

Assessment of Community Services Coverage at Primary Healthcare Facilities in Rural Population of Sharg-Elnil Locality - Khartoum State from 2018 to 2020.

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Abstract

Background: Sudan health system is based on the district health system approach, which emphasizes the principles of primary health care (PHC). Nevertheless, the decentralization of the public sector resulted in more deterioration of the PHC system particularly in rural and peripheral areas due to lack of financial resources and managerial capacities.

Objectives: The study aimed to assess the community services coverage at primary Healthcare Facilities in Rural Population of Sharg-Elnil Locality - Khartoum State from 2018 to 2020.

Materials and methods: A number of (37) Health facilities was selected in addition to (333) households. All selected mothers/care takers of children aged 12–23 months; all working Primary Healthcare sites and all health worker who are the first responsible of Health sites in the study area were included in the study. The study was conducted by using questionnaires, checklists, observation and Interview with structure close ended questionnaire. Data was computed and analyzed using SPSS program version 25.0. Descriptive and inferential statistic was used.

Results: The study showed that 55.6% of the participants stated that their areas distance less than 2 km. The majority of the participants 72.4% were obtained their health services by going to the hospital or rural health center. More than two thirds of the participants 66.7% stated that there was transportation mean for health center. The majority of participants 69.7% stated that their families or household having ability to pay the cost of transportation. Only 46.2% of the participants stated that there was health insurance for families. Approximately 96% of the participants had vaccination card explained the vaccination that taken the children less than 2 years. Also 98.5% their child completes the routine vaccination until the date of visit. The majority 93.4% of the participants their child under five obtained any vaccines including that taken in vaccination campaigns or national days for vaccination or during child health days. The majority of the participants 69.1% indicate that their children under 5 previously taken BCG vaccines. More than half of the participants 50.8% stated that their children under 5 infected with diarrhea disease the last 2 weeks. Also 58.3% had children under 5 infected with fever during the last 2 weeks. Less than 50% (45.6%) of the participants their family having bed nets for mosquito control. Only 26.1% of the participants had one sleep under nets last night. The majority of the participants 88% had periodic follow-up during the pregnancy. The most reasons for not follow-up during pregnancy were because the health center is faraway 23.7%, economic barriers 6.3% and family

barriers 3%. The participants stated that the tetanus doses coverage was 94%. The most doses of tetanus taken by the participants were five doses 36.3%. Also 56.5% of the participants stated that they were given any medical care during the first last 6 weeks after last delivery (postnatal). More than 63% of the participants were used contraceptive. The most reasons of not used contraceptive were fear from side effects 24.3%, due to refuse of husband 2.7%, due to culture believes 3.3%, not able to by 2.4% and because of not aware 2.4%. There was association education level of father and periodic follow-up during the pregnancy, $p=.000$. There was association education level of mother and use of contraceptive, $p=.000$. There was association between occupation of mother and use of contraceptive, $p=.000$. there was highly association between children under 5 infected with fever during the last 2 weeks and having any bed nets for mosquito control, $p=.002$.

Conclusion: The results show that coverage of the services provided were moderate which need to be strengthening and provision of resources for rural communities.

Keywords

Primary healthcare, Rural, Sharg-Elnil.

INTRODUCTION

The healthcare is a fundamental right of every human being and everyone's responsibility (Werner *et al.*, 1977). Hence when healthcare is viewed as a right and a responsibility, the state's active role in maintaining its people's health becomes even more pro-active more pro-active. This remedies the often-neglected individual's responsibility toward his/her health. There has always been an inverse distribution of healthcare services in rural when compared to the urban population, which is often referred to as the inverse care law or Pareto's Law.

Pareto's law of distribution applied to healthcare (according to the British General practitioner Julian Hart in 1971) hypothesized that those in the greatest need of medical services in healthcare get the lowest quality possible healthcare and at the very end (Hart, 1971).

The Rural Healthcare access is the ability of rural communities (or individuals residing in such communities) who can be promptly approached for health promotive, preventive, curative, and rehabilitative services. This works on the tenets of availability, utility, acceptability, feasibility, and equitability (Chapman *et al.*, 2004).

Barriers to healthcare access are systematic hindrances that may interfere with access to healthcare systems. In rural health systems, they could be broadly classified as structural (Infrastructure, human resources and time-related inadequacies), financial (leading to catastrophic expenditures, unaffordability of medical aid, or lack of completeness in treatment due to inability of money) or personal or socio-cultural (Physical and/or physiological hindrances, socio-cultural inappropriateness) (Institute of Medicine (US) Committee on Monitoring

Access to Personal Health Care Services, 1993). This study aimed to assess the community services coverage at primary Healthcare Facilities in Rural Population of Sharg-Elnil Locality - Khartoum State from 2018 to 2020.

MATERIALS AND METHODS

Study design

Analytical, prospective Facility and community-based study.

Study area

The study was conducted in the rural areas of Sharg Elnil locality. However, Sharg Elnil locality located in Khartoum state, it has an area of 8,188 km² and consists of eight localities and 8 administrative units, 4 of them are rural (Wad Abu Salih, Abudilage, Umdwaan ban and Wadi Soba AU. total population are 1,071,222 and 37% are rural community in 189 rural villages. The health services provided in rural

areas by (3) hospitals, (24) Government Health Centers, (10) Organization Health Centers, (21) HC, (22) Government BHUs and (13) BHU.

Study population

In-charge Health workers of the selected Health facilities.

Sample size

The sampling of (59) Health facilities was (37) Health facility selected according to the following formula;

$$\text{Sample Size } (n) = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N} \right)}$$

Whereas:

Population Size = N

Margin of error = e

Z-score = z

e is percentage, put into decimal form (for example, 3% = 0.03).

Confidence level = 95% and Margin of Error 10%.

A cluster sampling was conducted according to the following;

- Population under the study has been subdivided into clusters by rural village.
- Cumulative list of the population under the study has been done.
- Cluster interval calculated by division of rural population (396,352) cumulative on the number of the clusters, 396, 352 / 6 individuals = 66,058 HHs.
- Sample size $n = N/1+N(e)^2$, $n = 66,058/1+66,058*0.0025 = 398$ HHs
- Cluster = $398/37 = 9$ HHs
- The response rate was found to be $333/398*100=83.7\%$
- Selection one health facility + 9 HHs in unit.
- Total coverage for Admin units with few numbers of HFs (Abu Dilaige and Wad Abu Salih)

Sampling unit:

- Head of Household.
- Mothers/ care takers of children aged 12 – 23 months.

Sampling technique

- Simple random Sample to select Health facilities.
- Cluster sampling.

Inclusions criteria

- All selected mothers/ care takers of children aged 12 – 23 months.
- All working Primary Healthcare sites.

Exclusions criteria

- Secondary and Tertiary Health facilities.

- Health facilities not working.
- Outreaches and mobile sites.

Study variables

The variables under study were:

A. Background variables

- age, sex, area.

B. Reproductive, maternal, newborn and child health

- family planning
- antenatal and delivery care
- full child immunization
- Health-seeking behavior for child illness.

C. Infectious diseases

- coverage of insecticide-treated bed nets for malaria prevention
- Adequate sanitation.

D. Service capacity and access

- basic hospital access
- health worker density
- access to essential medicines

Data management and analysis

Data collection technique

The study was conducted by using questionnaires, checklists, observation and Interview with structure close ended questionnaire.

Data collection tool

Structured direct interview questions using MICS tool.

- ♦ Pre testing:

The tool was developed and tested by UNICEF.

Data collector

- ♦ Field work.
- ♦ Teams.

Data cleaning

First step: Data collected and checked at the facility to ensure no missing data or incorrect data had been collected.

Second step: verification of all collected data.

Data analysis

Data was computed and analyzed using SPSS program version 25.0. Descriptive and inferential statistic was used.

Ethical Clearance

- ✓ Informed consent was taken from the interviewers.
- ✓ The questionnaires were filled in each household after the acceptance of the women age 15-49 and caretaker of the child under the age of one year, are taken.
- ✓ No harm for the people is expected because no intervention or any other procedure was done, it is only data collection.

Conflict of interest & funding

The researcher has not received any funding or benefits from industry or elsewhere to conduct this study.

Limitations

- Cultural barrier of communicating with women in data collection process at households.
- Low Community acceptance or cooperation.
- Financial resources.

RESULTS

Figure 1 indicates that 55.6% of the participants stated that their areas distance less than 2 km, 39% distanced about 3-5 km while only 5.4% stated that their areas distanced about more than 5 km.

Figure 2 shows that the majority of the participants 72.4% were obtained their health services by going to the hospital or rural health center, 21.6% from village clinic, 5.1% going to the hospital or health center in urban while only 0.9% obtained from private clinic or traditional healer.

More than two thirds of the participants 66.7% stated that there was transportation mean for health center (in case of faraway of the health center) as shown in figure 3.

The majority of participants 69.7% stated that their families or household having ability to pay the cost of transportation, figure 4.

Figure 5 shows 46.2% of the participants stated that there was health insurance for families.

Approximately 96% of the participants had vaccination card explained the vaccination that taken the children less than 2 years, figure 6.

Figure 7 indicates that 98.5% their child completes the routine vaccination until the date of visit. Figure 8 explains that 93.4% of the participants their child under five obtained any vaccines including that taken in vaccination campaigns or national days for vaccination or during child health days.

The majority of the participants 69.1% indicate that their children under 5 previously taken BCG vaccines against tuberculosis-injection in arm or muscle left usually left permanent scar, figure 9.

More than half of the participants 50.8% stated that their children under 5 infected with diarrhea disease the last 2 weeks as shown in figure 10. Figure 11 indicates that 58.3% had children under 5 infected with fever during the last 2 weeks.

Less than 50% (45.6%) of the participants their family having bed nets for mosquito control figure 12.

Only 26.1% of the participants had one sleep under nets last night as shown in figure 13.

The majority of the participants 88% had periodic follow-up during the pregnancy, figure 14.

Figure 15 shows that, most of those who have follow-up during pregnancy their frequency of visit was monthly 80.5%.

The most reasons for not follow-up during pregnancy were because the health center is faraway 23.7%, economic barriers 6.3% and family barriers 3%, figure 16.

The participants stated that the tetanus doses coverage was 94%, figure 17.

Figure 18 shows that the most doses of tetanus taken by the participants were five doses 36.3%, three doses 28.5%, two doses 21.9% and four doses 13.2%.

Figure 19 shows that 56.5% of the participants stated that they were given any medical care during the first last 6 weeks after last delivery (postnatal).

More than 63% of the participants were using contraceptive, figure 20.

The most reasons of not used contraceptive were fear from side effects 24.3%, due to refuse of husband 2.7%, due to culture believes 3.3%, not able to by 2.4% and because of not aware 2.4%, figure 21.

Table 1 shows that there was association education level of father and periodic follow-up during the pregnancy, $p=.000$. Participants whose fathers having secondary school were significantly having high periodic follow-up during pregnancy 48.5%.

Table 2 indicates that there was association education level of mother and use of contraceptive, $p=.000$. Participants who having university and post university education were significantly having less preferred to deliver in the house 1.5%. Participants whose mother level of education was secondary were significantly more used of contraceptive 51%.

Table 3 indicates that there was association between occupation of mother and use of contraceptive, $p=.000$. Participants whose occupations were housewives were significantly more used of contraceptive 80%.

Table 4 indicates that there was no association between the distance of the area from the health center and taking any counseling or treatment for diarrheal disease from any source, $p> 0.05$. Those who distance less than 2km (54.5%) was more taking any counseling or treatment for diarrheal disease from any source but with no significant association.

Table 5 shows that there was no association between distance of health facility and whether they were free drugs available for children less than 5 years or not, $p>0.05$.

Also, those whose distance of health facility was less than 2km were more (50%) taking any counseling or treatment for diarrheal disease from any source but with no significant association.

Also, table 6 shows there was no association between the health insurance for families and whether they were giving any treatment for diarrheal disease or not during the disease time, $p>0.05$. However, those who have health insurance for families were more giving treatment for diarrheal disease 55.3% with no significant association.

Table 7 shows that there was highly association between children under 5 infected with fever during the last 2 weeks and having any bed nets for mosquito control, $p=.002$. Most of those who have-not bed nets were significantly having more under 5 infected with fever during the last 2 weeks 65.7%.

Table 8 shows that there was no association between distance of from the health center and there were any health insurance for families, $p>0.05$.

Table 9 shows that there was no association between family or household have ability to paid the cost of transportation and whether they were giving any treatment for diarrheal disease or not during the disease time, $p>0.05$.

The most family or household have ability to paid the cost of transportation were more giving any treatment for diarrheal disease during the disease time 66.8% but with no significant association.

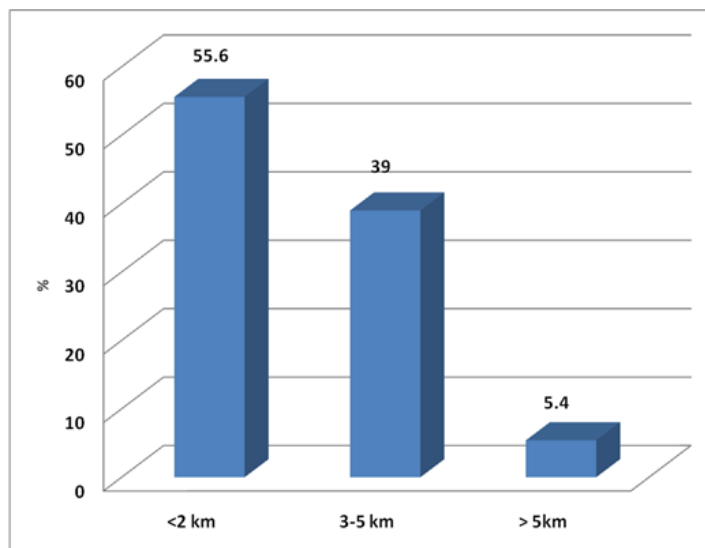


Fig. 1: Distribution of participants according to the distance of the area from the health center (n=333)

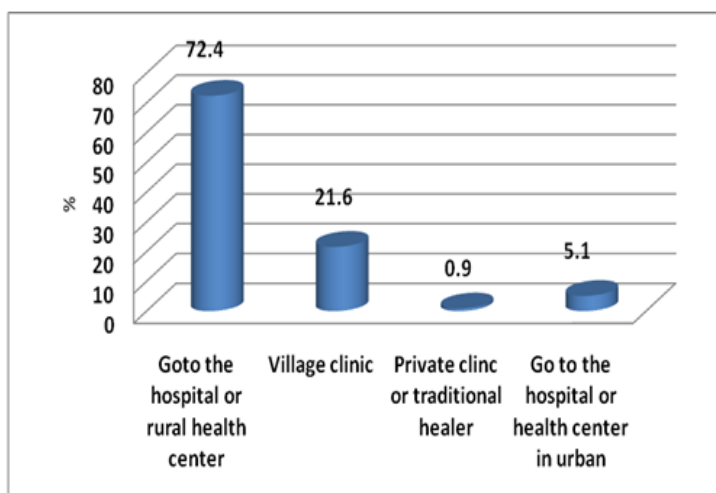


Fig. 2: Distribution of participants according to whether they were obtained health services (n=333)

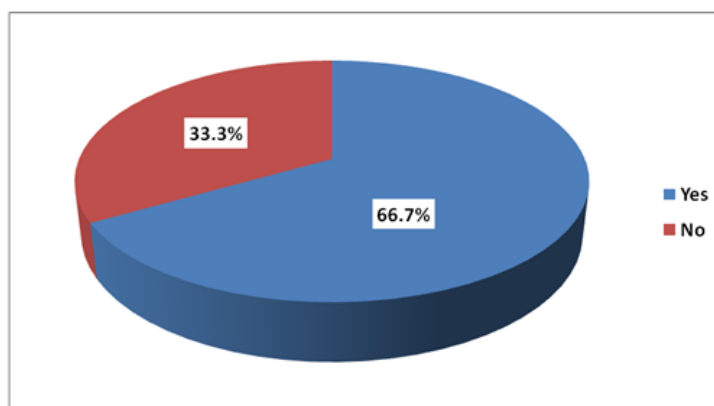


Fig. 3: Distribution of participants according to whether there were any transportation mean for health center (in case of faraway of the health center) or not (n=333)

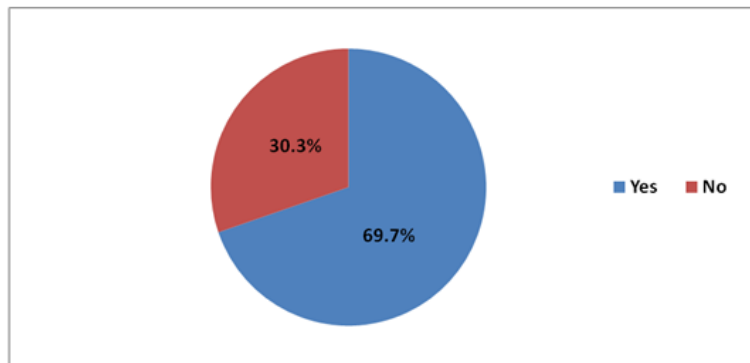


Fig. 4: Distribution of participants according to whether family or household having ability to pay the cost of transportation or not (n=333)

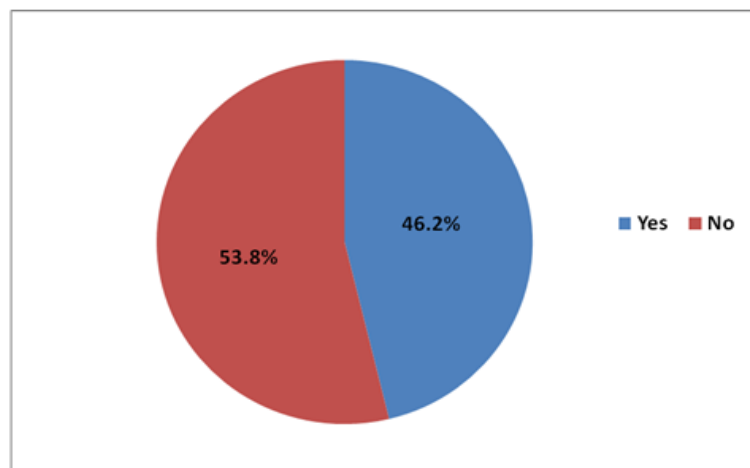


Fig. 5: Distribution of participants according to whether there were any health insurance for families or not (n=333)

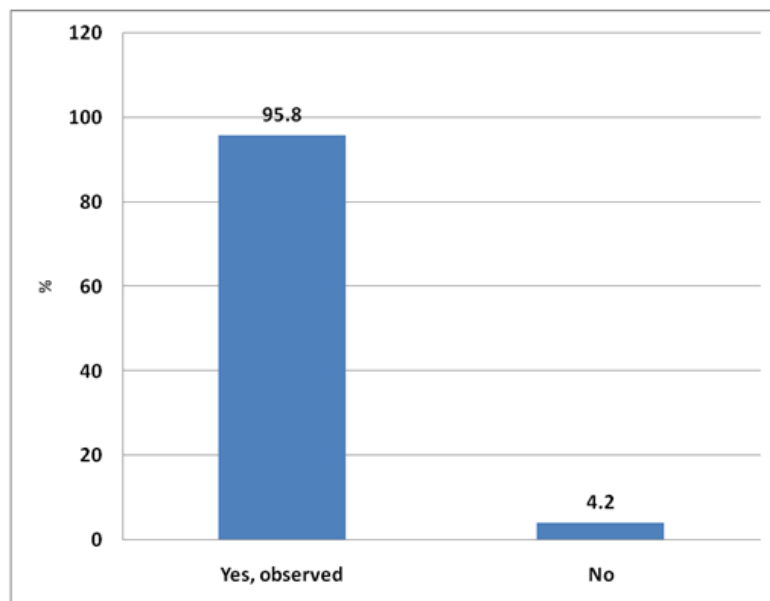


Fig. 6: Distribution of participants according to whether there were vaccination card explained the vaccination that taken the children less than 2 years or not (n=333)

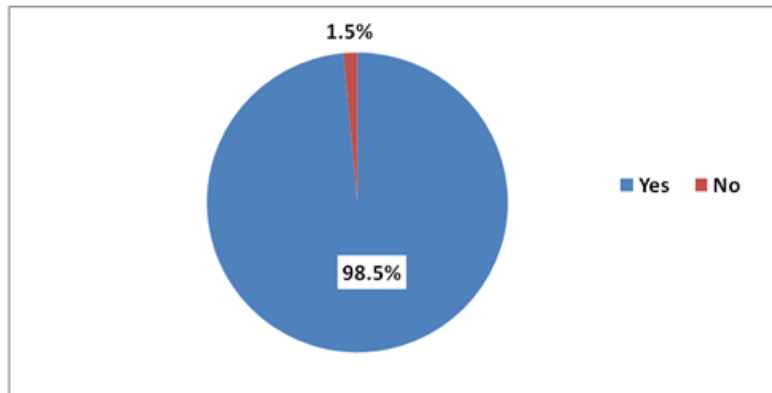


Fig. 7: Distribution of participants according to whether the child complete the routine vaccination until the date of visit or not (n=333)

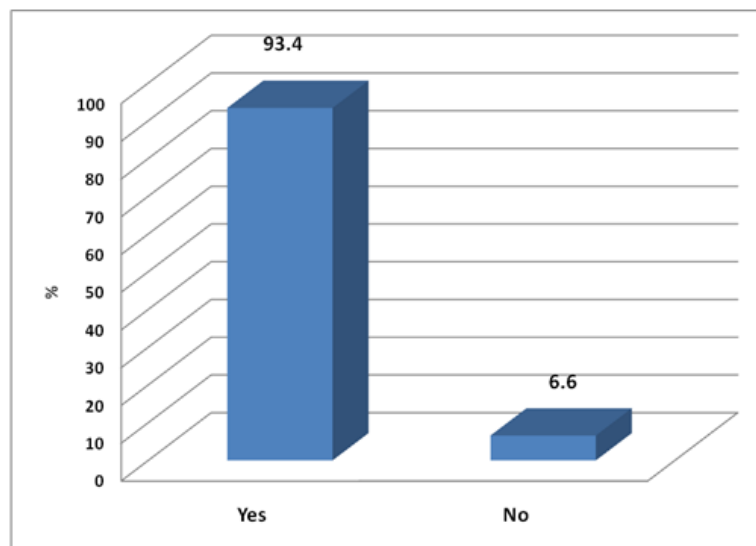


Fig. 8: Distribution of participants according to whether the child under five obtained any vaccines including that taken in vaccination campaigns or national days for vaccination or during child health days or not (n=333)

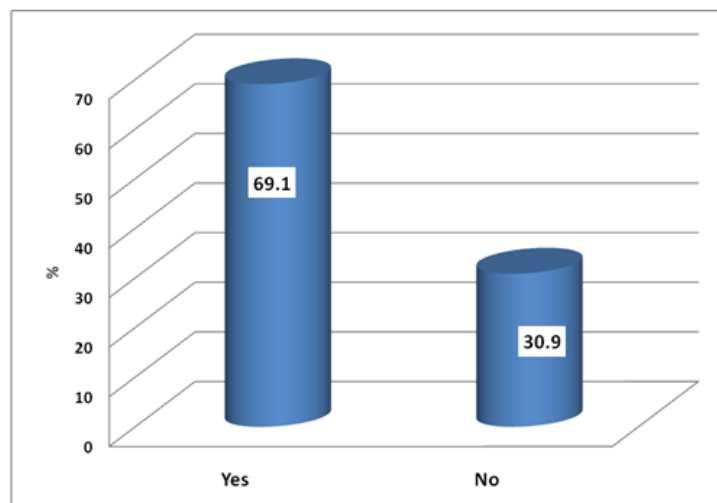


Fig. 9: Distribution of participants according to whether the children under 5 previously taken BCG vaccine against tuberculosis-injection in arm or muscle left usually left permanent scar or not (n=333)

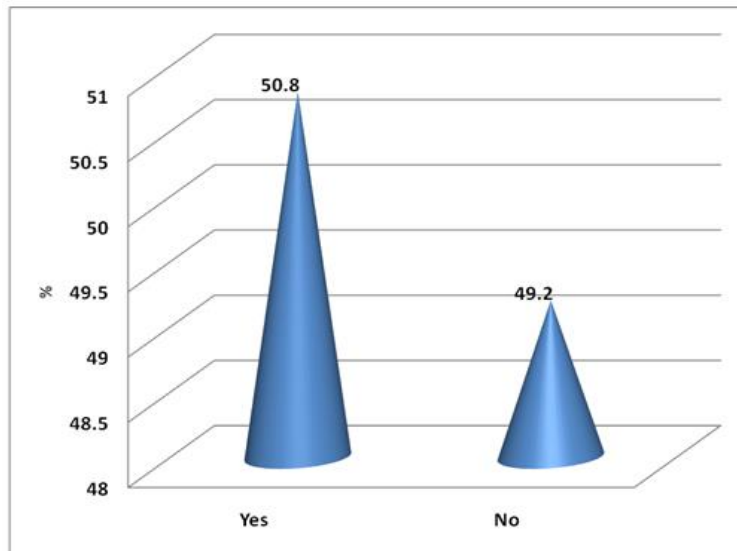


Fig. 10: Distribution of participants according to whether in the last 2 weeks, there were any children fewer than 5 infected with diarrhea disease or not (n=333)

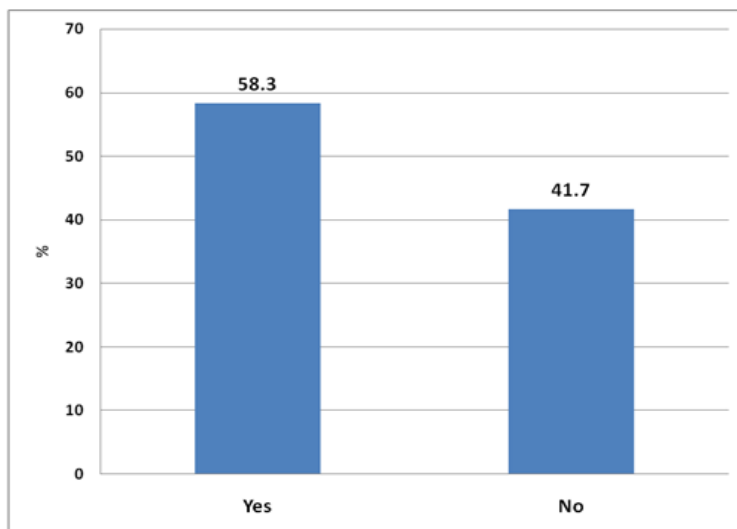


Fig. 11: Distribution of participants according to whether there were any children under 5 infected with fever during the last 2 weeks or not (n=333)

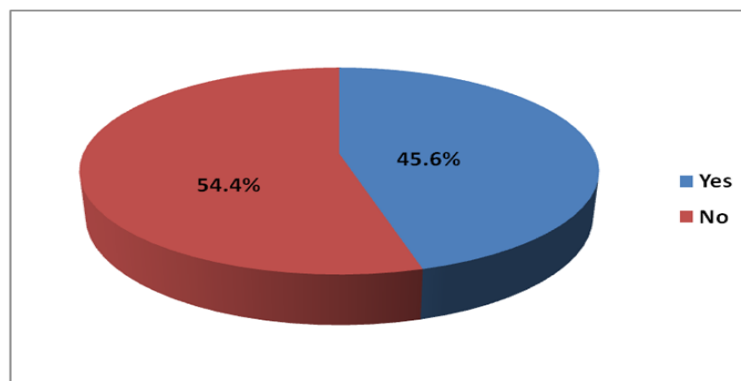


Fig. 12: Distribution of participants according to whether their family having any bed nets for mosquito control or not (n=333)

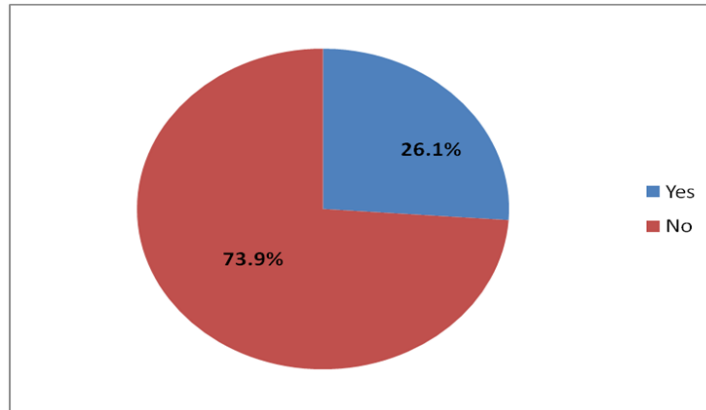


Fig. 13: Distribution of participants according to whether there were any one sleep under nets last night or not (n=333)

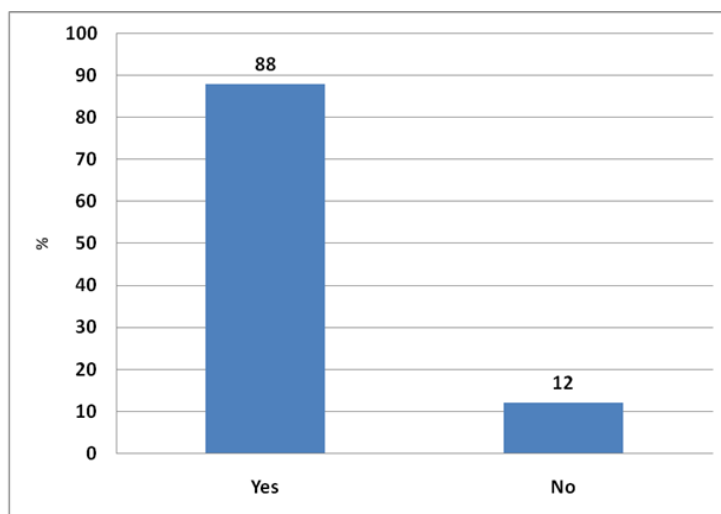


Fig. 14: Distribution of participants according to whether there were any periodic follow-up during the pregnancy or not (n=333)

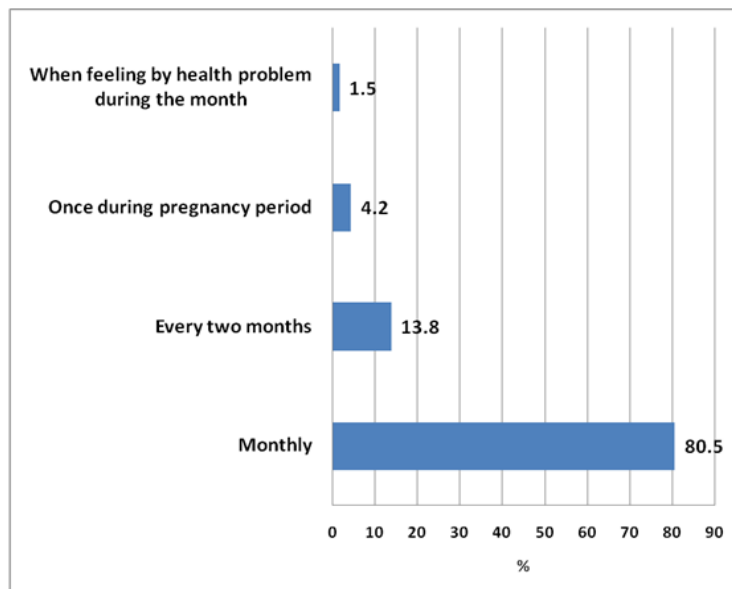


Fig. 15: Distribution of participants according to frequency of follow-up (n=333)

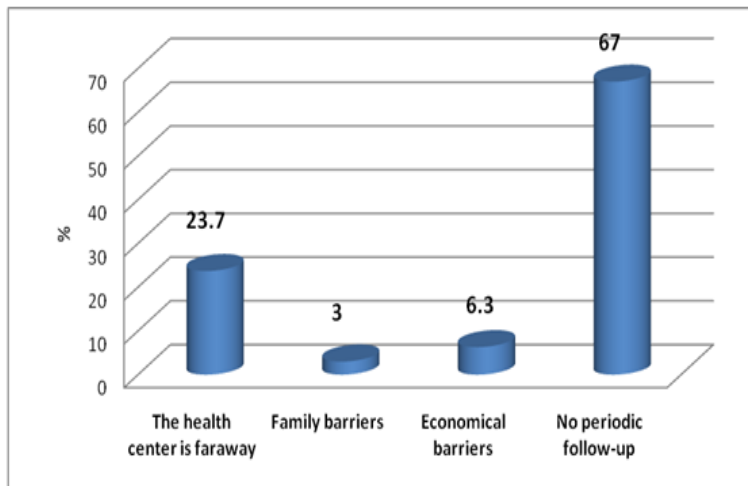


Fig. 16: Distribution of participants according to reasons of no follow-up during pregnancy (n=333)

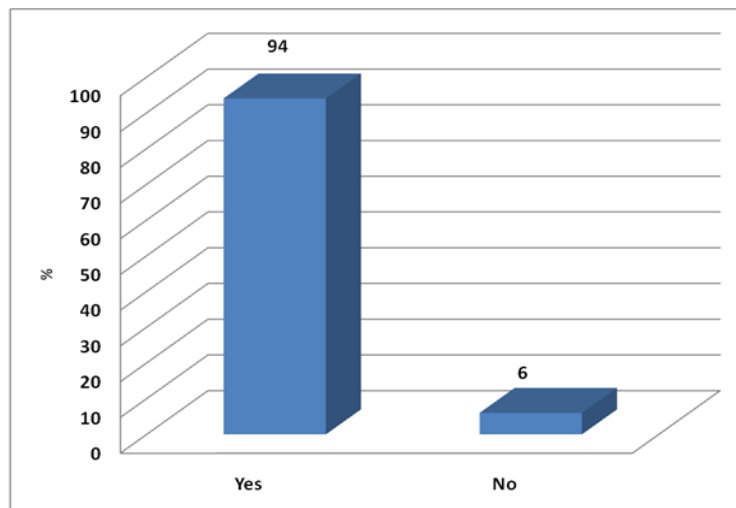


Fig. 17: Distribution of participants according to tetanus doses coverage (n=333)

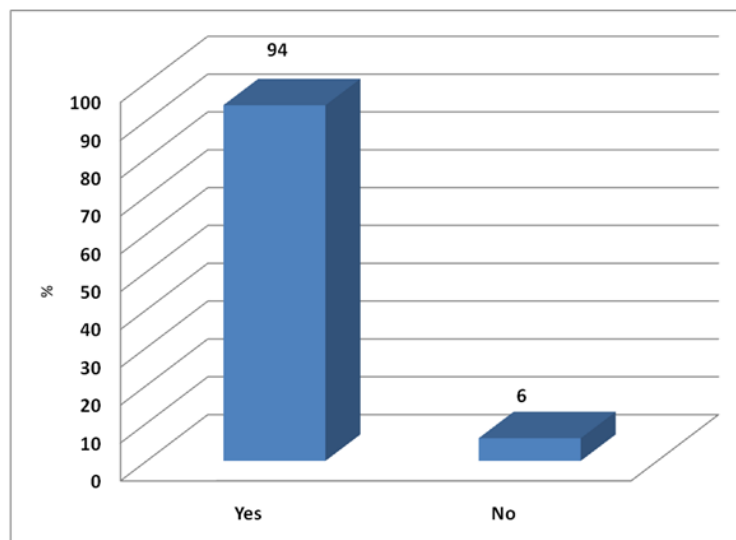


Fig. 18: Distribution of participants according to tetanus doses coverage (n=333)

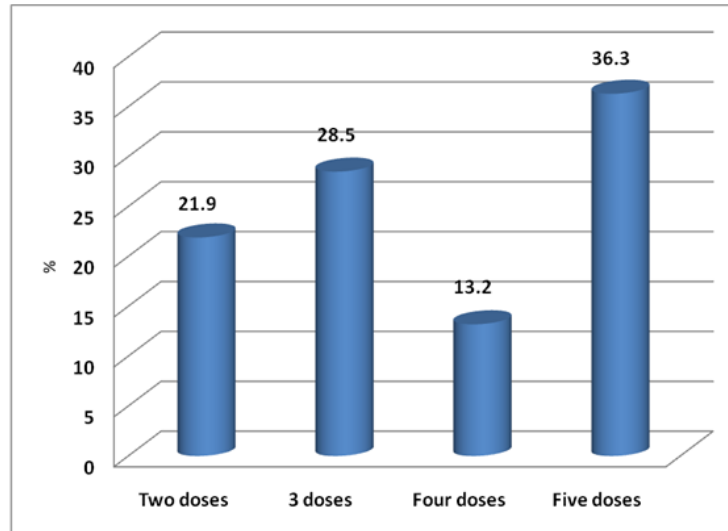


Fig. 19: Distribution of participants according number of doses of tetanus taken (n=333)

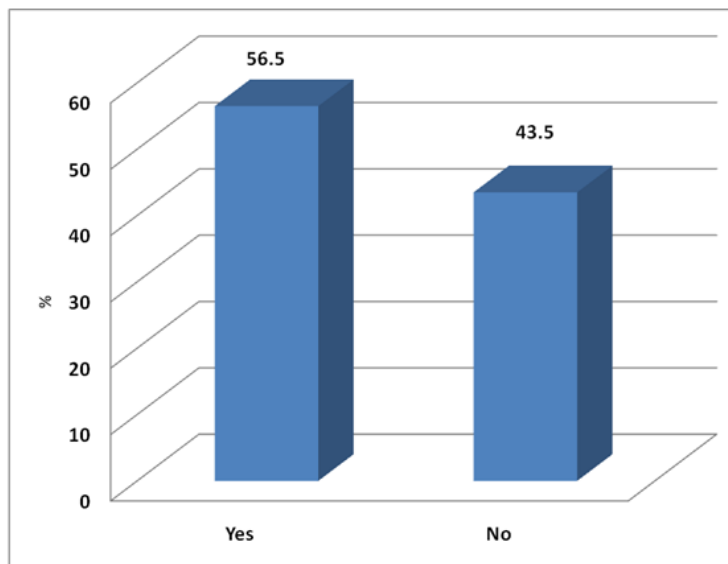


Fig. 20: Distribution of participants according to whether they were given any medical care during the first 6 weeks after delivery after last delivery (postnatal) (n=333)

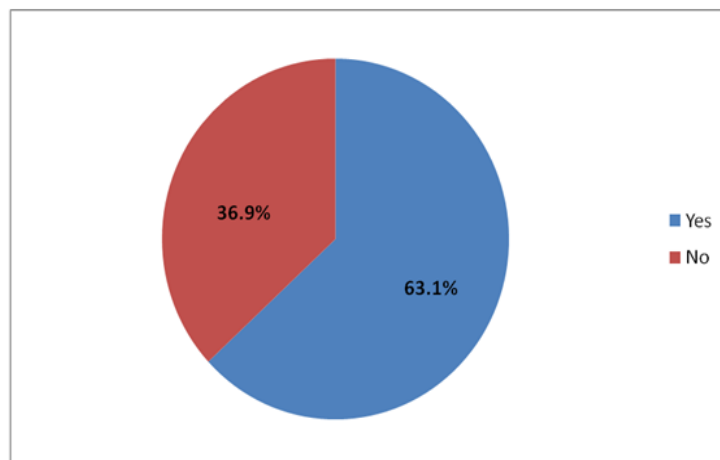


Fig. 21: Distribution of participants according to whether they were using contraceptives or not (n=333)

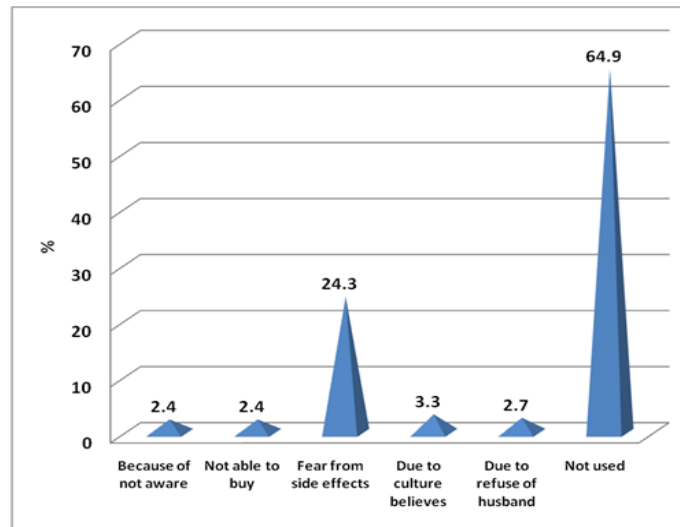


Fig. 22: Distribution of participants according to reasons of not used contraceptive or not (n=333)

Education level of the father (household)		Periodic follow-up during the pregnancy		Total
		Yes	No	
Illiterate	n	17	13	30
	%	5.8%	32.5%	9.0%
Khalwa	n	44	6	50
	%	15.0%	15.0%	15.0%
Basic	n	44	8	52
	%	15.0%	20.0%	15.6%
Secondary	n	142	8	150
	%	48.5%	20.0%	45.0%
University	n	45	5	50
	%	15.4%	12.5%	15.0%
Post University	n	1	0	1
	%	.3%	.0%	.3%
Total	n	293	40	333
	%	100.0%	100.0%	100.0%

Table 1: Association between education level of father and periodic follow-up during the pregnancy.

$\chi^2= 35.064'$ DF=5; P-value = .000 (Significant)

Education level of the mother		Used of contraceptive		Total
		Yes	No	
Illiterate	n	16	14	30
	%	7.6%	11.4%	9.0%
Khalwa	n	50	0	50
	%	23.8%	.0%	15.0%
Basic	n	22	30	52
	%	10.5%	24.4%	15.6%
Secondary	n	107	43	150
	%	51.0%	35.0%	45.0%
University	n	14	36	50
	%	6.7%	29.3%	15.0%
Post University	n	1	0	1
	%	.5%	.0%	.3%
Total	n	210	123	333
	%	100.0%	100.0%	100.0%

Table 2: Association between education level of mother and whether they were used contraceptive or not

$\chi^2= 16.5;$ DF=4; P-value = .002 (Significant)

Occupation of mother		Use contraceptive		Total
		Yes	No	
Housewife	n	168	106	274
	%	80.0%	86.2%	82.3%
Employee	n	18	14	32
	%	8.6%	11.4%	9.6%
Free work	n	18	3	21
	%	8.6%	2.4%	6.3%
Other	n	6	0	6
	%	2.9%	.0%	1.8%
Total	n	210	123	333
	%	100.0%	100.0%	100.0%

Table 3: Association between occupation of mother and use of contraceptive
 $\chi^2= 9.1$; DF=3; P-value = .028 (Significant)

The distance of the area from the health center		Taking any counseling or treatment for diarrheal disease from any source		Total
		Yes	No	
<2 km	n	115	70	185
	%	54.5%	57.4%	55.6%
3-5 km	n	88	42	130
	%	41.7%	34.4%	39.0%
> 5km	n	8	10	18
	%	3.8%	8.2%	5.4%
Total	n	211	122	333
	%	100.0%	100.0%	100.0%

Table 4: Association between distance of the area from the health center and whether they were taking any counseling or treatment for diarrheal disease from any source or not
 $\chi^2= 3.9$; DF=2; P-value = .139 (Not significant)

Distance of health facility		free drugs available for children less than 5 years		Total
		Yes	No	
<2 km	n	3	15	18
	%	50.0%	48.4%	48.6%
3-5 km	n	2	10	12
	%	33.3%	32.3%	32.4%
>5 km	n	1	6	7
	%	16.7%	19.4%	18.9%
Total	n	6	31	37
	%	100.0%	100.0%	100.0%

Table 5: Association between distance of health facility and whether they were free drugs available for children less than 5 years or not
 $\chi^2= 0.024$; DF=2; P-value = .988 (Not significant)

Health insurance for families		During the disease time whether they were giving any treatment for diarrheal disease or not		Total
		Yes	No	
Yes	n	115	39	154
	%	55.3%	31.2%	46.2%
No	n	93	86	179
	%	44.7%	68.8%	53.8%
Total	n	208	125	333
	%	100.0%	100.0%	100.0%

Table 6: Association between health insurance for families and whether they were giving any treatment for diarrheal disease or not during the disease time
 $\chi^2= 0.024$; DF=2; P-value = .988 (Not significant)

During the last 2 weeks is there any children under 5 infected with fever		Family have any bed nets for mosquito control		Total	OR	95% CI	
		Yes	No			Lower	Upper
		Yes	n 75 % 49.3%			n 119 % 65.7%	n 194 % 58.3%
No	n 77 % 50.7%	n 62 % 34.3%	n 139 % 41.7%				
Total	n 152 % 100.0%	n 181 % 100.0%	n 333 % 100.0%				

Table 7: Association between children under 5 infected with fever during the last 2 weeks and whether family having bed nets or not
 $\chi^2=9.1$; DF=1; P-value = .002 (significant)

The distance of from the health center		There were any health insurance for families		Total
		Yes	No	
<2 km	n	86	99	185
	%	55.8%	55.3%	55.6%
3-5 km	n	60	70	130
	%	39.0%	39.1%	39.0%
> 5km	n	8	10	18
	%	5.2%	5.6%	5.4%
Total	n	154	179	333
	%	100.0%	100.0%	100.0%

Table 8: Association between health insurance or families or not and the distance of from the health center
 $\chi^2=0.28$; DF=2; P-value = .968 (not significant)

Family or household have ability to paid the cost of transportation		During the disease time they were giving any treatment for diarrheal disease		Total
		Yes	No	
Yes	n	139	93	232
	%	66.8%	74.4%	69.7%
No	n	69	32	101
	%	33.2%	25.6%	30.3%
Total	n	208	125	333
	%	100.0%	100.0%	100.0%

Table 9: Association between Family or household have ability to paid the cost of transportation and during the disease time you were giving any treatment for diarrheal
 $\chi^2=2.1$; DF=1; P-value = .091 (not significant)

DISCUSSION

Our study indicated that 55.6% of the participants stated that their areas distance less than 2 km. In addition the majority of the participants 72.4% were obtained their health services by going to the hospital or rural health center. However, more than two thirds of the participants 66.7% stated that there was transportation mean for health center (in case of faraway of the health center). Supported literature showed that transportation costs have been reported as one of the factors shown as having influence on maternity care access and utilization (Brenner *et al.*, 2015). Krasovec (2004) revealed that the Ministry of Health and the introduction of a two-way radio system to link the hospital increased the number of women referred with major obstetric complications from 0.9 to 2.6 per month following the replacement of motorbikes for referral from primary health centers with a four-wheel drive vehicle. Transport played some role in increasing women's access to effective care, although some of these effects may have been an indirect result of additional women using the referral facility because of its upgraded status. Transport may have more greatly helped the survival of women coming from longer distances, while

enhanced treatment at the hospital had a greater role in improved outcomes for women living closer to the health facility (Probst *et al.*, 2007).

The majority of participants 69.7% stated that their families or household having ability to pay the cost of transportation. Rural patients reported more problems with transportation and travel distance to health care providers and had a higher burden of travel for health care when measured by distance and time traveled (Probst *et al.*, 2007). In a study by Sarnquist *et al.* (2011) that did not make urban comparisons, but included 64 rural, adult HIV patients, 31 % were lacking transportation and 37 % were missing appointments due to transportation problems.

This study showed that 46.2% of the participants stated that there was health insurance for families. The health insurance coverage is less than 50%. Comparable findings showed that people living in rural areas tend to have worse health outcomes than urban areas. On average, rural Americans are older and sicker than their urban counterparts and have higher rates of poverty, less access to health care services, and are less likely to have health insurance. They also have higher rates of cigarette smoking, high blood pressure, and obesity. Additionally, rural residents report less leisure-time physical activity and lower seatbelt use than their urban counterparts (Centers for Disease Control and Prevention, 2017). While the rate of drug use is lower in rural areas compared to urban areas, data through 2015 shows the overdose death rate has been higher in rural areas since 2006 (Centers for Disease Control and Prevention, 2020).

Approximately 96% of the participants had vaccination card explained the vaccination that taken the children less than 2 years. Also, the study showed that 98.5% their child completes the routine vaccination until the date of visit. In addition, 93.4% of the participants their child under five obtained any vaccines including that taken in vaccination campaigns or national days for vaccination or during child health days. This percentage of coverage is high compared to WHO that stated the Global coverage dropped from 86% in 2019 to 83% in 2020. An estimated 23 million children under the age of 1 year did not receive basic vaccines, which is the highest number since 2009. In 2020, the number of completely unvaccinated children increased by 3.4 million (WHO, 2021).

Furthermore, the majority of the participants 69.1% indicate that their children under 5 previously taken BCG vaccines against tuberculosis-injection in arm or muscle left usually left permanent scar. The coverage by BCG was high in our study. Studies in older children and adults showed 77% protection in Britain (Hart and Sutherland, 1977), only 14% in southern USA (Comstock and Palmer, 1966), and none in Madras (Federal Ministry of health, 2017). Furthermore, in a retrospective study of 22 children with TB of the spine in a developing country, all gave a history of BCG vaccination scars (Trial, 1979). In addition, several reports recommending the continuation of the policy of BCG vaccination offered routinely in schools are now concerned about the influence of the quality of the vaccine, its transportation, and the technique of its application on the protection obtained (Public Health Laboratory Service Communicable Disease Surveillance Centre, 1983).

More than half of the participants 50.8% stated that their children under 5 infected with diarrhea disease the last 2 weeks. Different studies showed that the prevalence of diarrheal diseases among children under five years is high in East African countries. Based on meta-analysis conducted in Ethiopia the prevalence of diarrhea ranges from 19% to 25% (Alebel *et al.*, 2018). Other studies conducted in Uganda, Rwanda, and Malawi uncovered that the prevalence of diarrheal diseases was 32% (7), 26.7% (Jean, 2017), and 20% (Moon *et al.*, 2019) respectively.

On the other hand, the study showed that more than two thirds of the participants 63.4% were take counseling or treatment for diarrheal disease from any source on health facility. This may be because many developing countries socio-demographic characteristics like maternal and child age and availability sanitary facilities, hygienic practices, flies infestations, and regular consumption of street food are also some determinant factors for the occurrence of diarrheal disease (Yassin, 2000, Oadi and Kuitunen, 2005). Also, might be due to the inclusion of only rural children and the difference in provision health service between rural and urban population.

Other study reported less prevalence of childhood diarrhea among under-five children was about 30.5% (Central Statistical Authority, 2011), and other study reported 13% reported by Ethiopian Demographic and Health Survey in 2011 (Sultana *et al.*, 2015).

However, the study showed that most of source of counseling or the treatment obtained about diarrheal diseases were from hospital or governmental health center 49.8%, private health sector 9.6% and community healthcare workers 7.8%. Also, more than 62% (62.5%) of the participants stated that they were they gave treatment for diarrheal disease during the disease time. This may be because most of developing countries sought treatment from public hospital. Similar study conducted in Bangladesh showed that diarrhea is preventable and managed with low-cost interventions; it is still the top cause of morbidity for patients who sought care from the public hospital system in Bangladesh (Sultana *et al.*, 2015).

This study showed that 58.3% had children under 5 infected with fever during the last 2 weeks. This may be returned to availability of treatment in the health facility. In line study showed that caregivers of children under-five sought more healthcares for fever after the free healthcare initiative (FHCI) was implemented than before the FHCI (Bognini *et al.*, 2022). The rise we observed in the prevalence of care-seeking for febrile children following the implementation of the FHCI in Sierra Leone is in keeping with the findings in Madagascar, and in Kenya, where similar increases in care-seeking for children under-five years of age after the initiation of free health care were also reported (Garchitorena *et al.*, 2018, Burgert *et al.*, 2011).

The study showed that less than 50% (45.6%) of the participants their family having bed nets for mosquito control. And only 26.1% of the participants had one sleep under nets last night. This study indicated that the possession of bed nets was less than 50%. Also, the study showed that sleep under nets is very poor. Our study in line with the recent survey by Hanson *et al.* (2008), household ownership of at least one net increased from 43% to 57% between 2005 and 2006. The same report has shown that among children under five years of age, use of any net increased from 28 to 41%, and ITN use from 15 to 28%. According to Tanzania Net Voucher Scheme, 36% of the households in Tanzania have at least one ITN and 65% have at least one net; 26% of children < 5years sleep under an ITN and 23 % of pregnant women sleep under an ITN (MoH, 2008).

The majority of the participants 88% had periodic follow-up during the pregnancy. While most of those who have follow-up during pregnancy their frequency of visit was monthly 80.5%. The study showed that all the participants stated that there were health advices during the antenatal visit. The proportion of pregnant women visits in our study was good compared to international standards. Nevertheless, there is a general agreement on the importance of antenatal care to improve the maternal and perinatal health (World Health Organization and UNICEF, 2003). It was also pointed out that the utilization of antenatal care services may lead to institutional delivery, seeking advice for pregnancy complications, and seeking advice for post-delivery complications (Ram and Singh, 2006), but there are several inconsistent reports (Tann *et al.*, 2007). A global evaluation of antenatal care, however, came up with a new model, which was endorsed by the World Health Organization (WHO), to deliver antenatal services in 4 focused visits (focused antenatal care). The schedule is first early in the first trimester, 2nd between 4–6 months, 3rd between 7–8 months and 4th at term unless indicated (Villar *et al.*, 2001).

The most reasons for not follow-up during pregnancy were because the health center is faraway 23.7%, economic barriers 6.3% and family barriers 3%. This finding is not away from previous literature that stated access to quality, Basic, and comprehensive health-care services impact every person's overall physical, emotional, social, mental health status and his/her quality of life, let alone the weak and disproportionate groups in the population like IDPs and marginalized community members. If not attained this access, barriers like unmet health needs, delays in receiving appropriate care including ANC and institutional delivery, inability to get preventive services such as immunization, and preventable hospitalization will emerge (Tesfaye *et al.*, 2020). The ability to access health-care services depends generally on availability, timeliness, affordability, and convenience. However, lack of decision-

making power for women that study participants highlighted was similar to the reports by previous researches (Munguambe *et al.*, 2016, Kimani *et al.*, 2020). Trust and traditional acceptance are the most cited reasons mothers choose home delivery with the assistance of TBAs.

More than 90% of the participants knew the terminology of maternal mortality. While the most causes of maternal mortality stated by the participants were bleeding 30.6%, no follow-up 24.9%, late delivery 24.6%, delivery difficulties 6.9% and medical errors 3%. This finding indicated high knowledge of participants by maternal mortality. Comparable descriptive studies have demonstrated that women face the highest risk of pregnancy-related death and severe morbidity (Hurt *et al.*, 2008) when they are very young or older (Blanc *et al.*, 2013) when they are expecting their first baby or when they have had many pregnancies, when they live far away from health facilities, or when they do not benefit from support from their families and friends (Mbizvo *et al.*, 1993). Also, observational studies have shown inadequate levels of hygiene in many maternity facilities (Benova *et al.*, 2014), with direct health impacts on mothers, newborns, and care providers (Mehta *et al.*, 2011).

The reasons are multifactorial and include poor infrastructure; inadequate equipment and supplies; and poor practices by care providers and cleaners as a result of inadequate knowledge, attitudes, motivation, and supervision (Campbell *et al.*, 2015). Interventions to address these constraints go beyond the health sector, particularly for water and sanitation (Shordt *et al.*, 2012). Timely access to care and the difficulties in obtaining motorized transport, as well as challenging topography and inadequate and poorly maintained roads, are important barriers to care. Gabrysch and others (Gabrysch *et al.*, 2011) demonstrate that in Zambia, the odds of women being able or choosing to deliver in a health facility decreased by 29 percent with every doubling of distance between their home and the closest facility. They conclude that if all Zambian women lived within 5 kilometers of health facilities, 16 percent of home deliveries could be averted.

On the other hand, the participants stated that the tetanus doses coverage was 94%. While the most doses of tetanus taken by the participants were five doses 36.3%, three doses 28.5%, two doses 21.9% and four doses 13.2%. However, the finding of the study indicated that the coverage of tetanus vaccination was high but with no completes the recommended doses. However, this coverage was higher than obtained in other studies such as a community-based household survey conducted in Lao People's Democratic Republic showed that the utilization of protective TT dose was 79.7% (Masuno *et al.*, 2009). National Family Health Survey in Indian also reported that protective TT dose coverage among mothers who attend antenatal care was 68% (Singh *et al.*, 2012). A cross-sectional study conducted in Ibadan, Nigeria revealed that about 81.1% of mothers were taken at least two doses of TT vaccine (Orimadegun *et al.*, 2017). Ethiopian demographic and health survey (EDHS 2016) report showed that the proportion of TT protective dose immunization was 49% (Csa, 2016). A systematic review and Meta-analysis done on TT protective dose immunization in Ethiopia is also showed that about 52.6% of women were vaccinated during pregnancy at least twice (Nigussie *et al.*, 2020). A community-based cross-sectional study done on immunization dropout rate in Debrebirhan Town, Amhara Region, Northern Ethiopia was found to be 72.3% (Kd and Fy, 2017).

The present study showed that more than 63% of the participants were used contraceptive. This in line with statements that contraceptives are used by the majority of married women, and evidence showed that 63% of married women worldwide used some form of contraceptive, and 58% of them used modern contraception methods (Blumenthal *et al.*, 2010, Winner *et al.*, 2012). Even though the involvement of the male partner in the globe is low, long-acting and permanent contraceptive methods (LAPCM) are more effective, save costs, and enable women to control their reproductive lives better (Winner *et al.*, 2012).

The most reasons of not used contraceptive were fear from side effects 24.3%, due to refuse of husband 2.7%, due to culture believes 3.3%, not able to buy 2.4% and because of not aware 2.4%. Similar finding showed that even when awareness is high, poor knowledge of contraceptive methods and their side effects has been associated with poor uptake (Wafula *et al.*, 2014). This finding may be related to the myths and misconceptions that many women hold about potential side effects and negative outcomes

(Oindo , 2002, USAID, 2009). Myths are heard about from peers and partners, whose influence on contraceptive demand and uptake is well documented in Kenya (Wafula *et al.*, 2014).

Another key barrier is lack of physical and financial access to family planning commodities. Studies have shown that health facilities offering family planning are not equitably distributed throughout the country (Remare, 2012). Women complain of frequent stock-outs and the associated costs of lost wages, transport and other financial challenges (Wafula *et al.*, 2014). Studies have shown that, among youth, lower socioeconomic status has been associated with less condom use (Alena *et al.*, 2011). There was association education level of father and periodic follow-up during the pregnancy, $p=.000$.

Participants whose fathers having secondary school were significantly having high periodic follow-up during pregnancy 48.5%. Also, there was association between education level of father and the causes of maternal mortality, $p=.000$. Participants whose fathers had khalwa education were significantly stated that delivery difficulties was high as causes of maternal mortality 69.6% followed by bleeding 17.6% and medical errors 10%. In addition, the study showed that there was association education level of father and Action done when mother death occurred during the delivery or pregnancy, $p=.000$. Participants whose fathers had secondary education were significantly high inform the health center 49.5%, inform the midwife in the village 52.2%. There was association education level of father and taking tetanus doses, $p=.000$.

Participants who having secondary education was significantly having high of taking tetanus doses. There was association education level of mother and use of contraceptive, $p=.000$. Participants who having university and post university education were significantly having less preferred to deliver in the house 1.5%. Participants whose mother level of education was secondary were significantly more used of contraceptive 51%. There was association between occupation of mother and periodic follow-up during the pregnancy, $p=.002$. Participants whose occupation was housewives were significantly having high periodic flow-up during pregnancy 86%. Also, there was association between occupation of mother and use of contraceptive, $p=.000$. Participants whose occupations were housewives were significantly more used of contraceptive 80%. Contraceptive use increased with education level; this finding is similar to that of previous research conducted in the Gulf region (Ghazal-Aswad *et al.*, 2001, Al Sheeha, 2010, Arbab *et al.*, 2011, Pushpa *et al.*, 2011).

However, studies conducted in India have found that education was not associated positively with contraceptive use (Chudasama *et al.*, 2008, Saleem and Bobak, 2005, Ong *et al.*, 2012). In general, improving women's education has been reported as a method of increasing their status and autonomy, which in turn can help to improve contraceptive practices (Saleem and Bobak, 2005). It is possible that less educated women have fewer educational and career-oriented aspirations and have lower levels of understanding of their health as compared to more educated women (Ong *et al.*, 2012). This is contrary to findings from Saudi Arabia, where contraceptive use was reportedly four times higher among working women (Al Sheeha, 2010).

Conversely, mothers working in the private sector in the current study were five times more likely to use contraceptives compared to government sector workers. This may be because employment decisions among mothers often depend on family and child care responsibilities; as such, women may prefer government professions over those in the private sector due to increased job and income security, more desirable working conditions and shorter working hours (Narcisse and State, 2011).

There was no association between the distance of the area from the health center and taking any counseling or treatment for diarrheal disease from any source, $p> 0.05$. Those who distance less than 2km (54.5%) was more taking any counseling or treatment for diarrheal disease from any source but with no significant association.

Also, there was no association between distance of health facility and whether they were free drugs available for children less than 5 yrs or not, $p>0.05$. However, those whose distance of health facility

was less than 2km were more (50%) taking any counseling or treatment for diarrheal disease from any source but with no significant association. Studies using the DHS have examined attendance at any health facility by distance to the nearest facility, but have not examined attendance at specific, named facilities nor the impact of quality of maternal care services provided on health facility use (Bauhoff and Busch, 2022). The DHS and similar surveys (eg, multiple indicator cluster survey) do not record facility names and such analyses are further complicated by the random displacement of household cluster locations for data protection purposes (ICF International, 2012).

Also, the study showed that there was no association between the health insurance for families and whether they were giving any treatment for diarrheal disease or not during the disease time, $p>0.05$. However, those who have health insurance for families were more giving treatment for diarrheal disease 55.3% with no significant association. In addition, there was association between family or household have ability to paid the cost of transportation and during the disease time and whether they were giving any treatment for diarrheal disease or not, $p>0.05$. The most family or household have ability to paid the cost of transportation were more giving any treatment for diarrheal disease during the disease time 66.8% but with no significant association.

Financing makes possible for all individuals to have access to health care (public health and personal services). That is made possible through raising, pooling and allocating the revenues to purchase healthcare. The Mexican healthcare system is unfairly financed in a way that does not ensure financial protection for everyone (Knaul *et al.*, 2003). A number of circumstances accounted for this situation. Approximately half of the country's population was not affiliated with social security services. This demonstrates that households face the risk and uncertainty of not being able to afford medical care in the event that one of its members gets sick.

Furthermore, it demonstrates large out-of-pocket expenditures for a healthcare system that still presents a significant percentage of the population with catastrophically high expenditures (Knaul *et al.*, 2007). Moreover, the study showed that there was highly association between children under 5 infected with fever during the last 2 weeks and having any bed nets for mosquito control, $p=.002$. Most of those who have-not bed nets were significantly having more under 5 infected with fever during the last 2 weeks 65.7%. Other studies which have reported the effectiveness of net usage in the reduction of malaria cases among school-age children (Koenker *et al.*, 2012, Larsen *et al.*, 2014, Oguttu *et al.*, 2017).

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