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Ng'eno Lily Chepketer

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Ng'eno Lily Chepketer

***Corresponding Author's Email: lngeno@kabianga.ac.ke**

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Abstract

The study sought to establish the relationship between the knowledge, attitude and practices of parents /guardians to pneumococcal conjugate vaccine uptake among children attending immunization services. This was a descriptive cross-sectional hospital-based quantitative and qualitative study. The study was conducted in Maternal Child Health (MCH) clinic and pediatric wards. It involved parents/caregivers (n= 104) bringing their children to the hospital. Simple random sampling was used to identify parent's/guardian respondents. A pretested questionnaire was used to collect data from the correspondents. A key informant interview with the nurse in charge was also conducted. Data were analyzed using the software Statistical Package for Social Sciences (SPSS) version 18.0 computer package. Research results were presented in frequency distribution tables, graphs pie charts and other forms of descriptive statistics. The study showed that there is an association between education and parental knowledge of vaccine uptake. There was a high level of awareness regarding the PCV availability in the hospital with the majority of parents /caregivers getting information from the health workers. The study recommends that: For PCV to reach effectively every child parents/guardians would need updated information tailored to the understanding of pneumonia disease burden and prevention. Information on PCV must be provided by well-informed and experience health personnel. Increase awareness in the community through increased sensitization and mass campaigns.

Keywords: *Relationship of knowledge, Attitude, Parents /Guardians, Pneumococcal Conjugate Vaccine, Immunization Services*

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1.0 Introduction

Pneumonia remains a leading killer among children in developing countries, where it accounts for up to 21% of deaths in children under the age of five years. The overall mortality rate for children aged less than five years in developing countries ranges from 60% to 100%. One-fifth of this is due to pneumonia. An estimated 1.9 million children die from pneumonia yearly. Half the world's deaths due to pneumonia in children under the age of five occur in Africa. In sub-Saharan Africa, the estimated proportion of death in children aged below 5 years attributed to pneumonia is 17-26% (Onyango *et al.*, 2012). In Kenya, Pneumonia has greatly affected children under the age of five. Currently, Kenya is ranked among the 15 countries with the highest estimated number of deaths due to clinical pneumonia, the mortality rate being 50 /10, 000 per year. It is the second leading cause of death among children under the age of five years and causes 16% of deaths in the age group (Onyango *et al*, 2012). It is currently diagnosed using Integrated Management of Childhood Illness (IMCI) criteria in public health facilities. Treatment of pneumococcal infection with antibiotics such as Penicillin and other drugs used to be very effective, but some strains of the disease have become resistant to these drugs.

Prevention of pneumonia has therefore become important. According to the report by the Center for Disease Control (CDC), Department of Health and Human Services, released in 2009, the Pneumococcal Polysaccharide Vaccine(PPV) protects against twenty-three types of pneumococcal bacteria including the most likely to cause serious disease. In February 2011, the Kenya Expanded Programme on Immunization (KEPI) officially introduced and included the PCV-13 vaccine as a free and mandatory vaccine in the immunization schedule for children under the age of five. KEPI launched the vaccination with the expectation that it would potentially prevent pneumococcal mortality. Initially, children would receive the vaccine at the request of their parents, usually from a private practitioner who paid exorbitant charges for the vaccine. Many people were unable to obtain the vaccine due to the high cost. Many more were unaware of the vaccine's existence prior to its release in 2011. The introduction of PCV-13 was thus a government attempt to reduce pneumonia prevalence among children under the age of five.

1.1 Statement of the Problem

Pneumonia is the second biggest cause of death among children under the age of five in Kenya. It is responsible for 16% of deaths in this age range (Onyango *et al*, 2012). Despite the government's introduction of the pneumococcal conjugate vaccination and inclusion in the KEPI program, which provides residents with free access to pneumonia prevention, a high number of children under the age of five continue to come at Kenyatta National Hospital with pneumonia. According to hospital records, four children are hospitalized to pediatric medical wards each day with severe streptococcal pneumonia, totaling 120 children every month. This calls into question the level of vaccination uptake among the target group. It is therefore critical to investigate the association between parental knowledge, attitude, and practices and pneumococcal conjugate vaccination uptake among children receiving immunization programs.

1.2 Objective of the Study

To establish the relationship of knowledge, attitude and practices of parents /guardians to pneumococcal conjugate vaccine uptake among children attending immunization services

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2.0 Literature Review

Parents/guardians may or may not be aware that the vaccination is available, which may affect vaccine uptake. Parents' understanding or cognitive process is an important influence in the demand for various immunizations (Meszaros *et al*., 1996). This is clear since, in general, humans act on the basis of the knowledge at their disposal. According to a study conducted in Sub-Saharan Africa, low vaccine uptake may be connected with low parental and community understanding about immunization and/or a lack of access to information on children immunization. Unimmunized children are uncommon among parents or groups with access to the media (Charles *et al*, 2012).

3.0 Methodology

The study employed a descriptive cross-sectional hospital-based quantitative and qualitative design. The investigation was carried out in Maternal Child Health (MCH) clinics and pediatric wards. It involved parents/caregivers (n=104) bringing their children to the hospital. Simple random sampling was utilized to identify parent/guardian responders. The data was gathered from the correspondents using a pretested questionnaire. A key informant interview with the charge nurse was also done. The software Statistical Package for Social Sciences (SPSS) version 18.0 was used to analyze the data. The findings of the study were presented in frequency distribution tables, graphs, pie charts, and other forms of descriptive statistics.

4.0 Findings and Discussions

4.1 Knowledge of the participants

Four items related to the pneumococcal vaccine immunization schedule and pneumonia etiologies were used to assess the level of knowledge regarding PCV immunization (Table 1). Eighty-nine per cent of patients knew that they were required to attend the MCH clinic every four weeks during PCV immunization and 57.8% were aware that infants receive three doses of vaccine. Twenty-one (20.6%) caretakers were aware that bacteria cause pneumonia.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 1: Knowledge of participants

	Frequency (n)	Percent (%)
Factors predisposing child to pneumonia		
Dirt	8	7.7
Bathing a child	42	40.4
Bacteria	26	25.0
I don't know	28	26.9
Cause of pneumonia		
Cold	68	66.7
Bacteria	21	20.6
Bathing child with cold water	11	10.8
Others	2	2.0
Number of scheduled pneumococcal vaccine doses		
One	3	2.9
Two	22	21.6
Three	59	57.8
Don't know	18	17.7
Duration between administration of vaccine doses		
One month	91	89.2
Three months	2	2.0
I don't know	9	8.8

Caretakers responding appropriately to all four knowledge items were considered to have adequate knowledge. Figure 1 shows that 15 (14.4%) caretakers had adequate knowledge concerning pneumonia aetiology and the vaccination schedule.

Stratford Peer Reviewed Journals and Book Publishing
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Volume 5||Issue 3||Page 59-73||November||2022|
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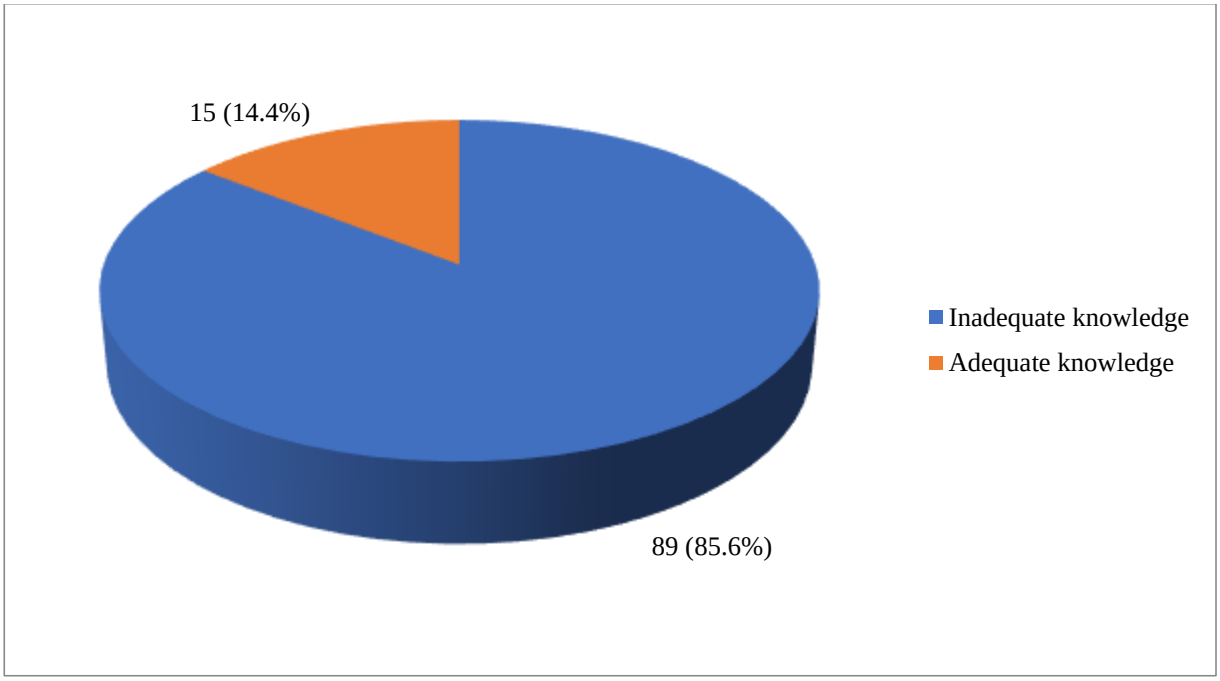

Figure 1: Care takers knowledge

4.1.1 Knowledge versus demographic factors

Caretaker knowledge showed statistically significant associations with parity ($p = 0.02$) and the spouse's level of education ($p = 0.004$). Higher parity was associated with increased knowledge and the caretaker's knowledge also increased with the increasing spousal level of education (Table 2).

Stratford Peer Reviewed Journals and Book Publishing
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Table 2: Knowledge versus demographic factors

Characteristic		Knowledge		p value
		Inadequate	Adequate	
Age	20 - 24 years	29(96.7)	1(3.3)	0.22
	25 - 29 years	24(82.8)	5(17.2)	
	30 - 34 years	26(78.8)	7(21.2)	
	35 - 40 years	10(83.3)	2(16.7)	
Sex	Male	4(100.0)	0(0.0)	1.00
	Female	85(85.0)	15(15.0)	
Marital	Single	2(100.0)	0(0.0)	1.00
	Married	87(85.3)	15(14.7)	
Parity	One	33(84.6)	6(15.4)	0.02
	Two	35(97.2)	1(2.8)	
	Three	14(73.7)	5(26.3)	
	Four and above	7(70.0)	3(30.0)	
Education	Primary	9(90.0)	1(10.0)	0.64
	Secondary	29(90.6)	3(9.4)	
	College	49(81.7)	11(18.3)	
Spouse's education	Primary	41(95.3)	2(4.7)	0.004
	Secondary	23(92.0)	2(8.0)	
	College	25(69.4)	11(30.6)	

4.1.2 Knowledge versus socio-cultural factors

As shown in Table 3 below, caretaker (p = 0.24) or spousal (p = 0.46) income, caretaker occupation (p = 0.24) and religion (p = 0.78) were not significantly associated with caretaker knowledge of pneumonia aetiology or vaccination.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 3: Knowledge versus socio-economic factors

Characteristic		Knowledge		p value
		Inadequate	Inadequate	
Occupation	Unemployed	2(100.0)	0(0.0)	0.23
	Housewife	52(91.2)	5(8.8)	
	Casual worker	11(73.3)	4(26.7)	
	Business	15(83.3)	3(16.7)	
	Formal employment	9(75.0)	3(25.0)	
Income	Below 5000	51(91.1)	5(8.9)	0.24
	6000-10000	11(78.6)	3(21.4)	
	11000-15000	8(80.0)	2(20.0)	
	16000-20000	7(70.0)	3(30.0)	
	Above 21000	10(83.3)	2(16.7)	
Spouse's income	Below 5000	10(90.9)	1(9.1)	0.46
	6000-10000	14(100.0)	0(0.0)	
	11000-15000	9(90.0)	1(10.0)	
	16000-20000	11(84.6)	2(15.4)	
	Above 21000	37(80.4)	9(19.6)	
Religion	Catholic	36(85.7)	6(14.3)	0.78
	Protestant	39(83.0)	8(17.0)	
	SDA	13(92.9)	1(7.1)	
	Muslim	1(100.0)	0(0.0)	

4.2 Attitude of the correspondents

Most caretakers either strongly agreed (46.2%) or agreed (50.5%) that immunization ensures adequate protection for the child (Table 4) and also agreed that nurses treated them well at the clinic (61.3%) answering all questions concerning vaccines (58.7%). Responses to negative attitude items indicate that most caretakers disagree immunization is prohibited by religious beliefs (63.4%), cultural practices (72.8%) or social norms (72.8%).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 4: Attitude of correspondents

	Strongly Agree	Agree	Do Not Know	Disagree	Strongly Disagree
Child's immunization ensures adequate health protection	43(46.2)	47(50.5)	0(0.0)	2(2.2)	1(1.1)
Childs immunization is against my religious belief	3(3.2)	9(9.7)	5(5.4)	59(63.4)	17(18.3)
Nurses have treated me well when I bring my child for immunization	31(33.3)	57(61.3)	2(2.2)	2(2.2)	1(1.1)
Nurses have answered all my questions concerning vaccine positively	28(30.4)	54(58.7)	3(3.3)	6(6.5)	1(1.1)
Child's immunization is against the habit (cultural practice) of my community	0(0.0)	2(2.2)	5(5.4)	67(72.8)	18(19.6)
Child's immunization is against the norms of my community	1(1.1)	2(2.2)	3(3.3)	67(72.8)	19(20.7)

4.2.1 Positive attitude

A total of 67 (64.4%) caretakers responded positively to all six attitude items implying a positive attitude toward pneumococcal vaccination (Figure 2).

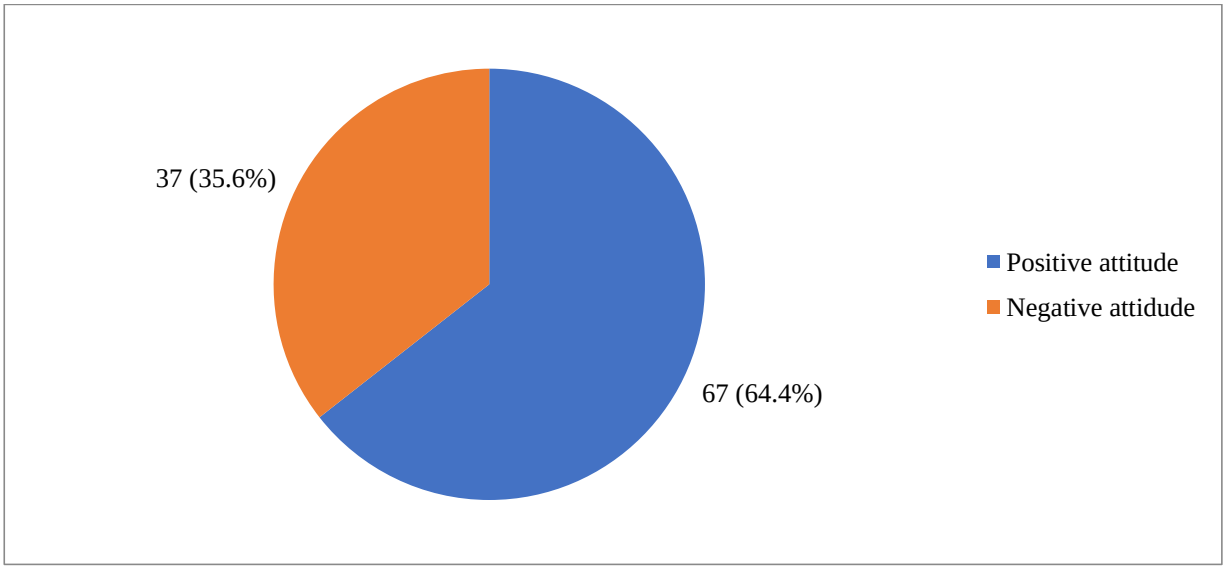

Figure 2: Attitude versus demographic factors

Table 5 shows that positive caretaker attitude toward pneumococcal vaccination was not significantly associated with demographic characteristics including age (p = 0.31), gender (p = 0.29), marital status (p = 0.12) or education (p = 0.50).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 5: Attitude versus socio-cultural and economic factors

Characteristic		Attitude		p value
		Negative	Positive	
Age	20 - 24 years	11(36.7)	19(63.3)	0.31
	25 - 29 years	9(31.0)	20(69.0)	
	30 - 34 years	15(45.5)	18(54.5)	
	35 - 40 years	2(16.7)	10(83.3)	
Sex	Male	0(0.0)	4(100.0)	0.29
	Female	37(37.0)	63(63.0)	
Marital	Single	2(100.0)	0(0.0)	0.12
	Married	35(34.3)	67(65.7)	
Parity	One	16(41.0)	23(59.0)	0.65
	Two	12(33.3)	24(66.7)	
	Three	7(36.8)	12(63.2)	
	Four and above	2(20.0)	8(80.0)	
Education	Primary	3(30.0)	7(70.0)	0.50
	Secondary	9(28.1)	23(71.9)	
	College	24(40.0)	36(60.0)	
Spouse's education	Primary	14(32.6)	29(67.4)	0.60
	Secondary	11(44.0)	14(56.0)	
	College	12(33.3)	24(66.7)	

4.2.2 Occupation income and religion

Housewives had a positive attitude toward immunization compared to caretakers within other occupations but this association did not attain statistical significance ($p = 0.05$). The remaining socio-cultural factors namely income ($p = 0.44$), spousal income ($p = 0.59$) or religion ($p = 0.86$) did not show significant associations with caretaker attitude towards immunization (Table 6).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 6: Occupation income and religion

Characteristic		Attitude		p value
		Negative	Positive	
Occupation	Unemployed	1(50.0)	1(50.0)	0.05
	Housewife	18(31.6)	39(68.4)	
	Casual worker	7(46.7)	8(53.3)	
	Business	10(55.6)	8(44.4)	
	Formal employment	1(8.3)	11(91.7)	
Income	Below 5000	19(33.9)	37(66.1)	0.44
	6000-10000	5(35.7)	9(64.3)	
	11000-15000	5(50.0)	5(50.0)	
	16000-20000	5(50.0)	5(50.0)	
	Above 21000	2(16.7)	10(83.3)	
Spouse's income	Below 5000	4(36.4)	7(63.6)	0.59
	6000-10000	4(28.6)	10(71.4)	
	11000-15000	3(30.0)	7(70.0)	
	16000-20000	7(53.8)	6(46.2)	
	Above 21000	14(30.4)	32(69.6)	
Religion	Catholic	14(33.3)	28(66.7)	0.86
	Protestant	17(36.2)	30(63.8)	
	SDA	6(42.9)	8(57.1)	
	Muslim	0(0.0)	1(100.0)	

4.3 Practice

Figure 3 compares reported caretaker practice and verified immunization status of infants in the study. Most 99%(n=103) caretakers indicate that they avail their children for vaccination, yet 89.4%(n=93) had immunization cards verifying reported immunization with 41.4%(n=43) showing that infants were fully immunized for age.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
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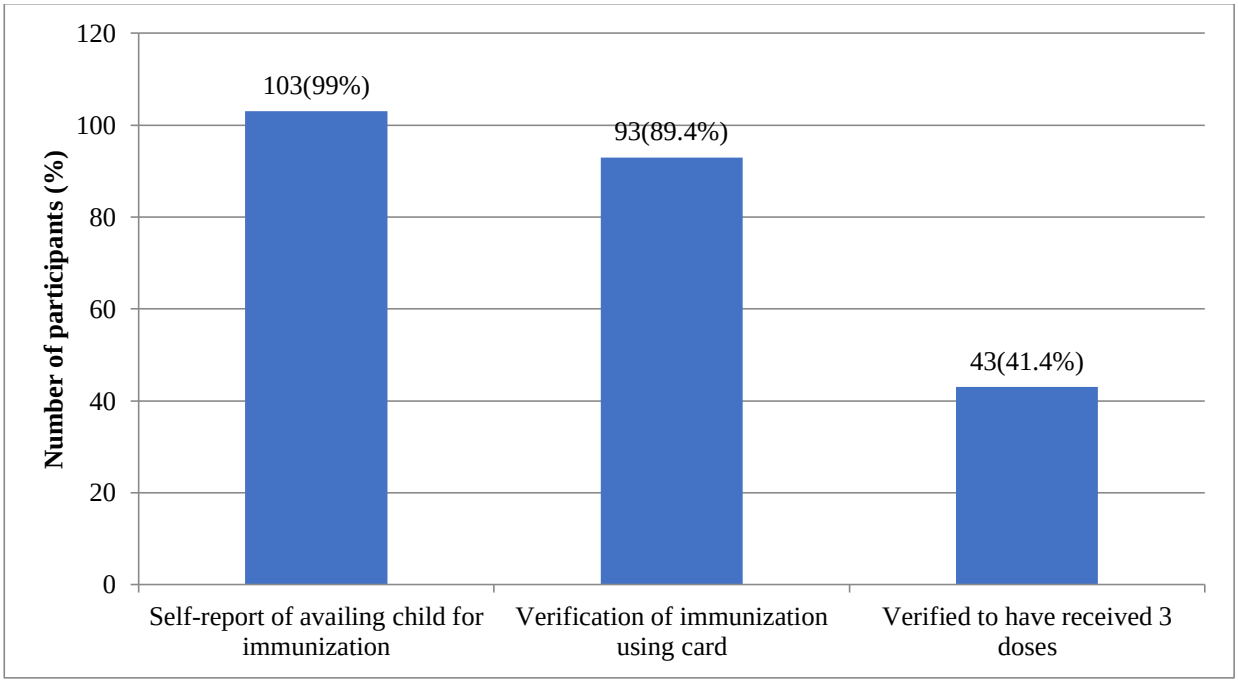

Figure 3: Practice versus demographic factors

4.3.1 Practice versus demographic factors

Spousal level of education was statistically significantly associated with practice (p = 0.01). Caretakers reporting either secondary or tertiary education level for spouses were more likely to have good practices compared to caretakers reporting that their spouses had primary level education (Table 7).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 7: Practice versus demographic factors

Characteristic		Practice		p value
		Inappropriate	Appropriate	
Age	20 - 24 years	24(80.0)	6(20.0)	0.08
	25 - 29 years	17(58.6)	12(41.4)	
	30 - 34 years	16(48.5)	17(51.5)	
	35 - 40 years	7(58.3)	5(41.7)	
Sex	Male	4(100.0)	0(0.0)	0.30
	Female	60(60.0)	40(40.0)	
Marital	Single	1(50.0)	1(50.0)	1.00
	Married	63(61.8)	39(38.2)	
Parity	One	24(61.5)	15(38.5)	0.79
	Two	24(66.7)	12(33.3)	
	Three	10(52.6)	9(47.4)	
	Four and above	6(60.0)	4(40.0)	
Education	Primary	8(80.0)	2(20.0)	0.47
	Secondary	20(62.5)	12(37.5)	
	College	35(58.3)	25(41.7)	
Spouse's education	Primary	33(76.7)	10(23.3)	0.01
	Secondary	10(40.0)	15(60.0)	
	College	21(58.3)	15(41.7)	

4.3.2 Practice versus socio-cultural and economic factors

Caretakers' immunization practices did not show significant associations with socio-economic factors including occupation (p = 0.67), income (p = 0.59), spousal income (p = 0.27) or religion (p = 0.61).

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 5||Issue 3||Page 59-73||November||2022|
Email: info@stratfordjournals.org ISSN: 2706-6606

Table 8: Practice versus socio-cultural and economic factors

Characteristic		Practice		Chi	p value
		Inappropriate	Inappropriate		
Occupation	Unemployed	2(100.0)	0(0.0)	*	0.67
	Housewife	36(63.2)	21(36.8)		
	Casual worker	7(46.7)	8(53.3)		
	Business	11(61.1)	7(38.9)		
	Formal employment	8(66.7)	4(33.3)		
Income	Below 5000	36(64.3)	20(35.7)	2.83	0.59
	6000-10000	9(64.3)	5(35.7)		
	11000-15000	5(50.0)	5(50.0)		
	16000-20000	4(40.0)	6(60.0)		
	Above 21000	8(66.7)	4(33.3)		
Spouse's income	Below 5000	8(72.7)	3(27.3)	*	0.27
	6000-10000	12(85.7)	2(14.3)		
	11000-15000	7(70.0)	3(30.0)		
	16000-20000	8(61.5)	5(38.5)		
	Above 21000	25(54.3)	21(45.7)		
Religion	Catholic	27(64.3)	15(35.7)	*	0.61
	Protestant	26(55.3)	21(44.7)		
	SDA	10(71.4)	4(28.6)		
	Muslim	1(100.0)	0(0.0)		

4.4 PCV immunization uptake

Uptake of pneumococcal vaccination determined by caretaker report that infant had received all the three scheduled doses of pneumococcal vaccine was 74% (n = 77), Figure 4.

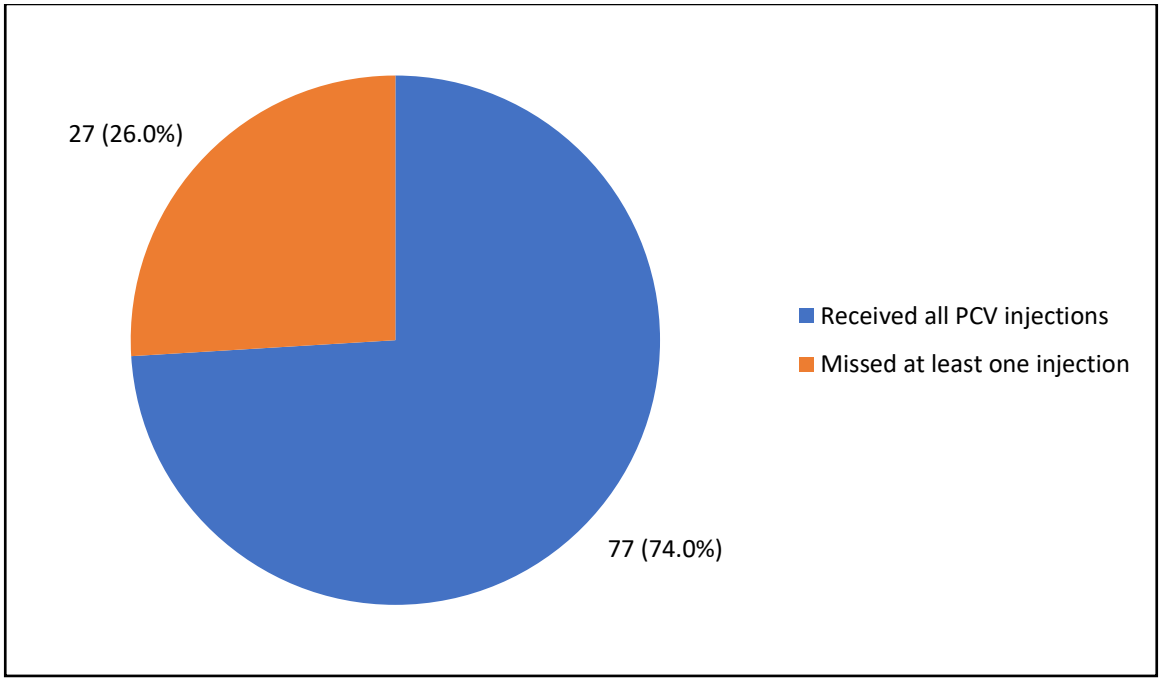

Figure 4: PCV immunization uptake

5.0 Conclusions

The study concluded that how successful the PCV would be made to reaching every child depends on the knowledge, attitude and practices about immunizations based on findings from the study. The decision of parents /guardians relies heavily on some of their knowledge and attitude/practices about immunization based on findings from this study. Thus for the Pneumococcal conjugate vaccine to reach every child parents or guardians would need updated information tailored to their understanding of pneumonia disease burden and prevention. This information must be provided by well-informed and experienced health personnel.

6.0 Recommendations

This study recommends that: For PCV to reach effectively every child parents/guardians would need updated information tailored to the understanding of pneumonia disease burden and prevention. Information on PCV must be provided by well-informed and experience health personnel. Increase awareness in the community through increased sensitization and mass campaigns.

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