



Accessibility to Integrated Community Case Management of Childhood Pneumonia Services among Caregivers in Kisii County, Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Pneumonia is the leading cause of childhood illness and mortality worldwide. The number of children under five with pneumonia in Kisii County, Kenya, was 10% compared to the national average of 9% despite the integrated Community Case Management (iCCM) roll out. In order to identify factors associated with caregivers' access to iCCM services, a study was conducted.

Materials and Methods: Qualitative and quantitative approaches were used in this descriptive cross-sectional study. Purposive sampling was utilized to choose 10 informants while multistage and random sampling was applied to select 330 caregivers. Thematic content analysis and discourse analysis techniques were used to analyse qualitative data, while Statistical Package for Social Science (SPSS) version 22 was used in quantitative data.

Results: Only 33.6% of caregivers accessed iCCM for childhood pneumonia services. In 49% of cases, CHVs was the first point of contact after onset of pneumonia symptoms, with only 31.2% seeking help within 24 hours. 96% of CHVs did not follow the recommended iCCM diagnostic protocols, and only 34.8% prescribed antibiotics. Age (0.011), religion (0.007), and marital status (0.024) were significantly associated with access to iCCM. Business persons were 2.97 times (OR 2.972; CI 1.232,7.167; P= 0.015) more likely to access iCCM than farmers. Caregivers who

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perceived pneumonia to be severe were 3.03 more likely to access ICCM (OR 3.039; CI 1.703,5.424; $P < 0.001$) than opposite peers. Respondents who didn't think pandemics affected access were 10% (OR 0.119; CI .058,0.246; $P < 0.001$) more likely to access iCCM.

Conclusion: Access to iCCM was low and Community health volunteers (CHVs) were not the first point of care for pneumonia in children. Evidence of poor performance by CHVs in the areas of diagnosis, treatment, and the administration of antibiotics suggests that iCCM needs more monitoring and oversight.

Keywords: Access; iCCM; pneumonia; caregivers; CHVs; Kenya.

1. INTRODUCTION

Reduction in morbidity and mortality from malaria, pneumonia, and diarrhoea in the under-five population remains a global focus [1]. Internationally, most deaths in children are caused by preventable and easily treatable diseases, namely pneumonia (18%) and diarrhoea (11%), malaria (7%) [2]. In Kenya, the under-five mortality rate stood at 43.2 per 1,000 live births in 2019 [2]. Facility-based correct management of childhood pneumonia, diarrhoea and malaria remain the most powerful interventions, but are subject to adequate access to treatment [3]. Integrated community case management (iCCM) was adopted to provide communities with fast diagnosis and treatment for malaria, pneumonia, and diarrhoea [4]. The Integrated Community Case Management (iCCM) implementation plan presents a platform for acceleration of the control and management of childhood diarrhoea, malaria, pneumonia, neonatal mortality and malnutrition at the community level [2]. The iCCM strategy is aimed to train, supply, and supervise community health volunteers (CHVs) to diagnose and treat diarrhoea, malaria, and pneumonia in communities where access to health services is poor [5].

In managing pneumonia, the MoH Kenya, iCCM policy directs community health volunteers (CHVs) among other things to identify problems with the child at the household level and carry out basic treatment or refer urgently based on some thresholds [1]. Specifically for pneumonia, the policy calls on the CHVs to check the child for cough, fever, difficulty feeding or drinking, chest in drawing, breaths per minute, and whether the child is sleepy/unconscious. Presence of danger signs such as a cough lasting longer than 14 days or a fever lasting longer than 7 days, convulsions, not able to feed or drink, chest in drawing as well as if the child is unconscious demand that the CHV refers the child immediately. A CHV can treat at home any child with a cough for less than 14 days and fast

breathing defined as 50 or more breaths per minute for a child 2 to 12 months or 40 breaths or more for a child 12 months to 59 months. The CHV can provide dispersible amoxicillin as treatment at home and advise the caregiver accordingly concerning any danger signs [1,2]. Since the implementation of the policy, 41% of the under 5 pneumonia cases in Nyanza are provided with antibiotics exposing the remaining 60% to pneumonia conditions [6]. Nyanza is a host to Kisii county that has a pneumonia prevalence that is 10% higher than both the Nyanza region and national average [6,7]. Kisii County identified pneumonia among the top 5 killers of less than five-year-old children and prioritized investment in CHVs for timely identification and management of childhood pneumonia among other interventions [7]. There have been, however, only few studies on lessons learnt from implementation in practice and caregivers' experiences which could inform future program modification and determine factors influencing access to iCCM for pneumonia.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

The study employed a descriptive cross-sectional survey entailing qualitative and quantitative approaches to collect data from caregivers of children less than 5 years of age in Kisii County. Kisii county is domiciled in Nyanza region and borders Narok County to the South, Nyamira County to the North East, and Homabay and Migori Counties to the West. The county of Kisii occupies approximately 1,302 km [2], a population of 1,266,509 people and 308,054 Households as per the 2019 Kenya Population and Housing Census. Children less than 5 years of age form 14% of the county population.

2.2 Sampling and Sampling Procedure

The study utilized multistage and random sampling techniques. Two sub-counties namely,

Bomachoge Borabu and Bomachoge Chache were randomly selected from the nine sub-counties in Kisii. All divisions making each of the two sub-counties were populated and one division was randomly selected. Subsequently, households within the two sampled locations with children under-five were randomly selected using the latest updated CHV household register (referred to as MoH 513). The sample size was calculated using the Krejcie and Morgan Minimum stratified sample sizes for all samples Formula, 1970 [8]. 71% (children less than 5 years of age in selected sub-counties presenting with pneumonia symptoms) was applied as most conservative sample size estimate with 5% to account for non-response. This provided a sample size of 330. Probability proportionate was applied in the distribution of the sample per location units. In each Household, one consenting caregiver was randomly selected and interviewed using a thematic structured questionnaire. The themes included socio-demographic characteristics, knowledge of childhood pneumonia, type of childhood pneumonia case management services accessed, factors that influence accessibility to iCCM for childhood pneumonia. The questionnaire was pre-tested and revised. To achieve reliability, Cronbach's alpha was calculated and Cronbach's average alpha reliability coefficient for the instrument was 0.705. Alpha Cronbach coefficients between 0.60 and 0.80 are regarded as modest yet acceptable [9]. Qualitative interviews were conducted to understand the context of iCCM practice and validate the community pull and push factors. Key informants were purposefully selected and interviewed and a total of ten KII were conducted.

2.3 Data Analysis

The research analysis had two fronts. Quantitative data was analysed using Statistical Package for Social Science (SPSS) version 22. Descriptive analysis was undertaken for proportions in the data and inferential statistics for hypothesis testing. On the other hand, qualitative data was analysed concurrently using thematic content and discourse analysis techniques to search for important word, text, nuances, patterns and themes in the data. Content analysis allows for interpretation of textual data through the process of coding and identification of themes [10]. The data was aggregated into categories and subcategories, coded and identified themes. Excerpts and direct

quotes from the data were used to support the quantitative figures.

3. RESULTS

3.1 Demographic Information of the Respondents

Three hundred and thirty respondents were recruited and interviewed. Table 1 shows the demographic information. The majority of the respondents were female 97%, had secondary education 97%, married 81%, aged between 21-40 years 71%, and farmers 68%, but religion varied.

3.2 Access to Integrated Community Case Management of Childhood Pneumonia Services

Table 2 presents the proportion of access to iCCM for services. The study findings revealed that only 33.6% of the respondents had access to iCCM for childhood pneumonia services. A CHV was the first point of contact after the onset of the pneumonia symptoms for 49% with only 31.2% seeking help within the recommended 24 hours. Similar results were qualitatively. The revealed minimal coverage of iCCM program in the study site as explained by a female County health management team who said "only 27% and 30% of our CHVs and CHEWs are currently trained on iCCM respectively but we planning to train more. Hence only the trained CHVs can diagnose and treat pneumonia at the community level. The rest of the sick children either visit nearest health facilities or even traditional healers". 96% CHVs did not follow the recommended iCCM diagnostic protocols with only 34.8% prescribing antibiotics to the children. Qualitative data supported this result and it was found that CHVs manage only uncomplicated cases, but do refer the rest. One key informant reported that sick children were either treated at home or referred to health facilities subject to patient condition. Male Sub-County health management team said "Depending on the severity of pneumonia, some of the sick children are managed at home by CHVs or referred to health facilities where they can be treated both at inpatient or discharged at outpatient". Another female key informant indicated that "Children less than 5 years are managed both at home and at the facility depending on the presenting complaints. CHVs manage uncomplicated cases of diarrhoea, fever, cough, while all other cases are referred to the facility".

3.3 Factors Associated with Access to iCCM for Childhood Pneumonia

An association between the caregiver factors with access to iCCM for childhood pneumonia was tested using Pearson's Chi-square analysis and significant results presented in Table 3. Gender and education level were not significantly associated with access to iCCM for childhood pneumonia but the converse was true of respondents' age (0.011), religion (p = 0.007), marital status (p = 0.024) and occupation (p = 0.001) at 95% confidence interval.

Other factors significantly associated with access to iCCM for childhood pneumonia were perception of pneumonia severity (p < 0.001) and emerging pandemics such as COVID-19 (<0.0071). Findings from qualitative discussion concurred with perception results and discussant documented community that low perception of pneumonia as a serious disease and poor terrain, as key challenges to access to iCCM. One female discussant alluded that "Mothers delay in seeking prompt care for children with suspected pneumonia denoting that they don't perceive pneumonia as serious disease".

Another rejoined and spoke that "Most households in the region are unaware of the role of CHVs in iCCM at the community level hence focus on alternative care as the first line of defence. The terrain compromises the movement of the few, who are informed of the role of CHVs in iCCM". Research to document the reasons driving the delay is warranted.

3.4 Multivariate Logistic Regression

Logistic regression was undertaken with factors significantly associated with access to iCCM at bivariate level. As shown in Table 4 engaging in business as a main source of income increased the likelihood of accessing iCCM for childhood pneumonia by 2.97 times (OR 2.972; CI 1.232,7.167; P= 0.015) as compared with the reference category. The likelihood of those caregivers who perceived pneumonia to be severe were 3.03 more likely to access iCCM (OR 3.039; CI 1.703,5.424; P< 0.001). In addition, those respondents who didn't think pandemics affected access were more likely to access iCCM for childhood pneumonia by 0.1 times (OR 0.119; CI .058,0.246; P<.0.001) as compared with the reference category.

Table 1. Respondents' demographic distribution (n=330)

	Proportion	%
Gender		
Male	9	2.7
Female	321	97.3
Age		
<20 years	38	11.5
21-30 years	169	51.2
31-40 years	64	19.4
41-50 years	38	11.5
>51 years	21	6.4
Marital status		
Married	267	80.9
Single/separated	52	15.8
Widowed	11	3.3
Education		
None	9	2.7
Primary	161	48.8
Secondary	158	47.9
Tertiary/University	2	0.6
Religion		
Catholic	124	37.6
Protestant	76	23.0
SDA	130	39.4
The main source of income		
Business	56	17
Employment	50	15.2
Farming	225	67.9

Table 2. Access to ICCM among caregivers of children less than 5 years of age in Kisii County (n=330)

Services	Responses (n/%)	
	Yes (%)	No (%)
Sought help CHV when symptoms worsened	160 (48.5)	170 (51.5)
Sought CHVs help within 24 hours	103 (31.2)	227 (68.8)
CHVs undertook the ICCM recommended check protocols	13 (3.9)	317 (96.1)
The child was given antibiotic medicine	118 (35.8)	212 (64.2)
Access to iCCM	111 (33.6)	219 (66.4)

Table 3. Factors associated with access to iCCM for childhood pneumonia (n=330)

Variable	Access to ICCM of childhood pneumonia services (n/%)		
	No	Yes	Significance test
Age			
<20 years	32 (84.2)	6 (15.8)	$\chi^2=13.086$ (4) p=0.011
21-30 years	118 (69.8)	51 (30.2)	
31-40 years	38 (59.4)	26 (49.6)	
41-50 years	19 (50)	19 (50)	
>51 years	12 (57.1)	9 (42.9)	
Religion			
Catholic	90 (72.6)	34 (27.4)	$\chi^2=10.042$ (2) p=0,007
Protestant	56 (73.7)	20 (26.3)	
SDA	73 (56.2)	57 (43.8)	
Marital status			
Married	172 (64.4)	95 (35.6)	$\chi^2=7.441$ (2) p=0.024
Separated/Single	42 (80.8)	10 (19.2)	
Widowed	5 (45.5)	6 (54.5)	
Main source of income			
Business	47 (83.9)	9 (16.1)	$\chi^2=14.115$ (2) p=0.001
Employed	38 (76.0)	12 (24.0)	
Farming	134 (59.8)	90 (40.2)	
Pneumonia severeness			
No	138 (76.4)	45 (24.6)	$\chi^2=19.043$ (1) p<0.001
Yes	77 (52.4)	70 (47.6)	
Pandemics effects			
Yes	102(50.2)	101 (49.8)	$\chi^2=54.386$ (1) p<0.001
No	113 (89.0)	14 (11.0)	

Key: n=number of respondents, %= percentage, χ^2 =chi-square, p= p value @alpha of 0.05

Table 4. Multivariate logistic regression

Parameters	Access to iCCM ^a	Sig.	Exp (B) (Odds ratio)	95% Confidence Interval for Exp(B)	
				Lower bound	Upper bound
Age	<20 years	0.590	1.538	0.321	7.357
	21-30 years	0.992	0.994	0.349	2.830
	31-40 years	0.479	0.668	0.218	2.041
	41-50 years	0.184	0.434	0.127	1.486
	>51 years		Ref	.	.
Marital status	Married	0.122	3.487	0.716	16.981
	Separated/Single	0.065	5.974	0.894	39.916
	Widowed		Ref	.	.
Religion	Catholic	0.073	1.774	0.949	3.318
	Protestant	0.279	1.518	0.713	3.234
	SDA		Ref	.	.
Main source of income	Business	0.015	2.972	1.232	7.167
	Employed	0.390	1.446	0.623	3.351
	Farming		Ref	.	.
Pneumonia severity	No	0.000	3.039	1.703	5.424
	Yes		.	.	.
Pandemics affects access	No	0.000	0.119	0.058	0.246
	Yes		Ref	.	.

4. DISCUSSION

Access and uptake of integrated community case management for childhood pneumonia services was found to be low in the study. Evidence from qualitative data also supports this finding. The low scores found in this study are similar to a study in Ethiopia which reported low utilization of community-based health workers (CBHWs) by caregivers of under-five children sick with diarrhoea, malaria and/or pneumonia after scale up of the iCCM of childhood illness strategy [11]. The result however disagrees with Ferrer et al., (2016) in cross sectional study who reported higher utilization of community-based iCCM interventions in case of fever, diarrhoea or cough [12]. The possible reason for the low iCCM access in the current study includes the inadequate training of CHVs and CHEWS, poor terrain and unawareness on the role of CHVs in iCCM strategy. In this setting, training of CHVs is presented as an emerging unmet need and opportunity to promote iCCM. Secondly, CHVs were not the first point of contact after the onset of the pneumonia symptoms in the community. Similar results were initially in Bondo, Kenya before the proportion of caregivers first seeking treatment from a CHV increased from three-fold after awareness and training [13]. Inadequate caregivers' information on the role of CHVs in iCCM may have contributed to this situation. This resonated with the proposition that caregiver awareness of CHV treatment roles influence services uptake and acceptability in the community [13]. For this reason, community awareness on the role of CHVs in iCCM may be the missing link in improving access and optimization of community strategy.

Adherence to the recommended 24-hour rule for iCCM service was low among caregivers. This finding is somewhat concerning as the children are likely to be at higher risk since pneumonia is an acute and fatal disease. This result is however attributed to the poor terrain of the region. CHVs neither performed well in diagnostic and management of pneumonia as per the recommended iCCM protocols nor in the prescription of antibiotics to children. This finding is broadly similar to the KDHS 2014 report that indicated that 40% of all children with pneumonia in Nyanza received antibiotics [6]. The finding is however inconsistent with evaluation in Kenya which reported that CHVs correctly followed the iCCM algorithm after training [13]. It is important to report that this was a randomized controlled trial. By not adhering to the appropriate diagnosis

and treatment of pneumonia, CHVs may have negatively impacted on the goals and targets of the iCCM Strategy. The lack of compliance or poor compliance on basic iCCM protocol may be a big barrier and may add voice to the fundamental question of whether lay health providers in Kenya can acquire the skills to correctly identify diagnosis and management pneumonia. As such as qualitative study with trained CHVs and community health extension worker (CHEWs) may provide succinct explanation for improvement which may increase CHVs confidence in diagnosing and managing Pneumonia.

This study identified age, religion, marital status, and occupation as factors that influence access to iCCM but not gender and education. It is important to report that the majority of caregivers were women which biased the gender outcome. The result of this study showed that business occupation increased the likelihood of accessing iCCM for childhood pneumonia three times more as compared to farming. The finding of this study corresponds to the study conducted by Debel and Nigusso that showed caregivers in development centres were more likely to utilize iCCM services [14]. The possible explanation might be that business people interact with diverse people hence are exposed and have access to enlightening information that may positively impact on their health seeking behaviours than farmers. The finding implies that awareness and exposure to information are important in raising and improving the behavior of the caregivers.

Similarly, caregivers who perceived pneumonia to severe and acute disease were significantly associated with access to iCCM for childhood pneumonia. The possible explanation might be that this cohort of caregivers have financial muscle and knowledge of child health care and pneumonia aetiology that can influence their decision making. For instance, the study demonstrated that caregivers who perceived pneumonia to be severe were three times more likely to access iCCM than those who had the converse perception. This finding was supported by a study done in Ethiopia which reported that caretakers' perception of a child's illness and knowledge of danger signs were found to be associated with the utilization of integrated community case management [14]. Likewise, respondents who didn't think emergence of pandemic such as COVID-19 affect access were 10% more likely to access iCCM for childhood

pneumonia than opposite peers. It is plausible that pneumonia is a significant threat to the health and wellbeing of children that even COVID=19 outbreak could have not hinder access and utilization of pneumonia health care services. The results however contradict research conducted by Saunders and Nellums that reported pandemic exacerbating child pneumonia due to closure of some health facilities delivering child vaccines and decreases in vaccines administered to children [15].

5. CONCLUSION

The study revealed low access to iCCM and that CHVs were not the first point of care in the community for pneumonia. Few CHVs and CHEWs are adequately on the iCCM strategy. Efforts to minimize community barriers to iCCM intervention should be incorporated in community outreach programs. Likewise, the statistics of poor CHVs performance in diagnostic, management and antibiotics prescription points to the importance of scaling up monitoring of quality of care and training of CHVs by iCCM providers.

ETHICAL APPROVAL AND CONSENT

Kenyatta University Ethics and Review Committee approved the study- PKU/2172/H316. The Kenya National Commission for Science, Technology and Innovation (NACOSTI) and the County government of Kisii permitted the protocol with permit number BAHAMAS ABS/20/7890 and KS/C/HS/42 Vol III (20) respectively. The data collectors were trained on research purposes and procedures of the study and consenting processes.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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