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Healthcare Worker Related Determinants Of Adherence To Integrated Management Of Newborn And Childhood Illnesses Guidelines For Childhood Pneumonia In Level 3 Hospitals In Nairobi City County, Kenya

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Abstract:
Background: *In Kenya, the basic level for implementing the Integrated Management of Newborn and Childhood Illness (IMNCI) guidelines is the level 3 health facilities. However, grim statistics denote possible gaps in implementation of IMNCI guidelines on pneumonia among healthcare providers working in the country's primary health care facilities. This is also affirmed by various surveys on the INMCI implementation in Kenya which noted that implementation of IMNCI strategy remained highly inadequate in the country. To address this implementation gap, the ministry of health in Kenya has been embarking on an increased rollout of revised IMNCI guidelines. Despite the roll-out of the revised IMNCI guidelines across health care facilities, the determinants for the adherence to the pneumonia IMNCI guidelines in the county's level 3 health facilities are unclear. This necessitates the current study that sought to determine the healthcare worker related factors influencing adherence to IMNCI guidelines for childhood pneumonia in Level 3 health facilities in Nairobi City County.*
Materials and Methods: *This study utilized an analytical cross-sectional research design. the location for the study was Level 3 health facilities in Nairobi City County constituted the study site. The target population for the study was 443 healthcare workers (295 nurses and 148 clinical officers) attending to infants/young children. The sample size for the study was 65 respondents, comprising of 44 nurses and 21 clinical officers. The research instrument used in this study was a self-administered/self-reported questionnaire. Data from the questionnaires was quantitative in nature and were analyzed using descriptive statistics. This included frequencies and percentages. Further, assessment of how the study's explanatory and explained variables related was undertaken with chi-square test at 95% confidence-interval with p values ≤ 0.05 denoting existence of a statistically significant association between the study variables. The study's outcomes were presented as figures and tables. The analytical software utilized was SPSS v.25.*
Results: *The healthcare worker related factors found to have a statistically significant association with adherence to the IMNCI guidelines on management of pneumonia were education level of the healthcare workers (χ^2 = 15.27, p = 0.002); years spent in caring for under-fives (χ^2 = 8.81, p = 0.032); interaction with sick children (χ^2 = 11.07, p = 0.032); training on the IMNCI guidelines (χ^2 = 9.20, p = 0.02); being aware of and knowledgeable of the IMNCI guidelines (χ^2 = 14.45, p < 0.0001); and attitude towards the IMNCI guidelines on pneumonia (χ^2 = 16.63, p < 0.0001).*
Conclusion: *Majority of the healthcare workers working in level 3 health facilities in Nairobi City County adhered to the IMNCI guidelines on management of childhood pneumonia. From the results education level of the healthcare workers, years spent in caring for under-fives, interaction with sick children, training on the IMNCI guidelines, being aware of and knowledgeable of the IMNCI guidelines and attitude towards the IMNCI guidelines on pneumonia were the healthcare worker related factors that influenced adherence to the IMNCI guidelines on pneumonia among healthcare workers in level 3 health facilities in Nairobi City County.*
Keywords: *Determinants, Guidelines, Healthcare Worker, IMNCI, Pneumonia*

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I. Introduction

The Integrated Management of Newborn and Childhood Illness (IMNCI) strategy was developed by World Health Organization (WHO) and the United Nations International and Children's Emergency Fund (UNICEF) to expand treatment access and value for children and infants in primary healthcare settings. Its goal is to reinforce healthcare professionals' illness handling skills of usual health conditions in children, enhance

the ability of health systems to deliver high-quality care and enhancing health-allied habits within communities and families. This in turn enables children to grow and develop in a healthy manner and aids in inhibition and better managing of regular diseases that affect newborns and children (WHO, 2019). Hence, IMNCI is a holistic strategy whose focus is the general well-being and health of a child in whole. It seeks to lower avoidable deaths, lessen ill health incidences and support young children to grow and develop well. It has features that may be applied by medical care entities, communities and families that are both curative and preventive (Krüger, Heinzel-Gutenbrunner & Ali, 2017). It thus promotes the thriving of children through more effective disease prevention and handling via interventions such as vaccination, dietary and developmental counselling (Rahamn et al., 2021).

The UNICEF and WHO promote IMNCI regulations' application on pneumonia as a leading intervention for curbing children's related deaths and disabilities in low and medium income countries (LMICs) (WHO, 2019). Rahamn et al. (2021) and Kalu (2016) reported a 20% and 14% decrease in childhood pneumonia related mortalities in Bangladesh and Malawi respectively attributable to IMNCI guidelines application. Boschi-Pinto et al. (2018) also reported reductions of between 13% and 25% in childhood pneumonia morbidity across diverse LMICs settings attributable to IMNCI guidelines implementation. However, while IMNCI guidelines on pneumonia have great potential to improve healthcare workers' performance and pediatrics care outcomes, poor implementation of these guidelines in ordinary healthcare settings within these countries, has been reported as evidenced in various studies findings (Pradhan, Rizvi, Sami & Gul, 2013; Mupara & Lubbe, 2016; Abdulrahman & Saleem, 2019).

In Kenya, the basic level for implementing the IMNCI guidelines is the level 3 health facilities. Level 3 health facilities in Kenya are staffed by nurses, clinical officers and occasionally by doctors. These health care workers work in collaboration and constitute the primary implementers of the IMNCI guidelines in these health facilities. They are therefore in a good position to report on the adherence status to the IMNCI guidelines on pneumonia within these health care facilities. Consequently, in Nairobi City County, IMNCI guidelines on pneumonia are implemented in all its Level 3 health care facilities. Despite this, the county government's health department records (2022) indicated that, in the period 2019 to 2021, the number of reported severe cases of pediatric pneumonia rose by 12% [from a rate of 20% to 32%]; reported cases of pediatric hospitalization from pneumonia rose by 9% [from a rate of 14% to 23%]; incidences of late referral of pediatric pneumonia patients increased by 20% and that there had been a notable increase of 11% in reported mortalities among children diagnosed with pneumonia in the county. The rise in pediatric pneumonia cases was attributed to poverty-related factors among the county residents including malnutrition, lack of proper sanitary facilities and access to clean water, air pollution in and out of the house and poor healthcare services (Nairobi Metropolitan Services County Health Reports, 2021).

These grim statistics denote possible gaps in implementation of IMNCI guidelines on pneumonia among healthcare providers working in the county's primary health care facilities. This was also affirmed by findings of various surveys on the INMCI implementation in Kenya which noted that implementation of IMNCI strategy remained highly inadequate in the country (Krüger et al., 2017; Mullei & Goodman, 2019). Despite the roll-out of the revised IMNCI guidelines on pneumonia across Nairobi City County's health care facilities, the determinants for the adherence to the pneumonia IMNCI guidelines in the county's level 3 health facilities are unclear. This necessitates the current study that sought to determine the healthcare worker related factors influencing adherence to IMNCI guidelines for childhood pneumonia in Level 3 health facilities in Nairobi City County.

II. Material And Methods

Research Design: This study utilized an analytical cross-sectional research design.

Study Location: Level 3 health facilities in Nairobi City County constituted the study site.

Target Population: 443 healthcare workers (295 nurses and 148 clinical officers) attending to infants/young children.

Sample Size: 65 respondents, comprising of 44 nurses and 21 clinical officers.

Sample Size Calculation: The sample size was calculated using Mugenda and Mugenda (2003) who depict that an appropriate sample size should lie between 10-30% of the target population.

Selection of Participants The study sample (health workers implementing IMNCI) comprised of 21 clinical officers and 44 nurses working in level 3 health facilities of Nairobi City County.

Inclusion Criteria: The study included all qualified healthcare workers.
- Who were either nurses or clinical officers implementing IMNCI in the selected study sites (level 3 health facilities)
- Who were on duty at the study sites during the study period
- Who were working in the under-five sick child clinics/IMNCI clinics
- Who provided informed consent.

Exclusion Criteria: The study excluded;
- Eligible study participants who were off duty at the time of the study
- Who declined to consent to participate.

Research Instrument: The research instrument used in this study was a self-administered/self-reported questionnaire.

Data Collection Procedures: The procedure for collecting this investigation's data involved administering the questionnaire to targeted respondents by the researcher. Prior to responding to the study tool, the respondents were required to go through the study's informed consent form so they could provide their consent of taking part in the study. The respondents were then provided with the questionnaire and were allowed to respond to queries in it at one's own time of convenience within a time lapse of 2 weeks. The principal researcher made regular follow-ups and reminders with the respondents to achieve an adequate response rate. The entire data collection exercise took approximately 4 weeks.

Data Analysis: Data from the questionnaires was quantitative in nature and were analyzed using descriptive statistics. This included frequencies and percentages. Further, assessment of how the study's explanatory and explained variables related was undertaken with chi-square test at 95% confidence-interval with p values ≤ 0.05 denoting existence of a statistically significant association between the study variables. The study's outcomes were presented as figures and tables. The analytical software utilized was SPSS v.25.

III. Results

Demographic Profile of the Respondents

The demographic profile of the respondents was evaluated. The demographic characteristics considered included the respondents' gender, age, education level, marital status, religion, job cadre, years of experience caring for under-five years-olds, whether they had been trained on the IMNCI guidelines and how often they interacted with sick children. On gender, most of the respondents were female (67.9%, n = 38) while 18(32.1%) were male. On age, 24(44.6%) of the respondents were aged 30 - 39 years, 17(30.4%) were aged 20 - 29 years and 11(19.6%) were aged 40 - 49 years. Those aged 50 years and above were few (5.4%, n = 3). On education level, most of the respondents had a Diploma (58.9%, n = 33), 15(26.8%) had a Bachelor's degree while 6(10.7%) had a Higher Diploma. Only 2(3.6%) had a Certificate. On marital status, majority of the respondents were either single or married with most being married (66.1%, n = 37) while 18(32.1%) were single. On the respondents' religion, majority were Christians (91.1%, n = 51) while the remaining were Muslims (8.9%, n = 5). On the respondents' job cadre, two-thirds (66.1%, n = 37) were nurses while 19(33.9%) were clinical officers. On years spent caring for children aged below 5 years, 21(37.5%) of the respondents indicated that they had been caring for children aged below 5 years for 1 - 5 years, 14(25%) said for over 10 years, 11(19.6%) said for less than 1 year while 10(17.9%) said for 6 - 10 years. Regarding how often the respondents interacted with sick children, most (57.1%, n = 32) indicated that they interacted with sick children all the time while 17(30.4%) said they interacted with sick children on a regular basis (see Table 1).

Table 1: Demographic Characteristics of the Respondents

Demographic attributes		Frequency	Percent
Gender	Female	38	67.9
	Male	18	32.1
Age	20 - 29 years	17	30.4
	30 - 39 years	25	44.6
	40 - 49 years	11	19.6
	50 years and above	3	5.4
Education level	Certificate	2	3.6
	Diploma	33	58.9
	Higher Diploma	6	10.7
	Bachelors	15	26.8
Marital status	Single	18	32.1
	Married	37	66.1

	Widowed	1	1.8
Religion	Christianity	51	91.1
	Islam	5	8.9
Job cadre	Nurse	37	66.1
	Clinical officer	19	33.9
Years spent caring for under-fives	Less than 1 year	11	19.6
	1 - 5 years	21	37.5
	6 - 10 years	10	17.9
	Over 10 years	14	25.0
Interactions with sick children	Sometimes	7	12.5
	Regularly	17	30.4
	Always	32	57.1

Adherence to IMNCI Guidelines for Childhood Pneumonia

To ascertain the level of adherence to the IMNCI guidelines on childhood pneumonia among the respondents, the respondents were requested to indicate the extent to which they observed the various IMNCI guidelines while caring and managing for sick children. Their responses were rated on a scale that ranged from 1 (few times) to 5 (always).

From the findings, majority of the respondents were assessed as being adherent to the IMNCI guidelines on childhood pneumonia (83.9%, n = 47) while 9(16.1%) were assessed as being non-adherent. This was evidenced by the fact that majority of the respondents did observe the six core guidelines on management of childhood illnesses which included assessing the child's illness observed by 92.8% of the respondents, classifying the illness based on signs observed by 96.4% of the respondents, identifying the treatment observed by 94.6% of the respondents, treating the child observed by 94.6% of the respondents, counselling the caregiver observed by 91.1% of the respondents and providing follow-up care observed by 83.9% of the respondents. The results are presented in Table 2.

Table 2: Adherence to the IMNCI Guidelines among the Respondents

IMNCI guidelines	Adherent		Non adherent	
	Freq.	Percent	Freq.	Percent
Assess the child's illness	52	92.8	4	7.2
Classify the illness based on signs	54	96.4	2	3.6
Identify the treatment	53	94.6	3	5.4
Treat the child	53	94.6	3	5.4
Counsel the caregiver	51	91.1	5	8.9
Provide follow-up care	47	83.9	9	16.1
Aggregate adherence status	Those adherent		47	83.9
	Those non adherent		9	16.1
Adherent - those who always or in most of the time adhered to the 6 IMNCI guidelines Non adherent - those who adhered to the 6 IMNCI guidelines for half of the time or less than half of the time				

Healthcare Worker Related Factors

The respondents were requested to indicate whether they had attended and completed an IMNCI provider course. From the findings, two-thirds (66.1%, n = 37) of the respondents indicated that they had attended and completed IMNCI provider course while a third (33.9%, n = 19) of the respondents said they had not attended and completed IMNCI provider course. This denoted that most of the respondents had received training on the IMNCI guidelines. The respondents were asked whether they were aware of the IMNCI guidelines on pneumonia. From the findings, majority of the respondents acknowledged that they were aware of the IMNCI guidelines on pneumonia (91.1%, n = 51). Further, the respondents were queried on whether they knew the correct steps under the IMNCI guidelines. From the findings, majority (82.1%, n = 46) of the respondents were able to answer correctly that the steps under the IMNCI guidelines included assess *followed by* classify *followed by* identify treatment *followed by* treat *followed by* counsel *followed by* offer follow up care. This denoted that they were knowledgeable of the correct steps under the IMNCI guidelines. The study, further, sought to evaluate the respondents' knowledge regarding various IMNCI guidelines on pneumonia. On the overall, 37(66.1%) of the respondents were assessed as having adequate knowledge of the IMNCI guidelines on childhood pneumonia while 19(33.9%) were assessed as having inadequate/sub-optimal knowledge of the IMNCI guidelines on childhood pneumonia. The study also sought to establish the attitude of the respondents towards the IMNCI guidelines on childhood pneumonia. From the findings, majority of the respondents (91.1%, n= 51) had a positive attitude towards the IMNCI guidelines on pneumonia (see Table 3).

Table 3: Health Worker Related Factors

		Frequency	Percent
Training on IMNCI Guidelines	Yes	37	66.1
	No	19	33.9
Knowledge of the IMNCI Guidelines on Management of Childhood pneumonia	Yes	51	91.1
	No	5	8.9
Knowledge on correct steps under IMNCI Guidelines	Yes	46	82.1
	No	10	17.9
Knowledge level	Adequate	37	66.1
	Sub-optimal or inadequate	19	33.9
Attitude towards IMNCI Guidelines	Positive	51	91.1
	Negative	5	8.9

Association of Healthcare Worker Related Factors with Adherence to the IMNCI Guidelines on Pneumonia among the Respondents

The association between the healthcare worker related factors and the respondents' adherence to the IMNCI guidelines on pneumonia was evaluated using chi-square statistic at 95% confidence level with chi-square test p values of < 0.05 denoting a significant association between the study variables. From the findings in Table 4, the healthcare worker related factors found to have a statistically significant association with adherence to the IMNCI guidelines on management of pneumonia were education level of the healthcare workers (χ^2 = 15.27, p = 0.002); years spent in caring for under-fives (χ^2 = 8.81, p = 0.032); interaction with sick children (χ^2 = 11.07, p = 0.032); training on the IMNCI guidelines (χ^2 = 9.20, p = 0.02); being aware of and knowledgeable of the IMNCI guidelines (χ^2 = 14.45, p < 0.0001); and attitude towards the IMNCI guidelines on pneumonia (χ^2 = 16.63, p < 0.0001).

Table 4: Association of Healthcare Worker Related Factors with Adherence to the IMNCI Guidelines on Pneumonia among the Respondents

Healthcare worker related factors		Adherence to the IMNCI guidelines		Total	Chi-square	
		Adherent (n = 47)	Non adherent (n = 9)		Statistic (χ^2)	Sig. (p)
Gender	Female	34	4	38	2.70	0.101
	Male	13	5	18		
Age	20 - 29 years	15	2	17	6.27	0.099
	30 - 39 years	22	3	25		
	40 - 49 years	9	2	11		
	50 years and above	1	2	3		
Education level	Certificate	1	1	2	15.27	0.002*
	Diploma	30	3	33		
	Higher Diploma	2	4	6		
	Bachelor's Degree	14	1	15		
Marital status	Single	16	3	19	0.001	0.967
	Married	31	6	37		
Religion	Christianity	43	8	51	0.06	0.802
	Islam	4	1	5		
Job Cadre	Nurse	32	5	37	0.53	0.467
	Clinical Officer	15	4	19		
Years spent caring for under fives	Less than 1 year	6	5	11	8.81	0.032*
	1 - 5 years	19	2	21		
	6 - 10 years	9	1	10		
	Over 10 years	13	1	14		
Interactions with sick children	Sometimes	3	4	7	11.07	0.004*
	Regularly	14	3	17		
	Always	30	2	32		
Trained on the IMNCI guidelines	Yes	35	2	37	9.20	0.002*
	No	12	7	19		
Aware and knowledgeable of the IMNCI guidelines	Yes	36	1	37	14.45	0.000*
	No	11	8	19		
Duration spent caring for sick children	≤ 5 years	26	6	32	0.40	0.529
	> 5 years	21	3	24		
Attitude towards the IMNCI guidelines	Positive	46	5	51	16.63	0.000*
	Negative	1	4	5		

* Statistically significant at 0.05 significance level

IV. Discussion

The findings that level of training has a significant association with adherence to IMNCI guidelines for childhood pneumonia agreed with those of (Krüger et al., 2017) who also identified medical staffs' level of training on the IMNCI guidelines as one of the leading determinants of their adherence to these regulations on managing common ailments in children and newborns. According to Khan et al. (2020) poor or inadequate HCPs' instructional training or guidance in relation to the IMNCI strategy remains one of the leading factors behind the low/poor adherence to these essential interventions in management of ill children. Meno et al. (2019) also identified inadequate training on the IMNCI guidelines as one of the factors that inhibited effective implementation of the integrated management of childhood illnesses (IMNCI) in primary health care facilities in a sub-district in South Africa. In their studies, Traoré et al. (2019) along with Rahmah and Astuti (2021) also acknowledged that inadequate training on IMNCI guidelines was a leading factor that impeded effective adherence to IMNCI guidelines among healthcare workers serving in PHC facilities in Burkina Faso and Indonesia respectively. Similar observations were made in studies by Seid and Sendo (2018), Cilliers (2019) as well as Reñosa et al. (2020) which identified health care providers' lack of training on IMNCI as one of the factors that impeded their effective adherence to the IMNCI strategy while treating under-five years old. Similarly, in inquiries undertaken by Meno et al. (2019) and Abebe et al. (2019) IMNCI guidelines adherence scores were better among HCWs trained on the IMNCI strategy compared to those with no training on the IMNCI guidelines. Similar sentiments were shared by Haryanti et al. (2022) who also concurred that training of health care providers on IMNCI guidelines was instrumental to improved implementation of these interventions in PHC setting.

From the findings, awareness and knowledge of the IMNCI guidelines emerged as another healthcare worker related factor that influenced adherence to the IMNCI guidelines on management of childhood pneumonia among the respondents. The findings were similar to those of Abdulrahman and Saleem (2019) who in a study exploring the implementation of IMNCI strategy in a PHC center in Iraq found that most of the HCWs were aware of the IMNCI guidelines and correctly identified the steps followed under the IMNCI guidelines. Similarly, Adekanye and Odetola (2014) also established that majority of the nurses serving in pediatric care centres in Nigeria's Ibadan hospitals were aware of the integrated management of newborn and childhood illness guidelines and had the right knowledge as to the steps they should follow when caring for sick children using the IMNCI framework. In studies in Indonesia and Bangladesh by Haryanti et al. (2022) and Rahamn et al. (2021), most of the surveyed health care workers serving in primary health care facilities were also found to be aware of the IMNCI guidelines and could correctly identify the steps followed under the IMNCI guidelines. Likewise, evaluated health care workers in studies by Tshivhase et al. (2020) and Kiplagat et al. (2014) were also found to be fairly knowledgeable of the IMNCI guidelines including defined steps within the guidelines.

The findings agreed with those of Tshivhase et al. (2020) who in a study exploring implementation of the IMNCI regulations in rural primary health care clinics in South Africa's Limpopo Province identified health care providers' awareness and knowledge of the IMNCI guidelines as one of the factors that influenced their adherence to these guidelines while caring for sick children. Kilov et al. (2021) while investigating implementation of the IMNCI guidelines in Malawi attributed the sub-optimal application of the guidelines by HCPs in treatment of ill children to their lack of adequate knowledge of the IMNCI guidelines. Indeed, Reñosa et al. (2020) asserted that there was no doubt that effective adherence to the IMNCI strategy was only possible with sufficient awareness and knowledge of this strategy among its implementers who were the staff who provided care in healthcare settings. In an assessment evaluating IMNCI strategy implementation in Pakistan, Pradhan et al. (2013) observed that health care workers with high knowledge of these regulations had better adherence scores compared to those with little or poor knowledge of the IMNCI guidelines. Similarly, poor knowledge of the IMNCI guidelines among HCPs was established to be a leading contributor to inadequate implementation of the IMNCI strategy in theoretical investigations performed by Abebe et al. (2019) and Khan et al. (2020). A notable link was also established concerning HCPs' awareness of IMNCI and their adherence to the IMNCI guidelines as espoused in studies by Traoré et al. (2019). Awareness and knowledge of the IMNCI guidelines was also found to be an instrumental factor that significantly influenced the levels of adherence to the IMNCI guidelines in management of sick children by health care workers in reviews by Krüger et al. (2017), Idindili et al. (2018) and Pandya et al. (2018). It was thus evident that enhancing the level of awareness and knowledge of the IMNCI guidelines among the health care workers could enhance their adherence to the guidelines while caring for the sick children.

A statistically significant association was established between attitude towards the IMNCI guidelines and adherence to the IMNCI guidelines on childhood pneumonia among the respondents. The findings were in agreement with those of Cilliers (2019) who in a study on the IMNCI guidelines' implementation in south Africa, identified health care providers' attitude towards the IMNCI guidelines as having significant influence on their adherence of the guidelines during their caregiving work. Similarly, in Pakistan, Pradhan et al. (2013)

did also identify health care workers' attitude towards the IMNCI guidelines as being a consequential factor that influenced their adherence to the guidelines while treating sick children. In the study, better adherence rates to the IMNCI guidelines were observed among HCPs that had a positive attitude towards the guidelines. As opined by Pandya et al. (2018), how the health care providers perceive the IMNCI guidelines and particularly with respect to their usefulness in diagnosis and treatment of children and whether the IMNCI guidelines contribute to better pediatric care outcomes do influence their implementation of these interventions. In-a theoretical inquiry performed in Tanzania exploring the factors which influenced implementation of IMNCI guidelines among HCWs in local public health care facilities, effective implementation of the IMNCI guidelines was found to positively correlate with positive attitude towards the IMNCI guidelines among the surveyed HCWs (Kiplagat et al., 2014). According to Seid and Sendo (2018), nurses working in primary health care facilities are much more likely to apply the IMNCI guidelines while treating sick children if they perceive the guidelines as being useful and relevant to their work and hence how the nurses perceive the guidelines affects their use or not of the guidelines. Poor health care workers' attitude towards the IMNCI guidelines was reported to be a major inhibiting factor to effective adherence to these requirements within local healthcare entities in North West South-Africa (Meno et al., 2019) and in Nigeria (Adekanye & Odetola, 2014). Similarly, studies by Abebe et al. (2019) and Traoré et al. (2019) also identified HCPs' positive perception of IMNCI guidelines as a positive predictor of their application of these regulations.

However, no statistically significant association was established between the duration spent caring for sick children and adherence to the IMNCI guidelines on management of childhood pneumonia among the respondents. The findings therefore implied that the healthcare workers' adherence to the IMNCI guidelines on management of childhood pneumonia in level 3 facilities in Nairobi City County was not significantly influenced by the years they had spent caring for sick children. The findings were in contrast to those of Fick (2017) and Kilov et al. (2021) which reported improvements in the level of adherence to IMNCI guidelines among healthcare workers based on their work experience level which was marked by years served as a health care professional. HCPs with longer work experience scored better in term of implementing the IMNCI guidelines compared to those that had practiced for shorter periods. Idindili et al. (2018) and Prosper et al. (2019) shared similar sentiments noting that there were increased odds of better observance of set IMNCI regulations among HCPs, the longer they practiced. In their studies, Krüger et al. (2017), Pandya et al. (2018) and Tshivhase et al. (2020) having practiced in primary health care settings for long ($\geq$ 10 years) positively correlated with better adherence to IMNCI guidelines especially when compared to having practiced for shorter durations such as $\leq$ 3 years.

V. Conclusion

Majority of the healthcare workers working in level 3 health facilities in Nairobi City County adhered to the IMNCI guidelines on management of childhood pneumonia. From the results education level of the healthcare workers, years spent in caring for under-fives, interaction with sick children, training on the IMNCI guidelines, being aware of and knowledgeable of the IMNCI guidelines and attitude towards the IMNCI guidelines on pneumonia were the healthcare worker related factors that influenced adherence to the IMNCI guidelines on pneumonia among healthcare workers in level 3 health facilities in Nairobi City County. The study recommends that the county health services administrators should ensure that healthcare workers serving in the county's level 3 health facilities are regularly trained on the IMNCI strategy.

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