




# Full Vaccination Coverage and Associated Factors Among 12-to-23-Month Children at Assosa Town, Western Ethiopia, 2020

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**Introduction:** Vaccination means the injection of a killed microbe to stimulate the immune system against the microbe, which prevents communicable diseases. It's the most important and cost-effective public health intervention to reduce child mortality and morbidity. Ethiopian national full vaccination coverage is 43%. This research aimed to assess full vaccination coverage and associated factors among 12-to-23-month children at Assosa Town.

**Methods:** A community-based cross-sectional study was conducted among children aged of 12 to 23 months from November to December 2020. Assosa town has two woredas. Each woreda has five kebeles. By using lottery method, five kebeles were selected from two woredas. Systematic sampling technique was used for sampling. The total sample size was 372. It was calculated by the proportionate allocation method. Questioners were used to collect data by the observation of vaccination caring and mother interviewing. Data were entered into SPSS and analyzed. Multivariate analysis was used by considering a 95% confidence interval. Variables whose p-value less than 0.05 were identified as significant.

**Results:** The respondent rate of this study was 372 (100%). Of the total respondents, 338 (90.8%) were females and 34 (9.1%) of them were males. The coverage of full, partial, and non-vaccination is 71.77%, 16.67%, and 11.56%, respectively. Based on multivariate logistic regression analysis, child age [AOR=2.7, 95% CI: (1.36, 5.4)], no antenatal care visit [AOR=0.41, 95% CI: (0.24, 0.71)] and fear of covid 19 at health institutions [AOR=3.5, 95% CI: (2, 6)] were identified as significant variables. There are major identified factors for partial and non-vaccination.

**Conclusion:** Coverage of full, partial, and non-vaccination was 71.77%, 16.67%, and 11.56%, respectively. Child age, no antenatal care visit, and fear of covid 19 at health institutions were significant variables. Fear of covid-19 is the commonest factor for partial and non-vaccination.

**Keywords:** Assosa, factors, full vaccination, 12-to-23 months

## Introduction

Immunization is the process whereby a person is made resistant to an infectious disease, typically usually by the administration of a vaccine.<sup>1</sup>

Immunization of children against preventable diseases is crucial to decrease childhood mortality and morbidity across the globe. Making and improving routine immunization services are the best options for prevention and control of vaccine preventable diseases. For that reason, the expanded program of immunization (EPI) was launched in 1974 as a global<sup>2</sup> and in 1980 it was launched by Ethiopian government Federal Ministry of Health (FMoH), with the goal of increasing immunization coverage by 10% annually.<sup>3</sup>

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Universal immunization of children for six common vaccine-preventable diseases, namely, tuberculosis, diphtheria, whooping cough (pertussis), tetanus, polio, and measles, is crucial in reducing infant and child mortality.<sup>4</sup> Other added childhood vaccines given in Ethiopia protect against hepatitis B, Hib, PCV, and rotavirus.<sup>4</sup>

WHO has estimated that around 29% of under-five-year deaths could be prevented with existing vaccines, which prevents between 2 and 3 million deaths each year globally.<sup>5</sup> It is considered as one of the most preferable and cost-effective ways of all health interventions. It also prevents incapacitating illness and complications and saves the lives of millions every year.<sup>6</sup> Given the short-term and long-term impact of declining immunization rates on child health, there is a need to actively monitor vaccination practices in low-resource settings to ensure there are no disruptions in service delivery.<sup>7</sup>

Children without vaccination and child/pediatric age in Africa are children at risk for the worst social and health outcome.<sup>8</sup>

Various reports vilified that the infant mortality rate is more common in low-income countries. Most children living in sub-Saharan Africa die every 12 months from communicable diseases that can be prevented through vaccination. For example, evidence of WHO from 2001 to 2008 revealed that around 9 million child deaths worldwide as a result of vaccine-preventable diseases, a higher proportion occurred in sub-Saharan Africa, which was 4.4 million.<sup>9</sup>

In 2018, complete immunization coverage at Ethiopian national level and Amhara region was 38.5% and 45.8%, respectively.<sup>10</sup>

According to EDHS 2019, full immunization coverage is 43%<sup>4</sup> and other national research reviews conducted from 2003 to August 2019 revealed that full immunization coverage in Ethiopia was 58.92%.<sup>11</sup>

Therefore, accurate immunization evidence is essential for decision-makers of the immunization program to track and improve its performance.<sup>10</sup>

Thus, this study would fill the existing information gap and help decision-makers and policy makers, regional and national programmers, and service providers to overcome challenges and improve the coverage of child vaccinations, which help fight vaccine-preventable diseases. Moreover, it would be a guide for effective utilization of resources by providing relevant and evidence-based recommendations for addressing issues related to vaccination.<sup>12</sup>

There for conducting this research helped to test the new variables incorporated, which helps as a baseline for other researchers.

## Objectives

### General Objective

To assess full vaccination coverage and associated factors among 12-to-23-month children at Assosa Town, Western, Ethiopia, 2020.

### Specific Objective

To assess full vaccination coverage among 12-to-23-month children at Assosa Town, Western, Ethiopia, 2020.

To determine factors associated with full vaccination coverage among 12-to-23-month children at Assosa town, Western, Ethiopia, 2020.

## Methods and Materials

### Study Area and Design

The study was conducted from November 01/2020 to December 10/2020 in Assosa town, Benishangul Gumuz region, Western Ethiopia. Assosa town is situated 662 km north western Addis Ababa and the town has two Woredas and it has one governmental hospital, two health centres, and eight private clinics. Women of childbearing age (15–49) were 7867 and a total of 5291 were children under 5 years of age. From these two woredas five kebeles were selected. From woreda one, two kebeles were selected and which has around 1497 children. From woreda two, three kebeles were selected and which has around 1381 children with the age range of 12 to 23 months.

### Source Population

All households which have children 12 to 23 months who were living in Assosa Zone, Assosa woreda Town.

### Study Population

The study population was children from 12 to 23 months of age from five randomly selected kebeles in Assosa town.

### Sample Size Determination

The sample sizes required were determined based on a single proportion population formula with the assumption of 5% marginal error (d), 95% confidence level (z), and the estimated proportion of full vaccine coverage is 48.8% which is conducted in Oromia, Serbo Town.<sup>13</sup>

$$n_0 = \frac{Z_{\alpha/2}^2 p (1-p)}{d^2}$$

$$(1.96)^2 \cdot 0.488 (1-0.488)$$

$$0.05^2$$

Based on the specification of the above formula, we got 383. The total number of eligible children below 2 years of age in the district is 2878 which is less than 10, 000. Therefore, we were using the finite population correction formula;

$$n_f = \frac{n_0}{1 + n_0/N}$$

$n_f$  = final sample size= required  
 $N$  = total number of eligible children=2854

By using the formula,  $n_f=338$ . Then we were added a 10% non-respondent rate which gave the final sample size of 372, so the final sample size was of 372.

## Sampling Techniques and Procedures

There were two Woredas in Assosa Town. These are Woreda one and Woreda two. Each Woreda has five Kebeles. From Woreda one, two kebeles and from Woreda two, three Kebeles were selected by using the lottery method. From Woreda one, Kebele one and Kebele three had target groups of 309 and 284, respectively. From Woreda two, Kebele two, Kebele four, and Kebele five had target groups of 295, 276, and 280, respectively.

By using proportionate allocation method, K value was approximately 5 for all five kebeles. Finally, systematic sampling was used to collect data every five intervals.

## Inclusion Criteria and Exclusion Criteria

### Inclusion Criteria

Children with their mother or caretaker living in Assosa town for at least 12 months

The inclusion criteria were all mothers or caregivers who had a child aged from 12 to 23 months. And caretakers aged 15 years and above were included in this study.

### Exclusion Criteria

Mentally or critically ill mothers or care children with their mother or caretakers who had not been living in the study area for at least 12 months to the date of data collection. And caretakers aged below 15 years were excluded from the study.

### Data Collection Procedure

Questionnaires were prepared in English and then translated to Amharic and translated back to English for

accuracy and consistency. It was collected by two trained BSc Nursing professionals.

Data on vaccination history were collected from the available immunization cards. Mothers or care takers of the child were asked for presence of the card. Then the information found on the immunization cards were recorded accordingly.

## Data Quality Control and Analysis

The Questionnaires were prepared in English and translated in to Amharic by ourselves and then translated back to English by another translator to compare the consistency. A two-day training was given for 2 BSc Nursing professionals who had a training certificate before and experience with the immunization services. Before data collection, the questionnaire was pretested on 5% of mothers in Bambasi Woreda and the findings were excluded from the main study. Data entry, cleaning, coding, and analysing were performed by using SPSS version 22 statistical software. Reasons for vaccination failure among partial and non-vaccination were analysed by descriptive statistics for observation.

## Operational Definitions

### Fully Vaccinated/Complete Immunization

A child from 12- to 23-month-old who received one dose of BCG, at least three doses of pentavalent, four doses of OPV/IPV, two doses of Rota, and one dose of measles vaccine by card plus mother history.

### Partially/Incompletely Immunized

A child 12 to 23 old who had missed anyone vaccine out of the ten vaccines.

### Non-Vaccinated/Immunized

A child 12 to 23 old who did not receive any vaccine.

### Caretaker

It is the most responsible person that provides child care for the 12 to 23 old children whose biological mother could not provide intimate care.

### Kebele

Is the smallest administrative area of Ethiopia.

## Study Variables

### Dependent Variable

Full vaccination/complete immunization

## Independent Variables

### Socio-Demographic Variables

Age, sex, marital status of the mother, religion, number of children and ethnicity, monthly family income, occupation, educational status of the family, residence, birth order, and place of birth of the index children

### Maternal Health Care Utilization and Related

Facility of vaccination, time to reach health facility, fear of covid 19 at health institutions.

### Availability and Accessibility of Vaccination Service

Attained ANC visit, Number of ANC visits, Received TT Vaccine, Number of TT injections and place of delivery.

### Knowledge of Mothers/Caretakers on Vaccine and Vaccine-Preventable Disease

Heard about vaccination, the way of information heard, objectives of vaccination, numbers of sessions for full vaccination, age of child to begin vaccination, vaccination will make your child sick, you bring a sick child for vaccination, and your child take any vaccination.

## Ethical Consideration

The ethical clearance was secured from the Internal review board of Assosa University on September 6/2020 with Ref. No: ASU/IRB/007/2020. An official support letter from Department of Public Health were written to the administrative body of Assosa town health office. It was conducted in accordance with the Declaration of Helsinki. Data collections were started after permissions were obtained from the town health office and municipality. Study participants were asked their informed consent before asking for any information. The objectives of the study were explained to every participant and were asked to give information only after they gave their written informed consent. No person was obligated to participate in the study without his or her consent. Also, participants under 18 years of age were approved by the ethics committee to provide informed consent on their own behalf.

## Results

Three hundred and seventy-two (372) mothers were eligible to participate in the study and we had a 100% respondent rate.

## Sociodemographic Characteristics of the Study Population

From the total of 372 respondents, 338 (90.9%) were female and 40 (9.1%) of them were male. From total mothers, 10 (2.7%), 85 (22.8%), 126 (33.9%), and 151 (40.6%) were aged found in the age range of 15–19, 20–24, 25–30 and above 30, respectively.

Around 242 (65.1%) of the mother's educational status were secondary school and above, whereas most of the mother's income levels were greater than 3000 thousand Ethiopian Birr and it accounts 205 (55.1%) (Table 1).

**Table 1** Socio, Demographic, and Economic Status of the Respondents at Assosa Town, Ethiopia, 2020

Variables	Categories	Frequency	%
Respondent Sex	Male	34	9.1
	Female	338	90.9
Respondent Religion	Orthodox	179	48.1
	Muslim	135	36.3
	Protestant	54	14.5
	Other	4	1.1
Mother age	15–19	10	2.7
	20–24	85	22.8
	25–30	126	33.9
	>30	151	40.6
Mothers' education	Cannot read and write	18	4.8
	Read and write	47	12.6
	Primary	65	17.5
	Secondary and above	242	65.1
Marital status	Single	18	4.8
	Married	303	81.5
	Divorced	21	5.6
	Widowed	30	8.1
Mother Occupation	Farmer	68	18.3
	Pastoralist	18	4.8
	Merchant	78	21.0
	Daily worker	29	7.8
	Government worker	178	47.8
	Other	1	0.3
Ethnicity	Oromo	119	32
	Amhara	131	35.2
	Berta	66	17.7
	Gumuz	44	11.8
	Other	12	3.2
Monthly income	<1500	23	6.2
	1501–3000	144	38.7
	>3000	205	55.1

## Sociodemographic Characteristics of Child

Approximately the same percentage of sex is 49.5%, 50.5% are male and females, respectively. And the percentage of child age who are >12 months accounts 57%, see (Table 2).

## Maternal Health Care Utilization and Related

From the 372 respondents, 369 (99.2%) of them had access to vaccination and the rest of them did not have access. And around 278 (74.7%) of all respondents had fear of covid 19 at health institutions during the time of vaccination (Table 3).

## Availability and Accessibility of Vaccination Service

Two hundred ninety (78%) mothers were attending their ANC visit during their pregnancy time. And 276

**Table 2** Sociodemographic Characteristics of Children Among 12 to 23 Months in Assosa Town, Ethiopia, 2020

Variables	Categories	Frequency	%
Child sex	Male	184	49.5
	Female	188	50.5
Child age	12–15 months	184	49.5
	16–19 months	114	30.6
	20–23 months	74	19.9
Number of siblings	0–2	167	44.9
	3–5	186	50
	>5	19	5.1
Birth spacing	< 2 years	194	52.2
	> 2 years	178	47.8

**Table 3** Maternal Health Care Utilization and Related Characteristics Among 12 to 23 Months at Assosa Town, Ethiopia, 2020

Variables	Categories	Frequency	%
Is there health facility access for vaccination	Yes	369	99.2
	No	3	0.8
Time to reach to health facility	<30 minutes	160	43
	30–60 minutes	185	49.7
	>60 minutes	27	7.3
Fear of COVID-19 at health institutions	Yes	94	25.3
	No	278	74.7

**Table 4** Availability and Accessibility of Vaccination Service-Related Characteristics Among 12 to 23 Months at Assosa Town, Ethiopia, 2020

Variables	Categories	Frequency	%
Attained ANC Visit	Yes	290	78
	No	82	28
Number of ANC Visit	Yes	258	69.4
	No	114	30.6
Received TT vaccine	Yes	303	81.5
	No	69	18.5
Number of TT injection	One times	66	17.7
	Two times	220	59.7
	Three times	16	4.3
	Zero times	70	18.8
Place of delivery	Health Facility	276	74.2
	Home	96	25.8

(74.2) of the mothers gave birth at health institutions and the rest 96 (25.8%) were gave birth at home (Table 4).

## Knowledge of Mothers/Caretakers on Vaccine and Vaccine-Preventable Disease (VPD)

The majority 351 (94.4%) of the mothers reported that they heard about vaccination and only 21 (5.6%) were did not heard about vaccination. From those mothers who were heard about vaccination, most of them 157 (42.2%) got information from the health profession. Around 220 (59.1%) of the respondents said that the objective of vaccination is prevention of diseases.

Three hundred twenty-nine (88.4%) respondents think that vaccination will make their child sick (Table 5).

## Vaccination Coverage of Children Aged 12–23 Months

From the total of 372 study participants, the coverage of full vaccination, partial vaccination, and non-vaccination was 71.77%, 16.67%, and 11.56%, respectively (Figure 1).

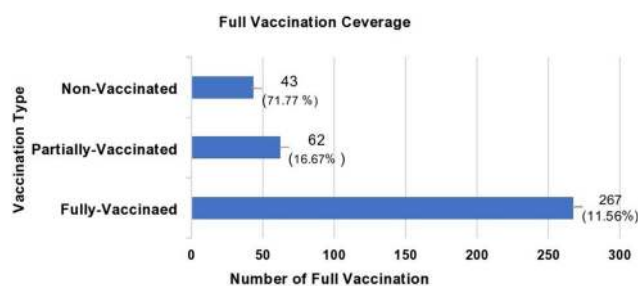
## Vaccination Coverage for Each Vaccine Type

The coverage immunizations for full, partially vaccinated, and none vaccinated were 71.77%, 16.67%, and 11.56%, respectively.

**Table 5** Knowledge of Mothers/Caretakers on Vaccine Related Characteristics Among 12 to 23 Months at Assosa Town, Ethiopia, 2020

Variables	Categories	Frequency	%
Do you hear about vaccination	Yes	351	94.4
	No	21	5.6
Way you heard	Radio	38	10.2
	TV	31	8.3
	Friends	88	23.7
	Schools	33	8.9
	Health	157	42.2
	Personals		
	Others	4	1.3
	No	21	5.4
Objects of Vaccination	To prevent disease	220	59.1
	For specific disease	18	4.8
	For Child health	107	28.8
	Do not know	7	1.9
	Others	20	5.4
Number of sessions for full vaccination	One	7	1.9
	Two	7	1.9
	Three	35	9.4
	Four	62	16.7
	Five	261	70.2
Age of child to begin vaccination	Just after birth	299	80.4
	One month after birth	35	9.4
	After one year	2	0.5
	I do not know	36	9.7
Do you think vaccination will make your child sick?	Yes	43	11.6
	No	329	88.4
Do you bring a sick child for vaccination?	Yes	57	15.3
	No	315	84.7
Did your child take any vaccination?	Yes	11	3
	No	361	97
Do you have a card?	Yes	372	100

From all children, around 326 (87.9%) took BCG. And most of them were taking OPV0 and the percentage of all other vaccines were gone reducing. The coverage of BCG, OPVO, PCV1, Penta 1, Rota1, and IPV are 326 (87.9%), 316 (84.9%), 310 (83.3%), 310 (83.3%), 310 (83.3%) and 284 (76.3%), respectively (Figure 2).



**Figure 1** Bar graph to compare full, partial, and non-vaccination among 12 to 23 months at Assosa Town, Ethiopia, 2020 (n=372).

### Reasons for Vaccination Failure Among Never or Partially Vaccinated Children

#### Reasons for Failure to Complete Full Vaccine

Those respondents who were partially vaccinated with their children were interviewed for reasons of failure to complete. Accordingly, the major reasons are fear of covid-19, lack of awareness, fear of side effects, and religious and cultural barriers which account 26 (41.9%), 16 (25.8%), 8(12.9%) and 6(9.7%) respectively are the main reasons for vaccine dropout (Table 6).

#### Reasons for Not Ever Vaccinating Child

Concerning the reason for not ever vaccinating their children, from the total children who were not ever vaccinated, the major reasons were fear of covid-19, lack of awareness and fear of side accounts 16 (37.2%),16 (37.2%) and 10 (23.3%) respectively were the main reasons (Table 6).

#### Factors Associated with Full Vaccination Status

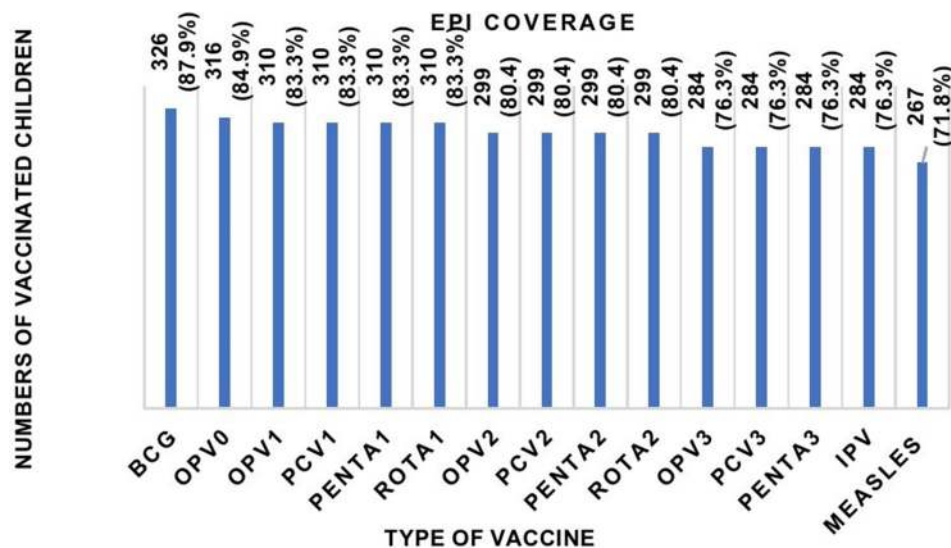
Based on the study conducted, child age, no ANC follow-up, and fear of covid 19 at the health institution were identified as significant factors for full vaccination (Table 7).

## Discussion

The coverage of immunization for full, partially immunized, and non-immunized were 71.77%, 16.67%, and 11.56%, respectively.

This study assessed immunization coverage and factors associated with part and non-vaccination status among children aged between 12 and 23 months in Assosa Town. In this study, a total of 372 mothers/caretakers who have immunization card were interviewed and the response rate was 100%.

Based on the findings of this research, the coverage of full vaccination was 267 (71.77%). This finding was low where



**Figure 2** Bar graph shows EPI coverage among 12 to 23 months at Assosa Town, Ethiopia, 2020 (n=372).

compared with studies conducted in Amhara, Mercha district (87.7%),<sup>14</sup> Amhara, Bahirdar town (75.6%),<sup>15</sup> Minjar Shenkor district (75.7%)<sup>16</sup> Amhara, Debre Markos Town (91.7%),<sup>12</sup> Amhara Gondar city administration (77.4%)<sup>17</sup> and Tigray Sekota Zuria Woreda (75.5%)<sup>18</sup>

This might be because of lack of awareness, fear of covid 19 at health institutions, fear of side effects, and religious and cultural barriers.

According to bivariate and multivariate logistic regression analysis, child age, no ANC visit, and fear of COVID 19 at health institutions were identified as significantly associated factors of full vaccination.

Children between 12 and 15 months of age were 2.7 times more likely to become incomplete immunization when compared to those of age from 20 to 23 months [AOR=2.7, 95% CI: (1.36, 5.4)].

Children whose mothers did not have prenatal care visits (ANC) are less likely to receive full vaccination compared to mothers who had an ANC visit. This finding was consistent with the result obtained in Mizan Aman Town<sup>19</sup> to: The use of prenatal care encourages the use of subsequent maternal and child health services, like vaccination.<sup>20</sup>

Children whose mothers had fear of COVID 19 at health institutions were 3.5 times more likely to have incomplete/non-immunization when compared with those mothers who had no fear of covid 19 at health institutions [AOR=3.5, 95% CI: (2, 6)]. This finding is in line with studies conducted in different areas.

In fact, this could be due to the risk of infection and the need to maintain physical distance in the early stages of the COVID-19 pandemic. Many countries have temporarily and

**Table 6** Reasons for Vaccination Failure Among Partially and Non-Vaccinated Children Among 12 to 23 Months at Assosa Town, Ethiopia, 2020

Reasons	Partial Vaccination				Total	Non Vaccinated				Total
	Yes	%	No	%		Yes	%	No	%	
Sibling and twin related	2	3.2	1	0.32	3	0	0	3	0.91	3
Health worker did not come to give vaccine	1	1.6	0	0	1	0	0	1	0.3	1
Religious and cultural barrier	6	9.7	1	3.22	7	1	2.32	6	1.82	7
Lack of awareness	16	25.8	17	5.48	33	16	37.2	17	5.16	33
Fear of side effect	8	12.9	10	3.22	18	10	23.25	8	2.43	18
Fear of COVID 19	26	41.9	16	5.16	42	16	38.1	26	7.9	42
Far distance	3	4.84	0	0	3	0	0	3	0.91	3
Total	62	100	310	17.4	372	43	100	329	19.43	372

**Table 7** Bivariable and Multivariable Logistic Regression Analysis with p value Less Than 0.2

Variables	Category	Full Vaccination		Crude OR (95% CI)	Adjusted OR (95% CI)	P value
		Yes	No			
Child Age in months	12–15	116(63)	68(37)	2.5(1.3,4.8)	2.7(1.36,5.4)	0.005
	16–19	91(79.8)	23(20.2)	1.1(0.5,2.3)	1.1(0.5,2.4)	0.82
	20–23	60(81.1)	14(18.9)	1	1	1
Birth spacing	< 2 years	133(68.8)	61(31.4)	1	1	1
	> 2 years	134(175.3)	44(24.7)	1.39(0.89,2.2)	1.4(0.87,2.34)	0.17
ANC follow-up	Yes	197(74.4)	61(23.6)	1	1	1
	No	70(61.4)	44(38.6)	0.5(0.3,0.8)	0.41(0.24,0.71)	0.01
Fear of COVID-19 at health institutions	Yes	50(53.2)	44(46.8)	1	1	1
	No	207(78.1)	61(21.9)	3.13(1.9,5.1)	3.5(2,6)	0.001
Place of delivery	Yes	207(75)	69(25)	1	1	1
	No	60(62.5)	36(37.5)	0.06(0.34,0.91)	0.06(0.34,1)	0.6
Accessibility of Health facility	Yes	266(72.1)	103(27.9)	1	1	1
	No	1(33.3)	2(66.7)	0.19(0.017,2.16)	0.3(0.02,4.5)	0.4

**Abbreviations:** COR, crude odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

adequately suspended mass preventive vaccination campaigns against vaccine-preventable diseases.<sup>21</sup>

The pool of un-immunized children is expanding during lockdown, leaving them susceptible to vaccine-preventable diseases.<sup>22</sup>

In times of quarantine, vaccination activities in all age groups, especially routine vaccines for children, were interrupted, delayed, reorganized, or completely transferred to another time. Many developed, as well as undeveloped and developing countries, are now seeing rapid declines in childhood vaccination rates.<sup>23</sup>

Covid 19 affects health care delivery like vaccination programs.<sup>24</sup>

Strategies like stay-at-home, social distancing results in decreased accessibility to routine immunization services and make children at risk for vaccine preventable-diseases and also its complications.<sup>25</sup>

The mitigation measures adopted to control the COVID-19 pandemic threaten to undo the progress achieved in the control of vaccine-preventable diseases in low- and middle-income countries and high-income countries.<sup>26</sup>

From the major reasons for vaccination failure among partially vaccinated children; there are religious and cultural barriers that account 6(9.7%) of all reasons. This might be due to missed understanding or miss interpretation of religious and cultural concepts or views of child vaccination. Therefore, to improve vaccination coverage

and to decrease the missing of their children's vaccination, government of the region need to do with religious leaders, community elders, health extension workers, and other concerned bodies.

## Strength and Limitations of the Study

### Strength of the Study

Since there was a shortage of data related to immunization coverage and factors associated with under vaccine in this area, this finding might be an additional resource for those stakeholders who want to do any more implementation. And they were different new variables added to this study like fear of covid 19 at health institutions, injectable polio vaccine (IPV), and rota.

### Limitations of the Study

Immunization coverage might have been underreported or overreported by mothers/caretakers may not remember vaccines that the child took due to recall bias. As a consequence, recall bias may affect the quality of data. Moreover, there might be the potential for selection bias while selecting households and choosing children from those households with more than one child during data collection time. And those mothers or care givers who did not live for less than 12 months were excluded from the study.



## Conclusions and Recommendations

Coverage of full vaccination, partial vaccination, and non-vaccination were 71.77%, 16.67%, and 11.56% not vaccinated, respectively. Child age, no antenatal care visit, and fear of covid 19 at health institutions were identified as significant factors. The major reasons for partial immunization and non-immunization were fear of covid-19, lack of awareness, fear of side effect, and religious and cultural barriers.

It is also recommended that the Assosa town health office, Regional Health Bureau, and Woreda health office need to do with health care providers in supporting of EPI officer, EPI focal at health centers, and hospitals and health extension workers. Better to do more on awareness creation on immunization side effects, covid 19, timely vaccination, ANC and traditional and cultural beliefs of immunization to vaccinate their children fully.

## Abbreviations

ANC, Ante Natal Care; BCG, Bacillus Calmette-Guerin; COVID 19, Corona Virus Disease 2019; DPT, Diphtheria Pertussis and Tetanus; EDHS, Ethiopia Demographic Health Survey; EPI, Expanded Program on Immunization; FMOH, Federal Ministry of Health; HBV, Hepatitis B Virus; HIB, Haemophilus Influenza Type B; IPV, Inactivated Polio Vaccine; OPV, Oral Polio Virus; U5MR, Under Five Mortality Rate; WHO, World Health Organization; SPSS, Statistical Program for the Social Sciences.

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## Author Contributions

MS, FA, ES and MW: All authors made a significant contribution to the work reported, whether that is, in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The authors declare no conflicts of interest for this work and that there are no conflicts of interest regarding the publication of this paper.

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