-intervention data as end line making it possible to compare results. This study design was useful as conditions for experimental design do not exist to determine the merits of intervention. Third, the evaluation assumed that factors that influence immunization coverage and dropout rate were constant before intervention and after the intervention. The only factor that changed was the implementation of 2YL social mobilization strategies in 2017. Therefore, the results of the evaluation can only be interpreted based on this assumption.

5. Conclusion

The implementation of social mobilization contributed to health facilities in the district significantly improving upon Measles-Rubella dropout rate. The statistical evaluation of the outcome of social mobilization on immunization coverage was significant for MR1 and MenA, but was not statistically significant for Pent3 and MR2 in the study area. However, descriptive evidence on immunization coverage (MR1, MenA, MR2, and Penta3) suggests that the year in which social mobilization was implemented had higher coverages than the year where there was no social mobilization activity. The implementation of social mobilization can be a good strategy for improving immunization coverage while helping achieve the global immunization strategy of leaving no child behind. This is because social mobilization can positively have effects of educating and sensitizing individuals and households on the need for immunization and the fact that immunization is a continuous process beyond age one of the child.

Ethical statement:

The study made use of secondary data and for this reason, the study addressed all the ethical issues related to secondary data sources and their use. Ethical clearance was sought from the Ghana Health

Service Ethics Review Committee with approval number GHS-ERC 027/06/20. In addition, permission to conduct the study was solicited and obtained from the District Director of Health Service in the Adaklu District and organizations that implemented the project.

Acknowledgment:

We wish to thank the District Director of Health Services and Disease Control Officer of the Adaklu District in Volta region, Ghana. Our sincere gratitude goes to Second Year of Life (2YL) coordinator - Dr. Joseph Kwadwo Opare for his encouragement and support when the idea of evaluating the 2YL social mobilization in Adaklu was picked up. We are also thankful to Ghana Coalition of NGOs in Health, the Ghana Red Cross Society, and the Health Promotion Division of Ghana Health Service for allowing your work to be evaluated.

Conflict of interest:

The authors have no conflict of interest.

Funding:

The study was funded by the Authors.

Authors' Contributions:

All authors mentioned in the paper made a significant contribution to the research.
J. K.B: Conceptualization and draft of the manuscript (30%)
J. N: Review of the manuscript (20%)
M. A: Review of the manuscript (20%)
G. C.A: Conceptualization and draft of the manuscript (30%).
All authors reviewed and approved the manuscript.

References

[1] Chandra, S. A., Ramachandra, S. S., et al. "National Family Health Survey-3 reported, low full immunization coverage rates in Andhra Pradesh, India: who is to be blamed?" *Journal of Public Health*, 33 (4), 489-495, 2011.

[2] European Public Health Alliance, Access to Childhood Vaccination, Brussels, 2015, https://epha.org/wp-content/uploads/2015/12/Access-to-Childhood-Vaccination.pdf

[3] WHO, "2018 Assessment report of the Global Vaccine Action Plan. Strategic Advisory Group of Expert on Immuization" Geneva, 2018, https://apps.who.int/iris/bitstream/handle/10665/276967/WHO-IVB-18.11-eng.pdf?sequence=1&isAllowed=y

[4] Nyaku, M., Wardle, M., et al. "Immunization delivery in the second year of life in Ghana: the need for a multi-faceted approach" *The Pan African Medical Journal*, 27(Supp 3), 4, 2017.

[5] Yawson, A. E., Bonsu, G., et al. "Regional disparities in immunization services in Ghana through a bottleneck analysis approach: Implications for sustaining national gains in immunization", *Archives of Public Health*, *75*(1), 1–10, 2017.

[6] GHS, Ghana Health Service 2014 Annual Report, GHS, Gana, 2015.

[7] Uddin, M. J., Larson, C. P., et al. "Child immunization coverage in urban slums of Bangladesh: Impact of an intervention package", *Health Policy and Planning*, 25(1), 50–60, 2010.

[8] Pradhan, N., Ryman, T. K., et al. "Expanding and improving urban outreach immunization in Patna, India", *Tropical Medicine and International Health*, 17(3), 292–299, 2012.

[9] Deutsch, N., Singh, P., et al "Legacy of Polio - Use of India's Social Mobilization Network for Strengthening of the Universal Immunization Program in India", *Journal of Infectious Diseases*, *216*(Suppl 1), 260–266, 2017.

[10] Dienye, P., Itimi, K., et al. "Community participation and childhood immunization coverage: A comparative study of rural and urban communities of Bayelsa State, south-south Nigeria", *Nigerian Medical Journal*, *53*(1), 21, 2012.

[11] WHO (2020, Feb. 21). *WHO's Reproductive Maternal and Child Health (RMCH) scorecard platform* [Online]. Available: https://www.who.int/data/gho/data/themes/topics/topic-details/GHO/health-equity-monitor-reproductive-maternal-newborn-and-child-health-interventions-(rmnch)-combined

[12] Hanson, C. M., Mirza, I., et al. "Enhancing immunization during the second year of life by reducing missed opportunities for vaccinations in 46 countries". *Vaccine*, 36(23), 3260–3268, 2018.

[13] Jalloh MF, Sengeh P, Ibrahim N, et al. "Association of community engagement with vaccination confidence and uptake: A cross-sectional survey in Sierra Leone, 2019", *J Glob Health*, 12:04006, 2022. doi: 10.7189/jogh.12.04006

[14] McArthur-Lloyd, A., McKenzie, A., et al. "Community Engagement, Routine Immunization, and the polio Legacy in Northern Nigeria", *Global Health Communication*, 2(1), 1-10, 2016.

[15] Demissie, S. D., Kozuki, N., et al. "Community engagement strategy for increased uptake of routine immunization and select perinatal services in north-west Ethiopia: A descriptive analysis". *PLoS ONE*, 15(10), e0237319, 2020

[16] Choudhary M, Solomon R, Awale J, Dey R, Singh JP, Weiss W. "Significance of a social mobilization intervention for engaging communities in polio vaccination campaigns: Evidence from CORE Group Polio Project, Uttar Pradesh, India", *J Glob Health*,11:07011, 2021

[17] Debaje, S. P. "Communication and mobilization campaigns for immunization (CMCI): need of time for strengthening Immunization services in India", *International Journal of Research in Medical Science*, 2(3), 830-833, 2014.

[18] Chimpololo, A. and Burrowes, V. "Use of Social Mobilization and Community Mobilizers by Non-governmental Health Organizations in Malawi to Support the Eradication of Polio, Improve Routine Immunization Coverage, and Control Measles and Neonatal Tetanus", *Am. J. Trop. Med. Hyg.*, 101(Suppl 4), 85–90, 2019

[19] Haldane, V., Chuah, F. L. et al. "Community participation in health services development, implementation, and evaluation: A systematic review of empowerment, health, community, and process outcomes". *PLoS ONE*, 14 (5), e0216112, 2019.

[20] Giné, X., Khalid, S. et al. "The Impact of Social Mobilization on Health Service Delivery and Health Outcomes Evidence from Rural Pakistan", in: *Towards Gender and Development* (Ed. Siwan Anderson, Lori Beaman, and Jean-Philippe Platteau), Oxford University Press, London, pp. 1 – 25, 2018.

[21] UNICEF "Bangladesh Humanitarian Situation Report No.22", Rohingya Influ, UNICEF, 2018

[22] Jalloh, M. F., Wilhelm, E., et al. "Mobilize to vaccinate: lessons learned from social mobilization for immunization in low and middle-income countries", *Human Vaccines & Immunotherapeutics*, 16(5), 1208-1214, 2020.

[23] Baguune, B., Ndago, J.A. & Adokiya, M.N. "Immunization dropout rate and data quality among children 12–23 months of age in Ghana", *Arch Public Health*, 75(18), 1-8, 2017.

[24] Kayembe-Ntumba, HC., Vangola, F., Ansobi, P. *et al.* "Vaccination dropout rates among children aged 12-23 months in the Democratic Republic of the Congo: a cross-sectional study", *Arch Public Health*, 80(18), 1-10, 2022.