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Immunization Coverage among Children Aged Between 12-23 Months in West Pokot County, Kenya

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Abstract

Vaccination has been shown to be one of the most cost-effective health interventions worldwide. Despite the efforts made towards global immunization coverage, the number of unvaccinated and under-vaccinated infants is still high. The situation is no different in Kenya. Basic vaccination coverage reduced from 77% in 2008 to 70% in 2017. National basic vaccination coverage of 70% is significantly lower than the global target of 90% by the year 2020. There are gaping regional differences in immunization coverage. The lowest national immunization coverage is documented at 31% in West Pokot County. This study sought to identify the determinants of vaccination coverage among children between 12-23 months of age in West Pokot County. The study used a community-based cross-sectional design where mothers/guardians of children between 12-23 months old were randomly sampled. The objectives of the study were to estimate the immunization coverage, investigate factors influencing immunization coverage and determine the influence of health service utilization on immunization coverage. Binary logistic regression was conducted to determine the influence of the independent variables on the dependent variable. The findings showed that, majority (62.4%) of the mothers/guardians had partially immunized their children, followed by those who had fully immunized their children (36.6%) and lastly 1.1% had not immunized their children. Age of the mother/guardian is significantly associated with immunization coverage (OR = 1.128, p =0.000<0.05). This suggests that the older the mother/guardian, the higher the chances of the child being fully immunized. The distance to nearest health facility was found to have no significant relationship with immunization coverage (p>0.05). Respondents who paid for the services were more likely to have their children fully immunized than those who did not pay for the services (OR = 3.546, p =0.019<0.05). It was also observed that Paternal occupation influences coverage OR = 2.006, P =0.035<0.05), visiting the health facility in last year also influenced immunization (OR = 3.147, P =0.01<0.05). The study concluded that the immunization coverage among children between 12-23 months in West Pokot County is below the set target. It is therefore recommended that the county government should intensify vaccination campaigns and develop policies aimed at economically empowering the residents of West Pokot County.

Keywords: *Immunization coverage, children aged between 12-23 months, West Pokot County*

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1.0 Introduction

Immunization has been demonstrated to be one of the most financially viable wellbeing intercessions around the world. Serious childhood diseases can be successfully prevented or eradicated through vaccination (UNICEF, 2021). Universal immunization of children against six common vaccine-preventable diseases namely; tuberculosis, diphtheria, whooping cough (pertussis), tetanus, polio and measles are crucial to reducing infant and child mortality (KDHS, 2014).

According to the guidelines developed by the World Health Organization (WHO) and adopted by Kenya, children are considered to have received all basic vaccination when they have received vaccination against tuberculosis also known as Bacillus Calmette-Guerin (BCG), three doses of Pentavalent which constitutes Diphtheria, Pertussis, Tetanus (DPT), Hepatitis B (HepB), Haemophilus Influenza Type B (Hib) abbreviated as (DPT-HepB-Hib), Oral Polio Vaccine (OPV) and a vaccine against measles. BCG vaccine is given at birth or at first clinical contact, while DPT-HepB-Hib and polio vaccine are given approximately at age 6, 10 and 14 weeks. Measles vaccine should be given at or soon after age of 9 months (GOK-MOH, 2021).

Since the beginning of the expanded program on immunization (EPI) in 1974, vaccines have significantly reduced vaccine preventable diseases and deaths worldwide (Gavi Alliance, 2018). In the absence of immunization, an excess of 5,000,000 young ones would die every year and a lot more become infected with vaccine preventable diseases (Galadima et al., 2021). Immunization protects the entire community by preventing the spread of disease and providing protection for those who are not vaccinated. Immunization coverage is an important indicator of child health outcomes in any population. Improving immunization coverage by ensuring all children born in and out of the healthcare system are immunized is paramount in preventing adverse outcomes of immunization preventable morbidities among children. In 2012, the World Health Organization (WHO) under Global Vaccine Action Plan (GVAP) developed a roadmap to prevent millions of deaths through equitable access to vaccines. In this plan countries hope to achieve vaccination coverage of at least 90% nationally and at least 80% at each district by the year 2020. To date, progress towards the GVAP targets is off track (Lober, 2021).

According to (MOH-GOK, 2019), national vaccination coverage in Kenya is at 70%. This is significantly lower than the global target of 90% by the year 2020 (Gavi Alliance, 2018). Further, there are gaping regional differences in immunization coverage. Highest vaccination coverage is 90% in central region while low coverage is documented in north eastern region at 51%. Lowest national coverage was documented at 31% in West Pokot County (KDHS, 2014). This territorial distinction in inclusion shows the difference in impact of determinants of vaccination in various locations in the nation.

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1.1 Statement of the Problem

In 2017, WHO statistics showed that global coverage of specific vaccines would be less than the global target of 90% by the year 2020. An estimated 19.9 million infants worldwide were not reached by routine immunization services such as 3 doses of DPT vaccination (Chard et al., 2020). Immunization coverage trends in Kenya are on the decline. According to (MOH-GOK, 2019), basic vaccination coverage reduced from 77% in 2008 to 70% in 2017. Low vaccination coverage leads to an increase in vaccine preventable diseases thus increasing disease burden and deaths. National basic vaccination coverage of 70% (MOH-GOK, 2019), is significantly lower than the global target of 90% by year 2020 (Gavi Alliance, 2018). There are gaping regional differences in immunization coverage. Significantly, highest immunization coverage is at 90% in central region while the lowest national immunization coverage was documented at only 31% in west Pokot county (KDHS, 2014). This study is along these lines important to recognize the determinant of low immunization inclusion among kids between 12-23 months of age in west Pokot County to produce information in order to improve vaccination inclusion in this county as well as different zones encountering low vaccination inclusion in Kenya.

Although several studies have been done on immunization coverage, most have been done in other regions of East Africa and the country; (Njeru et al., 2019) in Kirinyaga County, (Kuloba, 2019) in Bungoma County, (Nwankwo & Orua, 2020) in Nyarugenge District in Rwanda and (Girmay & Dadi, 2019) in remote areas of Ethiopia. Vaccination inclusion has been low throughout the years in West Pokot County reaching the lowest documented national vaccination coverage of 31% for fully immunized children in 2014 (KDHS, 2014). The decision to focus on West Pokot County as an examination site was impacted by the preceded low vaccination inclusion. Documented studies that have been directed in the zone to determine the variables that contribute to the low immunization inclusion are scarce. This study was accordingly important to fill the information hole that exists.

1.2 Research Objective

i. To estimate the immunization coverage among children between 12-23 months in West Pokot County.

ii. To investigate the factors influencing immunization coverage among children between 12-23 months in West Pokot County.

iii. To determine the influence of health service utilization on immunization coverage among children between 12-23 months in West Pokot County.

2.0 Literature Review

2.1 Predictors of immunization coverage

With availability of information on the harmful outcomes of vaccine preventable diseases and the enormous benefits that could be secured through immunization, it is expected that immunization coverage would be on the increase but this is not the case. Several factors influence immunization coverage as evidenced in studies conducted in different regions. A number of those studies are briefly reviewed below.

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Nozaki et al. (2019) in a study conducted in Myanmar to analyze vaccination coverage and factors associated with a complete immunization scheme in children. Observed that factors influencing immunization coverage can be grouped into four areas; immunization system or policy, parent knowledge and attitudes about the vaccination program, communication and information availability and family characteristics. The study showed that approximately one-half of 12–23-year-old children had received complete vaccination, which was lower than the estimated rate from routine administrative coverage. The results indicated that incomplete immunization status was associated with low economic status, younger maternal age, fewer antenatal care visits, and no maternal tetanus vaccination. They further observed that low income status, residence in rural areas, extremes of maternal age, high parity, low maternal education level, larger families, lack of knowledge about vaccine-preventable diseases, transportation difficulties and presence of disease among the children influence immunization coverage.

According to Girmay and Dadi (2019), in a study conducted in hard to reach areas of Ethiopia, observed that complete immunization coverage among children in their study was influenced by maternal health care service utilization and knowledge of mothers about the age at which child begins and finishes vaccination. They further observed that full immunization coverage of the district was lower than the target set by the World Health Organization. They posit that improving mother's health seeking behavior toward pregnancy follow-up and enhancing mothers' knowledge on child immunization, strengthening outreach services, community engagement, and actively working with local community-based health agents are likely to increase immunization coverage.

Nwankwo and Orua (2020) in their study in a Rwandan urban area observed that, factors that influence incomplete immunizations include respondent's religion, gender, and age of the participant and educational level of the study participants. Other factors are not being aware that vaccines prevent specific diseases, being too busy with other duties at the time of immunizations and being unaware of the need to complete the immunization schedule. Generally, three main variables influence incomplete immunization from the study respondent age of the mother, Knowledge of child immunization and hospital delivery. The general immunization status as reflected on the Immunization cards and histories verified reveal good status.

According to Njeru et al. (2019) in a study on utilization of immunization services among children aged under five years in Kirinyaga County Kenya. They observed that the utilization of immunization services for children under five for measles was low at 58%, which is below the recommended target by WHO of 85% meaning that not all those children who were started on BCG completed schedules. They also observed that socio demographic factors significantly influence the utilization of the immunization services by the mother or caregiver. This includes; age, gender, profession and income level. Health system factors also influenced the utilization of immunization services including; access, long queues and waiting time, vaccine out of stock and rescheduling of vaccination and clinic return dates lead to missed opportunities for successive vaccinations.

Kuloba (2019) in her study in a suburban area of Kenya found that maternal education was one of the factors that significantly influenced immunization coverage. The proportion of fully immunized children of mothers/guardians who had attained secondary school education and above was 81.6% which is higher than those who had attained primary school education at 76.9% and those with no formal education at 42.9%. She observed that mothers who receive antenatal care from health facilities are more likely to immunize their children compared to those who fail to go for routine medical check-up. This can be attributed to access and utilization of educational messages from health service providers and community health volunteers on adherence to the immunization schedule thus enhancing immunization coverage. The study found that a child who was delivered in a health facility was 2.26 times more likely to receive full immunization compared to one delivered at home by self or by a traditional birth attendant.

3.0 Research Methodology

The study used a community-based cross-sectional design where mothers/guardians of children between 12-23 months old were randomly sampled, visited and interviewed using structured questionnaires, key informant interviews and focus group discussions to obtain data on maternal characteristics and immunization history. Sampling of the study participants was done using the World Health Organization's (WHO) Immunization coverage cluster survey design. The study employed multi-stage and simple random sampling methods. Data was entered, coded and analyzed using Epi info version 7 statistical software. Prevalence Odds Ratio (OR) and corresponding 95% Confidence Interval (CI) were used to estimate the strength of association between the relevant factors with immunization coverage. P-values were reported at 95% Confidence Interval (CI) and statistical significance difference was defined at p 0.05. Binary logistic regression was conducted to determine the influence of the independent variables on the dependent variable.

4.0 Results and Discussion

4.1 Utilization of ANC services

The section provides results relating to utilization of ANC services. This is captured in Table 1. Majority (75.9%) of the respondents stated diseases prevention as the reason for immunization, and 20% noted that it was a requirement by health personnel. The respondents (55.2%) stated that a child should be fully immunized at 2 years. Results also indicated that 91.7% had immunization cards, and those who had no knowledge about any health facility in their location were (54.4%). Further, 53.9% had not visited the facility in the last one year. Majority (79.6%) of the respondents delivered their child in a health facility, and 19.6% delivered at home. In addition, 50% stated that they paid for the services and the rest did not pay. The average amount paid was Ksh 395, while the maximum amount paid was Ksh 1450.

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Table 1: Utilization of ANC services

Variable	N	%
Reason for immunization		
For treatment	13	3.3
To prevent diseases	296	75.9
It's a requirement by health personnel	78	20
I don't know	3	0.8
Age of full immunization		
9 Months	28	7.2
1 Year	47	12
2 Years	216	55.2
5 Years	100	25.6
Immunization card		
Yes	354	91.7
No	32	8.3
Knowledge about health facility		
Yes	177	45.6
No	211	54.4
Visit to the health facility		
Yes	83	46.1
No	97	53.9
Place of delivery		
Home	71	19.6
Health Facility	288	79.6
Other (Specify)	3	0.8
Charge for the service		
Yes	35	50
No	35	50
	Mean	**Max**
Amount paid for service	395.3	1450

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4.2 Immunization status and predictors

This section provides results on immunization status and predictors. Table 2 shows the findings. Full immunization or complete immunization is defined as a child who has received a BCG vaccination against tuberculosis; three doses of DPT vaccine to prevent diphtheria, pertussis, and tetanus (DPT); at least three doses of polio vaccine; and one dose of measles vaccine (Lober, 2021), partial immunization refers to a child who has missed any of the vaccines given under the national immunization programme at one year of age (WHO, 2019b) while non-immunized child, was one who had not received any vaccine up to 12 months of age or who had received only one polio vaccine (WHO, 2019b). The findings indicate that 94.3% of the respondent's children had received BCG vaccine; this was confirmed by the BCG scar examination on the children. Of the respondents (62.4%) were partially immunized, 36.6% were fully immunized as shown by their vaccination cards and parents/guardian history, while 1.1% had no evidence that the child was immunized. Majority of the respondents (86.5%) had their children fully immunized before one year of age. Most (71.4%) of the respondents were unaware of need for immunization as the reason for lack of full immunization, and 28.6% were unaware of need to return for 2nd or 3rd dose. Of the respondents (98.7%) noted that their child had received vaccination drops to protect against polio, and first polio drops were received in the first two weeks after birth (96.9%). On average, polio drops were received four times 3.56 ($\pm$0.918). The respondents (99.5%) cited that the child had received a pentavalent vaccination. The respondents (84.8%) noted that they would add another child.

Table 2: Immunization Status and Predictors

Variable	N	%
BCG		
Yes	364	94.3
No	22	5.7
Immunization status		
Not immunized	4	1.1
Partially immunized	232	62.4
Fully immunized	136	36.6
Full immunization before 1 year		
Yes	118	86.5
No	18	13.5
Reasons for lack of full immunization		
Unaware of need for immunization	10	71.4
Unaware of need to return for 2nd or 3rd dose	4	28.6
Vaccination drops to protect polio		
Yes	385	98.7
No	5	1.3
First polio drops		
Yes	370	96.9
No	12	3.1
Oral protection against polio		
Yes	372	96.9
No	12	3.1

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Child ever received a pentavalent vaccination		
Yes	382	99.5
No	2	0.5
Add another child?		
Yes	323	84.8
No	58	15.2

4.3 Barriers to Immunization

The section provides results on barriers to immunization. Table 3 shows the findings. The respondents, 50.9% stated that place of immunization being too far as a barrier to immunization, 10.9% cited Mother/guardian being too busy, and 10.3% cited time of immunization being inconvenient. According to 85.7% of the respondents, there were no cultural beliefs that prevented children from being taken for immunization, while 14.3% of the respondents agreed that culture was a barrier to child immunization. In particular, the respondents highlighted use of herbal medicine as the main cultural barrier.

Table 3: Barriers to Immunization

Variable	N	%
Barriers to immunization		
Place of immunization too far	192	50.9
Time of immunization inconvenient	39	10.3
Mother/guardian too busy	41	10.9
Family problem including illness of mother	24	6.4
Child ill, brought but not immunized	6	1.6
Long waiting time	8	2.1
Others	67	17.8
Cultural barrier		
Yes	55	14.3
No	329	85.7

The respondents were further asked to state other reasons why children may not be taken for immunization. The respondents noted the following reasons: harsh doctors, lack of vaccine, lack of knowledge, lack of finance, forgetting immunization date, misplaced clinic books, family conflict, lack of access to health facilities and child health problems such as being underweight.

The researcher sought the respondents' views on what should be done to improve access, utilization and coverage of immunization in the study location. The respondents noted that construction of more health facilities would improve access to health services. There is also need for health education on immunization. The door-to-door immunization would also ensure that more children are vaccinated. The health provides should formulate a mechanism to remind parents about immunization date such as phone call.

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4.4 Routine Immunization

This section provides results on routine immunization. Routine immunization information was obtained from health facility records and the healthcare providers. Table 4 indicates that 84.7% of the respondents agreed that there was provision of routine immunization services; 64.3% noted that they had not witnessed decrease in routine immunization, 63.8% had not witnessed decline in number of OPV, and 64.7% had not witnessed decrease in number of IPV. Further, 64.4% of the respondents had not witnessed decline in number of measles, 63.8% had not witnessed decrease in number of DPT, 63.8% had not witnessed decrease in number of Hepatitis B. In addition, 63.5% had not witnessed decrease in number of measles/mumps/rubella, 64% had not witnessed decrease in number of PCV and 64.3% had not witnessed decrease in number of Hepatitis A. Finally, 75.9% of the respondents cited that February to December 2020 as the period with most significant drop in routine vaccination.

Table 4: Routine Immunization

Variable	N	%
Routine immunization services		
Yes	332	84.7
No	60	15.3
Witnessed decrease in routine immunization		
Yes	127	32.4
No	252	64.3
I do not know	13	3.3
Decrease in number of OPV		
Yes	128	32.8
No	249	63.8
I do not know	13	3.3
Decrease in number of IPV		
Yes	124	32
No	250	64.6
I do not know	13	3.4
Decrease in number of measles		
Yes	124	31.8
No	251	64.4
I do not know	15	3.8
Decrease in number of DPT		
Yes	126	32.3
No	249	63.8
I do not know	15	3.8
Decrease in number of Hepatitis B		
Yes	125	32.3
No	247	63.8
I do not know	15	3.9
Decrease in number of measles/mumps/rubella		

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Yes	124	32.5
No	242	63.5
I do not know	15	3.9
Decrease in number of PCV		
Yes	124	32.5
No	244	64
I do not know	13	3.4
Decrease in number of Hepatitis A		
Yes	123	32.3
No	245	64.3
I do not know	13	3.4
Period with most significant drop in routine vaccination		
October-November 2019	5	3.8
December 2019-January 2020	8	6
February to December 2020	101	75.9
I do not know	17	12.8
I prefer not to answer	2	1.5

4.5 Binary Logistic Regression

The binary logistic regression was conducted to determine the influence of the independent variables on the dependent variable.

Influence of Socio-demographic factors on Immunization coverage among children between 12-23 months in West Pokot County

The study sought to determine the influence of socio-demographic factors on immunization coverage among children between 12-23 months. To achieve this objective, a binary regression analysis was conducted. The findings are displayed on table 5. Results reveal that gender has no significant relationship with immunization coverage (P=0.067>0.05). Age of the mother/guardian is significantly associated with immunization coverage (OR = 1.128, P =0.000<0.05). This suggests that the older the mother/guardian, the higher the chances of the child being fully immunized. Number of children are significantly associated with immunization coverage (OR = 0.694, P =0.000<0.05). This means that the chances of a child being fully immunized decreases with increase in the number of Children.

Table 5: Influence of socio-demographic factors on immunization coverage

Dependent Variable	Independent Variable		Sig.	Odds Ratio (95% CI)
Fully Immunized	Gender	Male	0.067	5.118 (0.892-29.354)
		Female		
	Age (years)		0.000	1.128 (1.073-1.186)
	Number of children		0.000	0.694 (0.588-0.818)

Influence of Socio-economic factors on Immunization coverage among children between 12-23 months in West Pokot County

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The study sought to determine the influence of socio-economic factors on immunization coverage among children between 12-23 months. To achieve this objective, a binary regression analysis was conducted. The findings are displayed on table 6. Results reveal that level of education of the mother/guardian has no significant relationship with immunization coverage (P>0.05). On occupation, respondents who were teachers were more likely to have their children fully immunized than others (OR = 3.286, P =0.04<0.05). The chances of farmers having their child fully immunized was higher compared to other (OR = 2.006, P =0.035<0.05), this concurred with a study by (Aalemi et al., 2020) in Afghanistan.

Table 6: Influence of socio-economic factors on immunization coverage

Dependent Variable	Independent Variable		Sig.	Odds Ratio (95% CI)
Fully immunized	Education level			
		None	0.436	0.676 (0.253-1.81)
		Primary	0.901	1.059 (0.43-2.609)
		Secondary	0.926	0.956 (0.37-2.473)
		Tertiary		
	Occupation	Teacher	0.04	3.286 (1.053-10.254)
		Business	0.115	1.544 (0.9-2.649)
		Farmer	0.035	2.006 (1.052-3.826)
		Other		

Influence of health facility factors on Immunization coverage among children between 12-23 months in West Pokot County

The study sought to determine the influence of health facility factors on immunization coverage among children between 12-23 months. To achieve this objective, a binary regression analysis was conducted. The findings are displayed on Table 7. Results indicate that knowledge about health facility in the location has no significant relationship with immunization coverage (P>0.05). The distance to nearest health facility was also found to have no significant relationship with immunization coverage (P>0.05). Respondents who paid for the services were more likely to have their child fully immunized than those who did not pay for the services (OR = 3.546, P =0.019<0.05).

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Table 7: Influence of Health facility factors on immunization coverage

Dependent Variable	Independent Variable		Sig.	Odds Ratio (95% CI)
Fully immunized	Knowledge about health facility in the location	Yes	.712	1.344 (0.279-6.479)
		No		
	Distance to nearest health facility	Less than 1 Km	.843	1.150 (0.288-4.595)
		1-5 Km	.234	2.153 (0.609-7.612)
		More than 5 Km		
	Charged for the service	Yes	.019	3.546 (1.236-10.180)
		No		

Influence of health service utilization on Immunization coverage among children between 12-23 months in West Pokot County

The study sought to determine the influence of health service utilization on immunization coverage among children between 12-23 months. To achieve this objective, a binary regression analysis was conducted. The findings are displayed on Table 8. Results indicate that knowledge about the age at which a child is supposed to be fully immunized has no significant relationship with immunization coverage (P>0.05). Respondents who had visited the facility in the last one year were more likely to have their child full immunized than those who had not visited health facility (OR = 3.147, P =0.01<0.05). Immunization card for each of the children has no significant relationship with immunization coverage (P=0.356>0.05).

Table 8: Influence of health service utilization on immunization coverage

Dependent Variable	Independent Variable		Sig.	Odds Ratio (95% CI)
Fully immunized	Age at which a child supposed to be fully immunized	9 Months	.998	.000
		1 Year	.851	1.125 (0.329-3.855)
		2 Years	.390	1.485 (0.602-3.663)
		5 Years		
	Visit to the facility in the last one year	Yes	.001	3.147 (1.567-6.324)
		No		
	Immunization card for each of your children	Yes	.356	0.491 (0.109-2.221)
		No		

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4.6 Responses from Key Informant Interviews

Four key informant interviews were carried out with the healthcare workers and community gatekeepers, while observing the ministry of health regulations on the prevention of Covid-19. The interviewees were asked to state some of the health problems that affect children in the health facility. Respondent 1 noted that "Scabies, Malaria, Measles and Common Cold were the major health problems". Respondent 2 stated that "children are protected from being affected by these health problems/diseases through immunization, providing treated bed nets to mothers, urging mothers to keep the children warm, and taking them to the hospital". He further added that "the vaccination services in the health facility were offered on time". Respondent 3 stated that "some challenges in delivering vaccination services at this health facility including delays in delivery of medicine and too many patients".

According to the interviewees "vaccination services can be improved by taking initiative in educating Mother on their set clinic days on importance of immunization, and educating mothers in the community on the importance of immunization". On compliance with the vaccination schedule in the community, respondent 7 said that "most of the times children received their vaccination on the set day, and that the day set for vaccination convenient". On the circumstances when a child may not be vaccinated in the clinic, respondent 3 cited "when the vaccine is unavailable". To help children to catch up with their vaccinations, the interviewees stated that they make sure that mothers are encouraged to take part in making sure the child receive all dose, and bringing awareness on dangers of not taking child for immunization.

Concerning the strategies the Ministry of health or the health facility can employ to improve the number of children receiving all of their recommended vaccinations on time, respondent 1 stated "creating awareness on importance of immunization", he also cited "addressing the resistance to change, lack of knowledge on immunization and lack of commitment among parents/caregivers as the barriers to implementing any of these interventions to reduce missed opportunities".

4.7 Responses from Focus Group Discussions

Four focus group discussions were carried out with the mothers/caregivers, while observing the ministry of health regulations on the prevention of Covid-19. From the focus group discussions, the following responses were recorded from the participants; on the question about health problems that affect children in the community, respondent 2 said "Malaria, Scabies, Measles and common cold are the main health problems that affect children in this community". On the question on how the children are protected from being affected by these health problems/diseases, respondent 6 answered that "the children are protected from being affected by these health problems/diseases through keeping them warm and making sure they complete clinic appointments". On the question on the community's perception on childhood vaccination, respondent 3 said "the community feels that childhood vaccination is helpful since children are protected from diseases". On the question concerning childhood vaccination services in the community, respondent 8 reported that "services in the community are not easily accessible since vaccination clinics were too far".

When asked about ways these vaccination services can be improved, the fourth respondents stated that "constructing more health facilities and making sure the vaccination medicine is available on the set day of vaccination will help". She also cited that "compliance with vaccination schedule was not that good since most of the time vaccination medicine was unavailable in the vaccination centers". Respondent 3 stated that "the reason why many children do not receive all their recommended vaccines on time was due to ignorance from the parents and when the child is under treatment with herbal medicine".

When asked to suggest ways of helping children to receive all their recommended vaccines according to the schedule, the participants highlighted "educating mothers on importance of immunization and having an accessible health facility". They also noted that "lack of vaccination medicine prevents health workers from giving children all their recommended vaccines on time". When asked the reasons why mothers/caregivers may not be willing or able to ensure that their children receive all their recommended vaccines on time when they visit the clinic/hospital, respondent 3 said "when the child is using herbal medicine they cannot be taken for clinic". On the question concerning ensuring that children receive all their recommended vaccines on time, respondent 6 recommended "construction of more health facilities, educating the mothers on the importance of immunization, and vaccination medicine to be available in the clinic on the set days of vaccination".

4.8 Discussion

Immunization coverage among children between 12-23 months in West Pokot County

The first objective of the study was to estimate the immunization coverage among children between 12-23 months in West Pokot County. According to the findings, majority of the mothers/guardians had partially immunized their children (62.4%), followed by those who had fully immunized their children (36.6%) and lastly 1.1% had not immunized their children. This implies that only a third of the children between 12-23 months in West Pokot County have been fully immunized. The findings concurred with Nozaki et al. (2019) who found that approximately one-half of 12–23 year-old children had received complete vaccination, which was lower than the estimated rate from routine administrative coverage. Similarly, the findings agreed with Girmay and Dadi (2019) observation that full immunization coverage was lower than the target set by the World Health Organization.

Factors influencing immunization coverage among children between 12-23 months in West Pokot County

The second objective of the study investigated the factors influencing immunization coverage among children between 12-23 months in West Pokot County. The findings indicated that age of the mother/guardian was significantly associated with immunization coverage. This implied that the older the mother/guardian, the higher the chances of the child being fully immunized. The findings supported Njeru et al. (2019) assertion that age significantly influences the utilization of the immunization services by the mother or caregiver.

Results also revealed that the number of children was significantly associated with immunization coverage. This denoted that the chances of a child being fully immunized decreased with increase in the number of children.

Results further indicated that respondents who were teachers were more likely to have their children fully immunized than others. Also, the chances of farmers having their child fully immunized was higher compared to others. The study established that the 'other' comprised mainly of housewives implying that the respondents who were housewives were less likely to have their children fully immunized compared to teachers and farmers. The findings agreed with Njeru et al. (2019) results that profession significantly influenced the utilization of the immunization services by the mother or caregiver.

The findings showed that respondents who paid for the services were more likely to have their child fully immunized than those who did not pay for the services. This implied that paying for the health services resulted to increase in immunization.

Influence of health service utilization on immunization coverage among children between 12-23 months in West Pokot County

The third objective of the study was to determine the influence of health service utilization on immunization coverage among children between 12-23 months in West Pokot County. The results indicated that respondents who had visited the facility in the last one year were more likely to have their child full immunized than those who had not visited health facility. This meant that visit to the health facility increased chances of a child being fully immunized. The findings mirrored those of Nwankwo and Orua (2020) who posited that improving mother's health seeking behavior toward pregnancy follow-up and enhancing mothers' knowledge on child immunization are likely to increase immunization coverage. The findings also agreed with Njeru et al. (2019) observation that health system factors influenced the utilization of immunization services.

5.0 Conclusion

The study concluded that the immunization coverage among children between 12-23 months in West Pokot County is wanting. This is because only a third of the children are fully immunized.

The study also concluded that socio and economic factors have an influence on immunization coverage among children between 12-23 months in West Pokot County. In particular, age of the mother/guardian and number of children were found to significantly influence the chances of child full immunization. Occupation categories teacher and farmer were also found to significantly increase the chances of child full immunization. The study also concluded that payment of health facility services significantly increased the chances of child full immunization.

The study further concluded that health service utilization influenced immunization coverage among children between 12-23 months in West Pokot County. In particular, visit to the health facility was found to significantly increases chances of child full immunization.

6.0 Recommendations

Based on the conclusion, the study makes recommendation to the national and county government of West Pokot to organize immunization campaign across West Pokot aimed at creating awareness to mothers/guardians on the importance of fully immunizing their children within the required age bracket.

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The study also recommends that the county government of West Pokot in collaboration with the national government should develop programs aimed at empowering the residents of West Pokot economically. For instance, government should support farmers in West Pokot to become self-reliant.

The study further recommends that the Ministry of health both at National and County level should develop programs aimed at educating mothers/guardians on health-related matters. The governments should also ensure that there are adequate health facilities within the County of West Pokot. This will ensure that mothers can conveniently visit the health facilities and have their children immunized.

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