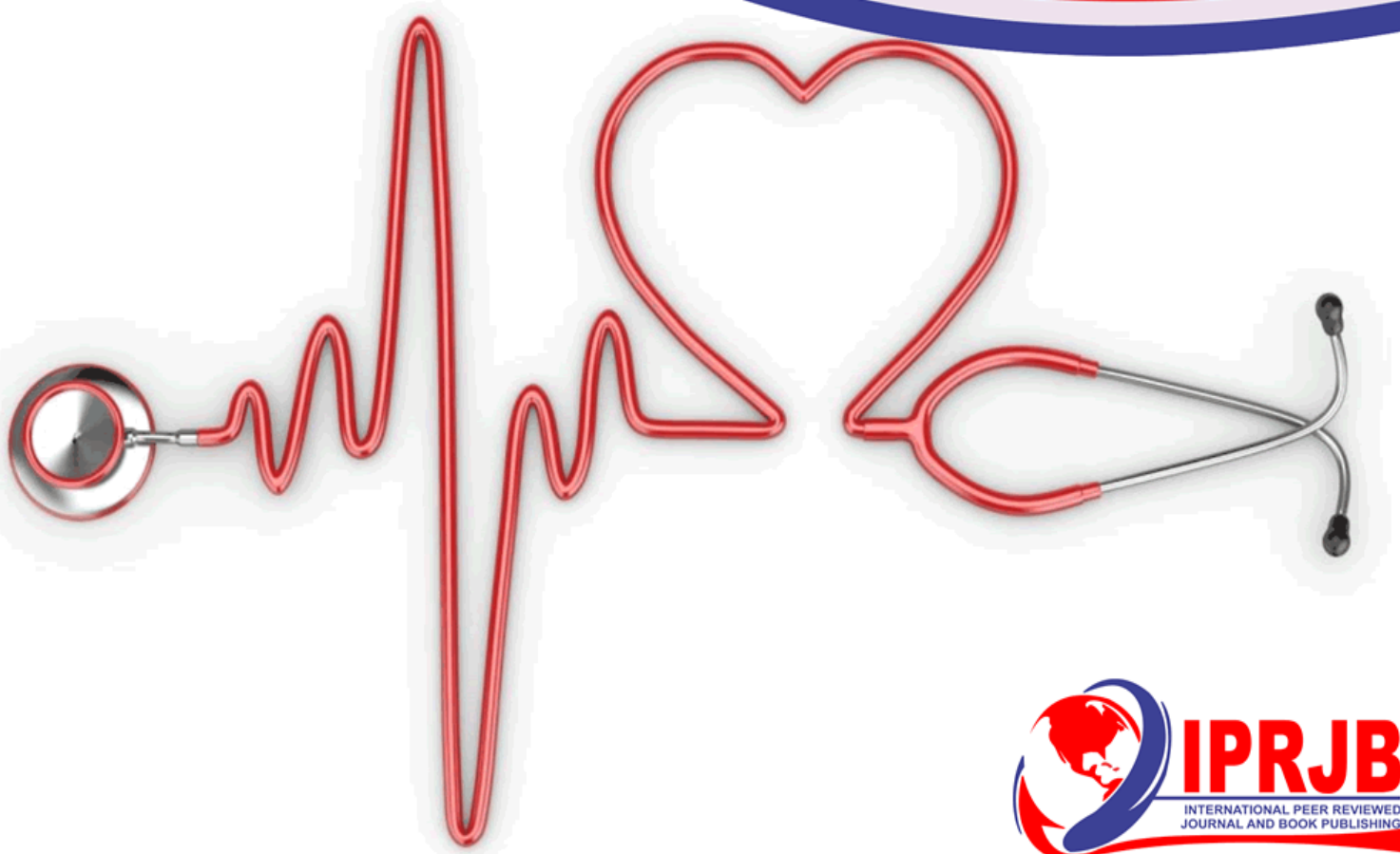


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**FACTORS INFLUENCING CLINICAL MANAGEMENT OF CRYPTOCOCCAL  
MENINGITIS AMONG HEALTH CARE PROVIDERS AT TWO REFERRAL  
HOSPITALS IN KISUMU COUNTY, KENYA**

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## FACTORS INFLUENCING CLINICAL MANAGEMENT OF CRYPTOCOCCAL MENINGITIS AMONG HEALTH CARE PROVIDERS AT TWO REFERRAL HOSPITALS IN KISUMU COUNTY, KENYA

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### Abstract

**Purpose:** Cryptococcal meningitis is one of the most common and lethal opportunistic infections among human immune virus infected clients/patients before initiation of antiretroviral therapy. It is majorly associated to morbidity and early mortality among human immunodeficiency virus infected patients in resource limited countries. The main objective of this study was to investigate the factors influencing clinical management of cryptococcal meningitis in adults among health care providers at two referral hospitals in Kisumu County, Kenya.

**Methodology:** A cross-sectional study using quantitative approach was used targeting 119 health care providers. Collection of data was through pretested self- administered questionnaires to examine factors influencing clinical management of cryptococcal meningitis. Data obtained was analyzed using the statistical package for social science version 25. Descriptive analysis was done using frequencies, percentages and means. Inferential analysis was conducted using bivariate logistic regression to determine relationships among the variables, p-values of at or below 0.05 were considered statistically significant.

**Results:** The major factor associated positively with clinical management of cryptococcal meningitis was the acknowledgement by the health care providers that the world health organization guidelines lead to a better patient outcome (97%, n=113) and inadequate supplies and resources to facilitate management (78%, n=90) was the major factor associated negatively. Health care providers with an experience of five years or less were 40% more likely to agree that the factors were influencing clinical management of cryptococcal meningitis in contrast to those with an experience of six years or more (OR: 0.6; 95% CI: 0.1 – 0.74; p=0.04).

**Unique contribution to theory, practice and policy:** The clinical management of cryptococcal meningitis in adults in the study area is majorly negatively influenced by inadequate supplies and resources to facilitate the process of management. The study recommends that the policy makers in the County government of Kisumu and the two hospital management teams need to scale up a timely and constant provision of adequate resources, facilities and supplies, which will promote effective clinical management of cryptococcal meningitis in the study area.

**Keywords:** *Cryptococcal meningitis, influencing, health care providers, Clinical, Kisumu Kenya*

## 1.0 INTRODUCTION

Meningitis is an inflammatory disorder of the meninges, which are structures that cushion the spinal cord and brain to provide protection. Most patients with this infection at least develop fever, severe headache, and neck rigidity and associated altered level of consciousness (Ganiem, 2013). Manga, *et al.*, (2016) defines cryptococcosis as a systemic fungal infection, which is in HIV infected and some patients with deranged body immune system. This systemic infection causes over 600 000 deaths annually in the tropical areas. According to WHO (2012), cryptococcal meningitis has a case fatality rate which has remained high ranging between 35% - 65%, in sub-Saharan Africa, comparing with 20%-30% in most developed countries. This case fatality rate is escalated because this infection is the most prevalent opportunistic infection in people living with HIV/AIDS. The clinical management strategies suitable for the control of cryptococcal meningitis in HIV infected patients by WHO 2018 include, early diagnosis and antiretroviral therapy (ART) initiation in HIV infected patients, early initiation of proper antifungal therapy followed by early and immediate referral for HIV care after diagnosis of cryptococcal disease.

The clinical standard treatment of HIV/AIDS associated CM for sub-Saharan Africa is, induction phase of 1 mg/kg/day AmpB for two weeks, consolidation period of Fluconazole 800 mg for four weeks, Fluconazole 400mg or 200mg orally for eight weeks, followed by a maintenance phase of Fluconazole 200 mg until CD4 counts were >200 cell/ml (Mdodo *et al.*, 2010). Increased intracranial pressure is frequent and the aim of management is to reduce increased cerebral spinal fluid pressure to below 20 cm H<sub>2</sub>O, perform lumbar puncture and drain excess CSF for treatment purposes until the clinical presentations related to raised ICP have resolved for 2 days, after every 10 ml of CSF removed, re-check CSF opening pressure (WHO,2018). Management of AmpB toxicity includes supplementation of electrolytes and fluid therapy administration by infusing 20 mEq of potassium chloride in 1 litre of normal saline solution over 2 hours prior to each regulated infusion of amphotericin B Then administer 8 –m+9Eq potassium chloride tablets 1-2 twice/day. 8-mEq potassium chloride 1 tablet twice/day, increased in the course of the second week, and 2 of 250-mg tablets of magnesium trisilicate supplemented twice/ day, or magnesium chloride 4 mEq twice/ day (WHO,2018). Management of relapse is done by initiating or recommencing induction treatment and complete the regimen with reinforcement of adherence then initiate HAART if HIV co-infected and has not been started yet. In addition, therapeutic lumbar puncture is performed to manage raised intracranial pressure (WHO,2018).

It is acknowledged that organizations and institutions have had a widespread adoption of standard clinical guidelines and precautions but significant omissions by healthcare workers have been noted following barriers such as infrastructure (Correa, *et al.*, 2013). In addition, large numbers of patients with insufficient resources notably escalates the ineffectiveness of clinical practice in basic care provision (Tsiga *et al.*, 2013). Carthey *et al.*, 2011 noted that guidelines with information overload was a hindering factor to clinical management. Clarke, *et al.*, (2010) also discovered that clinicians had problems in embracing new practices in the CPG protocols hence cling to their previous deeds despite the availability of the recommended guidelines. This study therefore was aimed at investigating the factors influencing clinical management of cryptococcal meningitis in adults among health care providers in JOOTRH and KCRH, in Kisumu County, Kenya.

## **2.0 METHODOLOGY**

### **Methods**

The study was conducted in major public hospitals in Kisumu County and ethics approval was obtained from Masinde Muliro University of Science and Technology ethics board, National commission for science and technology and the Kisumu County commission.

### **Research Design**

The study designs adopted for this study was cross-sectional analytical and applied a quantitative approach. Cross sectional analytical study design was ideal as the study was carried out in a limited geographical scope and hence it was logistically easier and simpler to conduct considering the limitations of this study.

### **Study setting**

The research was performed in the medical wards, outpatient departments and the patient support center (PSC) of Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) and Kisumu County Referral Hospital (KCRH) in September-November, 2019. JOOTRH is located in Kisumu County, Kisumu East constituency, Kondele ward. It is now the largest referral hospital in Western Kenya and serves more than 100 county and sub-county hospitals in the region. Its main mandate is to provide curative, preventive, promotive, diagnostic and rehabilitative services. It serves a catchment population of 83642 (JOOTRH Hospital Strategic Plan, 2016-2021). On the other hand, KCRH is the second largest public hospital in Kisumu County located in Kisumu city center, Kisumu East constituency, Railway ward. It serves the peripheral facilities and offers diagnostic curative, preventive, promotive, and rehabilitative services. The hospital refers its complicated cases to JOOTRH for further management.

### **Participants**

The target population were the qualified health care providers offering care to adult patients suffering from CM in the medical wards, patient support center (PSC) and outpatient clinics in the two hospitals. Proportionate random sampling method was applied in the selection of the sample. This sampling method produces approximations of total population parameters with high accuracy, thereby guaranteeing a more representative sample obtained from a fairly homogeneous population. In addition, proportionate methods goal is to decrease standard error by affording slight control over variance (Barbie, 2004). In this study, the sample size was obtained using Yamane (1967) formula. This sampling method was suitable because the sample population was homogeneous and was less than 10,000. The sample size calculation yielded a sample of 119 respondents with a 97% response rate. A total of 60 observations was achieved during the study period. The inclusion criteria were all qualified health care providers employed in the medical units, outpatient clinics/casualty and the patient support center for at least three months. The

exclusion criteria were all the qualified health care providers in the target population who did not consent to participate in the study.

### **Questionnaire**

Questionnaires were selected as data collection instruments. Kothari, (2007), clarifies that self-administered questionnaires are the only way to prompt peoples' attitudes, beliefs, opinions and values. The research instrument for obtaining data in the study had two parts. Part A obtained demographic features of the respondents and part B solicited for data on factors influencing clinical management of cryptococcal meningitis in adults. An instruction for selecting the responses was provided in all the sections. The questionnaire consisted of closed ended questions. To increase the validity of the instruments, the questionnaire was evaluated by experts. Then based on the feedback the final questionnaire was prepared for pre-test. The pretest study was conducted in Ahero County hospital. The reliability of the scale of the questionnaire was found to be: Internal consistency = (Cronbach's  $\alpha = 0.701$ ).

### **Data Analysis**

Data analysis was done using the statistical program for social sciences (SPSS) version 25. Descriptive and inferential statistics were used to analyze data. Descriptive analysis of data was done using the mean, frequencies and percentages. In this study association between the study variables was assessed by a two-tailed probability value of  $p < 0.05$  for significance. Visual inspection of the data illustrated that missing data appeared to be missing at random. Univariate analysis was used to describe the distribution of each of the variables in the study objective, appropriate descriptive analysis was used to generate frequency distributions, tables and other illustrations. Bivariate analysis was done using logistic regression from which the chi square, odds ratios and the p- values were drawn.

### **3.0 RESULTS**

The research targeted a sample size of 119 respondents out of which 116 completed and returned the questionnaires, making a total response rate of 97%. According to Mugenda and Mugenda (2003) a response rate of 50 percent is adequate, a response rate of 60 percent is good, and a response rate of 70 percent is very good. Therefore, the 97 percent response rate reported for this study formed an acceptable basis for drawing conclusions. The study sought to obtain information on the respondents' background characteristics based on the gender, job title, experience, age bracket and unit currently working. The summary of their responses is given in Table 1.

**Table 1. Demographic background characteristics of respondents**

		N	%
Gender	Male	52	44.8
	Female	64	<b>55.2</b>
Age groups	30 years and below	74	<b>64.3</b>
	31-40 years	24	20.9
	41-50 years	9	7.8
	51 years and above	8	7.0
Job title	medical consultant	5	4.3
	medical officer	14	12.1
	nursing officer	78	<b>67.2</b>
	clinical officer	19	16.4
Experience categories	5 years and below	75	<b>64.7</b>
	6-10 years	17	14.7
	11-20 years	12	10.3
	20 years and above	12	10.3
Unit of work	male medical ward	52	44.8
	female medical ward	37	31.9
	patient support center	15	13.0
	outpatient clinics	12	10.3

With regard to their gender profiles, many were females (n=64, 55.2 %). This implied that majority of health workers in public hospital in the study area are female as opposed to males. Distribution of age bracket showed that many (n=74, 64.3%) were aged 30 years or below. Results on their job titles revealed that majority (n=78, 67.2%) were nursing officers while only a few (n=5, 4.3%) were medical consultants. A Greater part of the respondents had experience of 5 years or below (n=75, 64.7%).

### **Factors influencing clinical management of cryptococcal meningitis**

The third research question of the study was to find aspects that influence clinical management of Cryptococcal meningitis. Firstly, the respondents were asked if they were aware of the WHO guidelines on the management of cryptococcal meningitis, 89% (n=103) accepted that they were aware of the WHO recommended standards on management of CM. When asked if they have ever been trained on WHO guidelines on clinical management of cryptococcal meningitis, 55% (n=64) reported to have been trained. When asked if adherence to WHO to guidelines leads to better patient outcomes, 97%(n=113) accepted, 95%(n=110) agreed that WHO standards are useful source of advice to them, 88%(n=102) agreed that WHO guidelines are based on sound evidence and 56%(n=66) declined that adherence to WHO standards was part of their annual performance appraisal objective. When asked if WHO guidelines are not available in their unit of work, 68%(n=79) agreed, 65%(n=75) noted that WHO guidelines have information overload hence very

complex to use, 87%(n=101) disagreed that WHO guidelines have multiple rules and are not easy to comply, 99%(n=115) disagreed that WHO guidelines are outdated and unrealistic, 53%(n=62) declined that there was increased workload hence no enough time to comply with the WHO guidelines, 83%(n=96) did not accept that WHO standards conflict with other clinical practice standards and 78%(n=90) acknowledged that there were no adequate supplies and resources to facilitate adherence to the WHO guidelines. Table (2) below gives an analysis of the responses

**Table 2: Factors influencing clinical management of Cryptococcal meningitis**

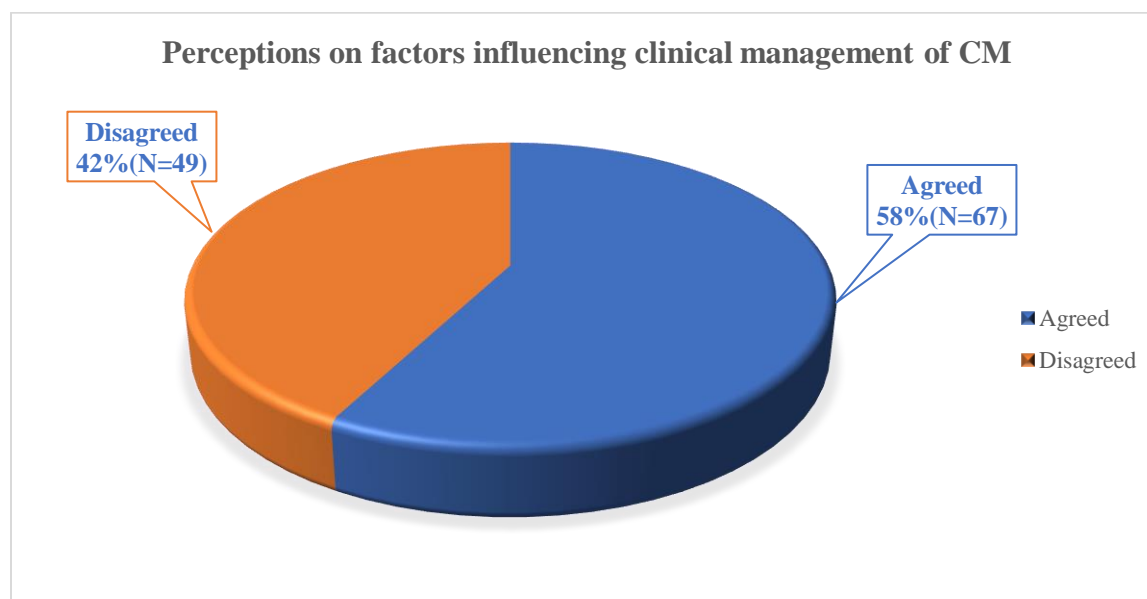
		n	%
I am aware of the WHO guidelines on the management of CM	Yes	103	88.8
	No	13	11.2
I have been trained on WHO guidelines on clinical management of CM	Yes	64	55.2
	No	52	44.8
Adherence to WHO to guidelines leads to better patient outcomes	Yes	113	97.4
	No	3	2.6
WHO guidelines are a useful source of information to me	Yes	110	94.8
	No	6	5.2
The WHO guidelines are based on sound evidence	Yes	102	87.9
	No	14	12.1
The adherence of WHO guidelines is part of my annual performance appraisal objective	Yes	50	43.1
	No	66	56.9
WHO guidelines are not available in my unit of work	Yes	79	68.1
	No	37	31.9
The WHO guidelines have information overload hence very complex to use	Yes	41	35.3
	No	75	64.7
The WHO guidelines have multiple rules and are not easy to comply	Yes	15	12.9
	No	101	87.1
The WHO guidelines are outdated and unrealistic	Yes	1	0.9
	No	115	99.1
There is increased workload hence no enough time to comply with the WHO guidelines	Yes	54	46.6
	No	62	53.4
The WHO guidelines conflict with other clinical practice guidelines	Yes	20	17.2
	No	96	82.8
There are no adequate supplies and resources to facilitate adherence to the WHO guidelines	Yes	90	77.6
	no	26	22.4

### Scoring of factors influencing clinical management of CM

Respondents answered a total of nine closed ended questions. Scale scores were computed by adding responses to the nine questions resulting in a minimum possible score of 0 and a maximum of 9. Respondents who scored below the mean score of 6.7 were classified as agreeing that the factors had a considerable influence on clinical management and those that scored above the mean score were classified as disagreeing that the factors had considerable influence on clinical management.

- Agreed (above mean score of 6.7)
- Disagreed (below mean score of 6.7)

From the results, a larger number of the respondents were in conformity that the factors had a major influence on adherence to WHO guidelines (n=67, 57.9%), while only 42.1 % (n=49) disagreed that the factors had a considerable effect on adherence to WHO guidelines (Figure 1).



**Figure 1. Summary on scoring of factors influencing clinical management of CM**



### **Bivariate analysis of socio-demographic characteristics associated with factors influencing clinical management of CM**

Bivariate analysis on socio-demographic aspects that are associated with perceptions on factors influencing clinical management shows that there was a major association between age and perceptions on factors influencing clinical management of CM (OR: 7.3; 95% CI: 1.5 – 35.7;  $p=0.01$ ) as shown in table (3). The respondents aged 30 years and below were 7.3 times more likely to agree that the factors were influencing clinical management compared to respondents aged 31 years and above (OR: 7.3; 95% CI:1.5-35.7;  $p=0.01$ ).

Males were 80% less likely to agree that the factors were influencing clinical management compared to females (OR: 0.2; 95% CI: 0.03 – 1.2;  $p=0.02$ ). Job titles was not statistically significant with perceptions on factors influencing clinical management with the results showing that respondents who were medical consultants/medical officers being 80% less likely to agree that the factors were influencing clinical management compared with their counterparts nursing officers/clinical officers (OR: 0.2; 95% CI: 0.06 – 0.8;  $p=0.3$ ).

Similarly, respondents with an experience of five years or less were 40% more likely to agree that the factors were influencing clinical management of CM in contrast to those with an experience of six years or more (OR: 0.6; 95%CI: 0.1 – 0.74;  $p=0.04$ ).

**Table 3: Demographic characteristics associated with perceptions on factors influencing clinical management of CM**

	n	Perceptions on factors influencing clinical management of CM		Overall OR	95% CI	p-value
		Agree	Disagreed			
<b>Age</b>						
<=30	74	60.8(45)	39.2(29)	7.3	1.5 – 35.7	<b>0.01</b>
<31	42	43.9(18)	56.1(24)			
<b>Gender</b>						
Male	52	60.0(31)	40.0 (21)	0.2	0.03 – 1.2	<b>0.02</b>
Female	64	54.5 (35)	45.5(29)			
<b>Job titles</b>						
Medical consultant/Medical officer	19	55.7(11)	44.3 (8)	0.2	0.06-0.8	0.3
Nursing officer/clinical officer	97	45.2 (44)	54.8(53)			
<b>Experience</b>						
<=5	75	54.4(41)	45.6 (34)	0.6	0.1-0.74	<b>0.04</b>
<6	41	42.3(17)	57.7 (24)			

**4.0 DISCUSSION, CONCLUSION & RECOMMENDATION**

The study finding indicate that a good number of HCP (89%, n=103) were aware of the WHO standards on the administration of cryptococcal meningitis and a satisfactory number (55% n=64) reported to have been trained on WHO guidelines on clinical management of cryptococcal meningitis. This finding outcome is commensurate to a study done by Castro-Sanchez *et al.*, 2014, who stated that a learning culture that is powerful promotes adherence to clinical practice guidelines. There was a substantial relationship between age and perceptions on factors influencing clinical management in the study area (OR: 7.3; 95% CI: 1.5 – 35.7; p=0.01). Study results additionally showed that respondents who were medical consultants/medical officers were 80% less likely to agree that the factors were clinical management compared with their counterparts nursing officers/clinical officers (OR: 0.2; 95% CI: 0.06 – 0.8; p=0.3).

Similarly, respondents having an experience of five years or less were 40% more likely to agree that the factors were influencing clinical management of CM patients in contrast to those with an experience of six years or more (OR: 0.6; 95%CI: 0.1 – 0.74; p=0.04).

The study findings establish that the major motivating factor for effective clinical management of cryptococcal meningitis was the acknowledgement by the HCP that WHO guidelines lead to a better patient outcome (97%, n=113). Other motivating factors included WHO guidelines are useful source of advice to HCP, 95% (n=110), and WHO guidelines are based on sound evidence, 88% (n=102). These findings tally with those in a research by Barth *et al.*, 2015 which showed that clinical guidelines promote good practice and improve patient outcome.

On the other hand, the major hindering factor to clinical management of CM was inadequate supplies and resources to facilitate adherence (78%, n=90). This was followed closely by unavailability of WHO guidelines in the unit of work, (68% n=79). These research results concur with a study done by Almazrou, 2013 on barriers to adherence to clinical guidelines. In addition, 46.6 %, (n=54) of HCP stated that there was increased workload hence were not able to adhere to WHO guidelines, this finding also tallies with a study done by Tsiga *et al.*, 2013 which identified time pressure and excess workload as factors influencing clinical management negatively.

### **Conclusion and recommendations**

Notably, more than half of HCP in the study area had been trained on WHO guidelines on clinical management of cryptococcal meningitis. In addition, the major motivators of effective clinical management of CM in the study area included HCP's acknowledgement that WHO guidelines lead to better patient outcome, are a good source of advice and are based on sound evidence. However, inadequate resources and supplies to facilitate adherence to the WHO guidelines, unavailability of WHO guidelines in the unit of work, and increased workload, were the major hindrances of effective clinical management of cryptococcal meningitis. Considering the disease burden in the study area and the wake of the National Universal Health Coverage strategy, the policy makers at the ministry of health in the County government of Kisumu should provide adequate resources, facilities and supplies to facilitate clinical management of CM management.

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