

Bypassing Primary Health Care Facilities for Common Childhood Illnesses in Sharg-Alneel Locality in Khartoum State, Sudan 2015

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Abstract: In Sudan despite the current implementation of universal health coverage policy, routine monitoring reports highlight that patients frequently bypass Primary Health Care (PHC) facilities in favor of higher-level hospitals, though hospitals are costly and time consuming. The main objective of this study was to study the extent of bypassing the public PHC facilities and factors associated with the decision of caretakers to bypass such facilities seeking care for their under-five year's children with common illnesses in Sharg-Alneel locality, 2015. The study proposed strategies and interventions to the Sudan government -Federal Ministry of Health (FMoH) - to improve PHC service utilization. The study was cross-sectional comparative study, interviewer administered questionnaires and facility assessment checklist was used for data collection. The data was analysed using SPSS. The study interviewed 497 caretakers, 87% of them pursued health care for their children directly from secondary hospitals. The main reasons for bypassing the closest public health facilities were unavailability of doctors, lack of health insurance services and higher cost of services. The proportion of bypassing a PHC facility for child care is significantly associated with child sex, child age, presenting symptoms of diarrhea, fever, difficult breathing and severe vomiting, caretakers' occupation as well as the economic status. In a resource limited country, health policy to achieve universal health coverage is better to focus on quality of care as well as quantity. Community mobilization and interventions to improve access and utilization of quality PHC services are all recommended. Furthermore, more research on bypassing behaviour is also recommended.

Keywords: PHC, Child Health Services Utilization, Accessibility, Caretaker

1. Introduction

The provision of PHC services in Sudan is arranged across four levels of services according to the population size. Each level is provided by specific type of facilities that has standardized service profile, staffing and supported by a standardized set of management and supportive components. The four levels of service are: community services, family

health units, family health centers (FHC) and local hospitals. The five core services provided through those four levels are: treatment of common illness including Integrated Management of Childhood Illnesses (IMCI), vaccination, antenatal care and family planning, growth monitoring and nutrition education and provision of essential drugs. Other PHC services e.g. management of non-communicable diseases, emergency obstetric care, mental health, dental health, eye health, are provided mainly at the level of local

hospitals [1].

Child health care services in Sudan include: Expanded Program on Immunization (EPI), IMCI, and Nutrition services as well as Maternal, Newborn and Child health services. The implementation of those services in Sudan is fragmented and of limited coverage; the coverage of IMCI is 22%, of EPI 76% and only 42% of the population has access to essential MCH services [2].

Sudan is one of seven countries in the Eastern Mediterranean region which has a very high mortality rates in children under the age of five (83 per 1000) [3]. The major causes of morbidity in the under-five children in Sudan are malaria, diarrheal diseases, acute respiratory infections (ARI), vaccine preventable diseases especially measles and the underlying malnutrition. Most of under-5 deaths (58%) occur in the post-neonatal period and 42% occur in the neonatal period [2].

Key interventions to prevent and control all the above mentioned leading causes of morbidity and mortality among children are best to be provided and delivered by PHC packed by strong referral system [4-7]. However, several studies [8-11] have documented poor quality of services in most of these facilities causing majority of the care-seekers to bypass them while seeking child care.

According to Sudan referral system, PHC facilities are supposed to be the first contact for mild childhood illnesses. However, in 2011 a KAP survey (n=2223) indicated that 19% of the respondents prefer to utilize hospitals directly [12]. In 2013 Khartoum annual health statistical report showed that PHC coverage is 1:13,000. The report also indicated that the total number of out-patients is about 6,289,568, of whom 36% attending at hospital level, 31% attending FHC, only 3% attending FHU and the rest attending at private facilities. Under-5 children represent 1,096,526 of the total number of out-patients. Only 423,437 out of the 2,242,306 attended the referral hospitals (19%) had been referred [13]. Therefore, over 80% of out-patients in Khartoum approach secondary level directly after feeling of sickness.

Sudan has a high rate of mortality among children under age of 5 caused by diseases that can be simply prevented and treated at PHC facilities which are made easily accessible to the population [3]. Yet, self-referral (bypassing primary care facilities) for common childhood illnesses is a widespread phenomenon. Bypassing primary care level results in overburden of referral facilities and high cost for the care takers and health care system. So there is a general failure in applying a primary health care approach and implementing referral system in Sudan. This study was aimed to 1) measure the proportion of bypassing public PHC facilities among caretakers seeking care for their under-five children 2) determine consistency (illnesses that is difficult to be treated at the primary care facility) of self-referral with the national IMCI guidelines 3) identify factors (caretakers, child, illness factors, institutional) associated with bypassing public PHC services. Since PHC services are supposed to be the first contact for common childhood illnesses, the two words bypassing and self-referral will be used interchangeably in

this paper.

2. Methods

2.1. Study Design

This was a cross sectional comparative study to measure the proportion and clients reasons for bypassing PHC facilities. This was complemented by assessment of all primary health facilities bypassed by the interviewed caretakers to explore facility as well as providers factors related to bypassing PHC services.

2.2. Study Area

Un-published routine data is indicating that the referral system is inadequately performing at all the 7 localities in Khartoum state. To choose the appropriate study area for conducting our study we have agreed on specific criteria, accordingly Sharg-Alneel locality was selected because it has high reported cases of childhood illnesses, wide range of PHC facilities and also because of its priority locality for FMOH.

Sharg-Alneel locality health care system has three levels, the highest of which are Alban –Jadeed, Om-Dawaban, Abu-Dleg and Wad-Abu-Salih hospitals with 462 beds at the rate of 1/2143 population and only 16 pediatrics' beds. It serves an estimated population of 989,919 at the rate of 1/197,984. There are 36 governmental family health centers (FHC) and 53 non-governmental organizations (NGOs). FHC provides the second level of care, and the first level is provided by 50 governmental FHUs. FHC coverage is estimated to be 1/11,000 population, if properly utilized, it has a great potential for further health gains for children under five years. There are also one private hospital and 135 private clinics [13].

2.3. Study Population

The target population refers to the population from which the sample population was drawn. For this study, the target population was the total number of caretakers seeking care for their under-five children at the four governmental hospitals in Sharg-Alneel locality.

The participants for this study were: caretakers of sick children between 1 month and 5 years, with a history of fever, cough or diarrhoea seeking care at the outpatient/emergency departments of the 4 referral hospitals. The study population also involved the family health centres, family health units at the locality mentioned by the interviewed caretakers, with the aim to examine, in general, the characteristics of facilities intended to be bypassed.

2.4. Sample Size

The equation for calculating sample size was as follows:

$$n = z^2 P (1-P) / e^2$$

Where:

Z = level of confidence (1.96)

P = baseline level of the indicators (proportion of bypassing PHC facilities) (0.8)

e = margin of error (0.05)

The calculation for sample size was as follows:

$$N = (1.96^2) \times 0.8(1-0.8)/(0.05)^2 = 246 \times 2 = 492$$

492 was the total final sample size from all of the 4 hospital setting. To compute sample size, the average number of patients seen in the various hospitals at Sharg- Alneel locality was obtained from Statistical records which are under the responsibility of the statistics and information department at the Khartoum state ministry of health. 500 questionnaires were collected and 497 analyzed.

Table 1. Sample size per each hospital.

Hospital Name	Patients attendants in the hospital in the last 6 months	Sample allocation
Abo delag	7616	40
Wad abosalih	5882	31
Alban jaded	48978	265
Om dawan ban	29158	161
Total	91634	497

2.5. Sampling Technique

According to statistical records obtained, approximately 91634 patients were seen at the 4 hospitals during the last 6 months. These formed the study population as it was from this sampling frame a sample of patients to participate in the study was obtained. Stratified sampling was used. From each of the 4 hospital, setting sample was taken according to the number of outpatients in each hospital. Probability simple random sampling was used. Study samples were selected randomly from all sick children presenting at the outpatient/emergency room, between 9 am and 2 pm, with a history of one or more of the following symptoms: fever, cough, difficulty in breathing/fast breathing and diarrhoea or vomiting. Purposive sampling was used for focus group discussion.

2.6. Data Collection

The research team included a principal investigator and 4 data collectors. Contact between the team was sustained with regular meetings and phone calls.

2.7. Data Collection Techniques

The proportion of bypassing PHC facilities among study population as well as all variables in the questionnaire such as demographic characteristics and reasons behind bypassing PHC were explored using the following data collection techniques:

2.7.1. Interviewing

The interviewers were personally managing the study at outpatient/emergency room. The purpose of the study was clarified and the participant was asked for her/his consent to take part in the study. Before progressing with the interview,

consent form was read to and signed by the participant. The interview was carried out using questionnaire with fixed list of questions.

2.7.2. Observing

Public family health centers and units mentioned by the bypassed study participants within Sharg-Alneel locality were selected for the assessment. Interviewed caretakers mentioned names of 32 primary public health facilities close to their homes and which could have been used by them. In preparing for the assessment tool, principal investigator reviewed the National IMCI program tools developed for health worker follow up after training and assessment during supervision. Then the principal investigator drafted an observation and facility inventory checklist. Data collectors were teams of 5 who were either national IMCI facilitator or supervisors. They spent 3 weeks to assess 24 facilities and this was because 25% of the facilities were reported either closed, cadre is not available or not functioning. The assessors observed IMCI performance of 24 health workers in clinical sessions with 24 children at Sharg-Alneel, as well as checking facilities' health system in term of availability of drugs and supplies relevant to the IMCI implementation. Once the assessment was completed, data was entered, cleaned and analyzed.

2.8. Data Management and Analysis

The questionnaires were checked for accuracy and completeness. When missing information was found, corrective measures were taken when possible. Data cleaning and entry was completed and analyzed using statistical package for the social science (windows version 21.0; SPSS). General descriptive analyses were used. Cross tabulations for variables that were thought to have an association were performed. The chi-square test was used as appropriate and P-value of 0.05 was used to determine significance.

3. Result

A total of 500 caretakers were interviewed in the hospital survey. 497 were analyzed: 53.3% from Alban –Jadeed, 32.4% from Om-Dawaban, 8% from Abu-Dleg and 6.2% from Wad-Abu-Salih hospitals.

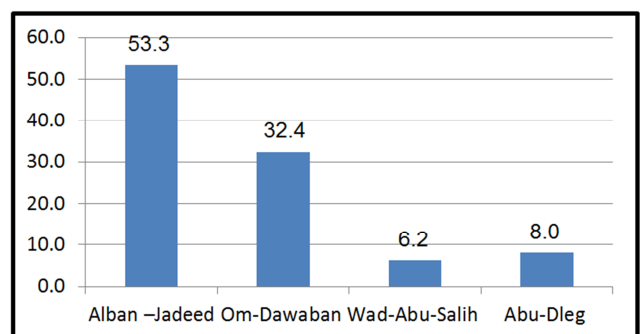


Figure 1. Percentage of caretakers interviewed by study hospital at Sharg-Alneel locality 2015.

General description of the study participants

The proportion of female and male caretakers interviewed was 85.7% and 14.3% respectively. The mean age of the caretakers interviewed was 29.1 years and only 7% were not Sudanese. The majority of the female caretakers were the mothers (84.9)%. 34% of the caretakers were illiterates, 23.7% had primary school education and only 4.4% had university education (table 1). 63% of the caretakers interviewed stated that their total family spending was less than 15, 00 Sudanese pounds (SDG) per month (1 US\$≈12 SDG).

The majority of children of the interviewed caretakers were boys (326, 65.4%) and the girls were 172 in number which is 34.6%. The mean age of the children of caretakers interviewed was 17.4 months. Almost half (242, 49%) of the interviewed caretakers reported their children being sick within the past 1-2 days.

The most common symptoms reported were fever among 259 (52.1%) children, diarrhea among 186 (37.4%) children,

and cough among 106 (21.3%) children. These were followed by shortness of breathing among 109 (21.9%), severe vomiting among 60 (12.1%) children, not able to drink or breast feed among 24 (4.8%) children, convulsion among 24 (4.8%) children and stiff neck among 1 (0.2%) child.

Children who had more than one of the main symptoms presented with fever and cough been (40.69%), fever and diarrhea (24.5%) and fever and vomiting (16.67%).

Quantitative results (Bypass of PHC facilities)

87% of interviewed care takers reported that they were self-referred (bypassing the public PHC Facilities) during the current child's sickness episode and only 12.9% were referred by health workers at other health facilities. About 304 caretakers interviewed (61%) reported having a nearer facility other than the study hospital and 98% took less than 30 minutes walking distance to access such facilities. Of these, 79.6% had bypassed them during the current child's sickness episode.

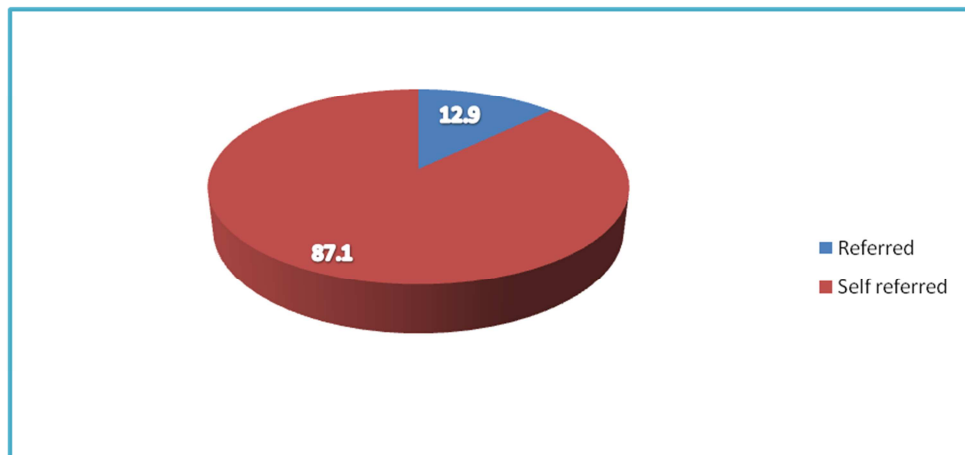


Figure 2. Proportion of caretakers seeking care for their under five children bypassing the PHC at Sharg-Alneel Locality, 2015.

Even though there are three Hospitals in Sharg-Alneel locality other than Alban-Jadeed, it is chosen by almost half of those bypassing PHC levels seeking care for common child illnesses. The main reason most frequently mentioned by the study participants for directly attending the chosen hospitals was that this hospital was the closest

(43.9%), followed by better health care quality at the hospital (34.2%) and availability of doctors at the hospital (23.1%). Few caretakers interviewed mentioned availability of drugs (3.5%) and not knowing other health facilities available (3.5%) as reasons for directly choosing the study hospital without referral.

Table 2. Bypass PHC facilities by general characteristics of the study participants.

Variables	Frequency	%age	% referral (non-bypassed)(n=64)	% self-referral (bypassed) (n=433)
Caretakers sex (n=497)				
Male	71	14.3	14.06	14.3
Female	426	85.7	85.9	85.7
Caretaker nationality (n=497)				
Sudanese	463	93.2	93.75	93.07
Not Sudanese	34	6.8	6.25	6.93
Caretakers' relationship to the child (n=497)				
Mother	422	84.9	84.375	84.99
Father	43	8.6	10.9375	8.31
Other relatives	32	6.4	4.6875	6.70
Caretakers' education (n=497)				
Illiterate	169	34	33	34
Primary	162	32.6	31	33

Variables	Frequency	%age	% referral (non-bypassed)(n=64)	% self-referral (bypassed) (n=433)
Intermediate	28	5.6	3	6
Secondary	112	22.5	25	22
University	22	4.4	8	4
Postgraduates	4	0.8	0	1
Caretakers' occupation (n=497)				
Housewife	399	80.3	80	80
Free Business	62	12.5	13	12
Private sector employee	7	1.4	6	1
Public sector employee	11	2.2	0	3
laborer	12	2.4	0	3
Student	5	1.0	2	1
Retried	1	0.2	0	0
Average monthly spending (n=497)				
<1000 (low)	156	31.39	19	33
1000- 2500 (medium)	301	60.56	73	59
>2500 (high)	40	8.08	8	8
Age of the child (n=497)				
1 month- 12	234	47.1	66	44
13- 24	150	30.2	25	31
25- 36	61	12.3	9	13
37- 48	35	7.0	0	8
48- 60	17	3.4	0	4
Sex of the child (n=497)				
Male	325	65.4	78.13	63.5
Female	172	34.6	21.88	36.49
Child illness symptoms (n=497)				
Fever	259	52.1	40.63	53.81
Diarrhea	186	37.4	14.06	40.88
Cough	106	21.3	15.63	22.17
SOB	109	21.9	70.31	14.78
Vomit everything	60	12.1	4.69	13.16
Convulsion	24	4.8	7.81	4.39
Not able to drink or breast feed	24	4.8	0	0.23
Stiff neck	1	0.2	9.38	4.16

Among those caretakers seeking care for their under-five children who were referred, only 30% contacted public PHC first at Sharg-Alneel locality. The majority of referred caretakers (42%) contacted NGOs health facilities initially and the remainder (28%) was referred from private clinics, pharmacy, local hospitals and traditional healers.

Bypassing public PHC facilities was found to be higher among caretakers of children who had fever (53.9%), followed by diarrhea (40.8%) and cough (22.1%). The results also indicated that bypassing public PHC facilities was higher (79%) among children with short duration symptoms of 1-4 days. The caretakers who bypassed the public PHC facilities with danger signs that coincided with the national IMCI guidelines were the majority (73.3%).

The proportion of caretakers seeking care for their under-five children who bypassed the public PHC facilities for illnesses according to the national IMCI guidelines at Sharg-Alneel locality were presented as follows: 64 ill children had Shortness of Breathing (SOB) and 58 had vomiting of everything, while ill children with Convulsions, not able to drink or breastfed and neck stiffness were 19, 20 and only one respectively. Bypassing public PHC facilities was highest for the youngest age group (44.2%) and it declined

thereafter for older groups, where it reached 3.9% for children older than 4 years. Bypassing public PHC facilities for common child illnesses for boys (64%) was more than for girls (36%).

More than half of the caretakers who bypassed public PHC facilities were between the ages of 20-30, while the lower percentage of bypassing was found to be among the age group of more than 50 years (2%). Also the highest percentage of bypassing phenomenon was indicated among female (86%) and married (93%) caretakers.

With respect to the caretaker's nationality and relationship, the findings indicated that the proportion of caretakers who bypassed public PHC facilities were 93% Sudanese and 85% biological mothers. Considering caretaker's education, results showed that bypassing PHC facilities for common child illnesses was higher (34 and 33%) among illiterate and primary educated caretakers, while among the highly educated caretakers it was 5%. Regarding caretakers occupation, respondents who were housewives reported the highest (80%) self-referral proportion to hospitals.

Concerning caretaker's economic status, the influence of respondents' economic status on bypassing behavior was estimated using average monthly respondents' spending data.

Respondents were divided into 3 groups (low, medium and high level spenders) according to their average monthly spending (<1000 SDG, 1000- 2500 SDG and >2500 SDG). Data analysis stated that bypassing public PHC facilities was elevated (92%) among low and medium average monthly spending.

Association of bypassing (self-referral) with independent variables

To recognize the association between bypassing public PHC facilities for common child illnesses with the independent variables, chi-square test was used and then variables with P-values less than 0.05 were considered being associated with the dependent variable.

Accordingly, the analysis revealed that bypassing behavior of public PHC services was statistically significantly different between child age groups ($P = 0.007$) and child sex ($P = 0.02$). Similarly, presenting symptoms of diarrhea ($P = 0.00004$), fever ($P = 0.04$), SOB ($P = 0.0003$) and vomit everything ($P = 0.05$) were associated with bypassing public PHC facilities and self-referral to secondary health care facilities. The only identified caretaker's factors found to be associated with the bypassing behavior were occupation of the caretakers ($P = 0.014$) as well as the economic status ($P = 0.001$).

Table 3. Association of bypassing (self-referral) with independent variables.

Independent variables	P value
Child age	0.007
Child sex	0.02
Diarrhea	0.00004
Fever	0.04
Shortness of breathing	0.0003
Vomit every thing	0.05
Occupation	0.014
Economic status	0.001

The number of study participants who reported availability of closer health facilities was 303 (61.2%), among those 161 (53.3%) reported presence of public PHC facilities. 30.6% of the study participants reported absence of nearest facility and 8.2% reported that availability of nearest facilities is unknown to them. Availability and knowledge about the existing PHC services was found to be statistically different between referred and self-referred respondents ($P = 0.001$). Common reasons given why caretakers bypassing the closer public health facilities were unavailability of doctors ($P = 0.0001$), lack of health insurance services ($P = 0.001$) and higher cost of services ($P = 0.001$) (table 4).

Table 4. Reasons for directly choosing the study hospitals mentioned by caretakers at Sharg-Alneel locality 2015.

Reasons for bypassing closer PHC facilities	Public PHC facilities (n= 161)	Other health facilities (n= 142)	P- value
unavailability of doctors	71.60	28.4	0.0001
lack of health insurance services	19.05	80.95	0.001
higher cost	25	75	0.001
Lack of trust on the quality of services	47.5	52.5	0.44
Child not getting better	52.22	47.78	0.84
Unavailability of drugs	51.85	48.15	0.89
Care is unsatisfactory	59.32	40.68	0.28
Others	53.95	46.05	0.87

Assessment findings

Two third of health facilities assessed were Family Health centres. 70.8% of the health workers observed were males, 54.2% were doctors and 41.7% were medical assistants, and only 33% received IMCI training. Health care providers checked for child weight, temperature and current complain, percent being 83%, 50% and 96% respectively. 3% of health care providers checked child for all danger signs and 67 percent checked for child's four main symptoms.

Health care providers who checked for child's vaccination status, vitamin A supplementations and malnutrition status were 54.2%, 29.2% and 8.3% respectively. 25% of health care providers followed all the assessment steps in the IMCI guidelines accurately for cough cases followed by diarrhea (12.5%), fever and ear problem (4.2%). Less than 5% of health care providers were correctly "classified" (IMCI terminology meaning diagnosed) cases of cough and ear problem. No health workers classified cases presenting with fever and diarrhea correctly. Among 16 children who required an emergency transfer during the assessment, 12 were referred. Almost 83% of children who were referred (12/16) received a pre-referral treatment. In addition, only 50% of health care providers treated cases classified as having ear problem correctly, while 90% and 70% correctly

treated classified children having malaria and diarrhea correspondingly. Findings concerning communication and counseling revealed that percentage of health care providers who advised caretakers on rules of home treatment and nutrition/feeding was 41.7%, while those who advised on when to immediately reconsider the PHC were only 12.5%.

65%, 66.7% and 65.8% of health care providers checking for child weight, temperature and current complain respectively were not trained on IMCI. All health care providers who checked children for danger signs received IMCI training. More than 50% of health care providers who checked for child's four main symptoms did not receive IMCI training. Health care providers who received IMCI training and checked for child's vaccination status, vitamin A supplementations and malnutrition status were 46.2%, 42.9% and 100% respectively. All health care providers followed all the assessment steps in the IMCI guidelines accurately for diarrhea, fever and ear problem cases and were trained on IMCI. All health care providers who correctly "classified" (IMCI terminology meaning diagnosed) cases of cough and ear problem received IMCI training while only half of those who classified cases of malnutrition were correctly trained. Only one third of HCP who transfer children requiring an emergency referral were trained on IMCI. HCP who received

IMCI training and prescribed pre-referral treatment at the PHC (anti-malarial and/or antibiotics) were 30%. In addition, 100% of health care providers treated cases classified as having ear problem correctly and they did receive IMCI training, while 71.4%, 44.4% and 28.6% correctly treated classified children having pneumonia, malaria and diarrhoea correspondingly and were trained on IMCI. More than half of health care providers who advised caretakers on rules of home treatment and nutrition/feeding did not receive IMCI training, while two third of HCP who advised on when to immediately transfer to the PHC received IMCI training.

Thirty six indicators related to the health system support for the management of cases through IMCI in health centers in sharg-Alneel locality have been calculated. The analysis was limited to the availability on the day of the visit. They were divided into three categories: the availability of essential equipment, availability of essential IMCI drugs and availability of pre-referral drugs. The assessment reported that no health facilities had all items of equipment, material and essential IMCI drugs. Percentage of health facilities which had all items of the pre-referral drugs was 4.2%. 37% of health facility had free drugs for under-5 children.

Table 5. Health workers performance by IMCI training regarding assessment, classification, management and counseling of under-5 sick child at health facilities in Sharg-Alneel locality.

Indicators	% Received IMCI training	% Not received IMCI training
Assessment of case		
HCP who checked child weight	35	65
HCP who checked child temperature	33.3	66.7
HCP who checked child current complain	34.2	65.8
HCP who checked child for danger sign	100	0
HCP who assessed main symptoms (cough)	46.7	53.3
HCP who assessed main symptoms (diarrhoea)	43.8	56.2
HCP who assessed main symptoms (fever)	50	50
HCP who assessed main symptoms (Ear problems)	83.3	16.7
HCP who checked child with malnutrition correctly	100	0
HCP who checked for child's vaccination status	46.2	53.8
HCP who checked for vitamin A supplementations	42.9	57.1
HCP who assessed child with cough correctly	66.7	33.3
HCP who assessed child with fever correctly	100	0
HCP who assessed child with diarrhea correctly	100	0
HCP who assessed child with ear problem correctly	100	0
Classification of case		
HCP who classify child with cough correctly	100	0
HCP who classify child with fever correctly	0	0
HCP who classify child with fever for measles correctly	0	0
HCP who classify child with diarrhoea for dehydration, persistency and dysentery correctly	0	0
HCP who classify child with ear problem correctly	100	0
HCP who classify child with malnutrition correctly	50	50
Management of cases		
HCP who transfer of children requiring an emergency reference	33.3	66.7
HCP who prescribed and gave Pre-referral treatment at the PHC (anti-malarial and/or antibiotics)	30	70
HCP who did noted referral	20	80
HCP who treated Pneumonia properly	71.4	28.6
HCP who treated Malaria correctly	44.4	55.6
HCP who treated Diarrhea properly (- ORS only)	28.6	71.4
HCP who treated Diarrhea properly ORS + zinc sulfate	33.3	66.7
HCP who treated ear problem properly	100	0
Counseling and communication		
HCP who advised to return for follow up	50	50
HCP who advised on rules of home treatment: give more liquid and continue feeding during illness	45.5	54.5
HCP who advised when to return immediately to the PHC	66.7	33.3

4. Discussion

Main objective of Sudan PHC reform 2012-2016 was to increase population access to PHC services from 86% to 100% with the availability of free health care services policy for under-5 children. However, the real use of the service has been low, extremely restricting the overall effectiveness of the health system response. This study identified the

magnitude of and factors influencing bypassing PHC services for common childhood illnesses in Sudan. This chapter discusses the findings from the study in section 3. It is organized on the major elements of the study objectives and included the findings from other low and middle income countries.

The result revealed that the majority of caretakers were uneducated young mothers. This might be due to the interview was conducted during the official working hours of

the head of the family. The majority of children were boys presenting with fever of short duration.

The findings showed that though 45.3% of caretakers interviewed took from more than 30 minutes to more than 180 minutes to reach the study hospital, 87% of caretakers interviewed had sought care for their under-5 children directly from secondary hospital without referral. This is in line with other findings from other low income countries such as Uganda, Nigeria, Tanzania, and Namibia [14, 15, and 16]. The main common reasons given for directly choosing the study hospitals were the hospitals are nearer than PHC services, better quality of health care services and availability of doctors at secondary level. Of the total interviewed Caretakers who bypassed, 61% have nearer PHC services which they could have utilized, among these 98% were less than 30 minutes walking distance. 43.9% of bypassed caretakers reported that hospital is closer, among those 30.5% reported that they did not have nearer PHC facilities and 8.4% did not know about the availability of the closer PHC services. Therefore, 5.1% reported that they had physical access to PHC facilities but they perceived that the hospital is closer.

The main common reason given for bypassing nearer PHC facilities was unavailability of doctors which was consistent with national characterization of health facilities. PHC services staffed by medical doctors were FHC and local hospitals located at urban areas while rural areas were only staffed by paramedics [17]. However, Sudan has started to implement in-services family medicine project in Gezira state which succeeded in recruiting 207 medical doctors providing PHC services in 158 Family Health Centers, of which more than half had never been served by a doctor before [18].

The second most common reason given for bypassing PHC facilities was lack of health insurance services. The FMOH policy emphasizes the important position of (PHC). Inversely, the National Health Insurance Fund's (NHIF) investment is mainly on tertiary and secondary care. NHIF in Sudan purchase services from governmental Family Health centre only at the Primary Health services level [19]. According to Health Insurance Khartoum State (HKS) report 2015, service coverage is 67% of the governmental Family Health centre all over Khartoum state. Though NGOs services are not included in health insurance services coverage, this study reported that they are widely available and more utilized than governmental one in the study area. Low and non-inclusive health insurance service coverage could justify our study findings.

Free care for pregnant women and under-fives was announced by the President, January 2008. Nevertheless, another reason for bypassing PHC facilities given by caretakers in our study was high cost of services. This is consistent with our qualitative findings and facility assessment finding which found that only 37% of PHC facilities have free drugs for under-5 children. Findings from other policy evaluation study that showed Sudan free care policy are highly needed but are poorly specified, funded, implemented and monitored [20] Obviously this result in low

participation of health facilities in policy implementation and hence continuation of fee for services and drug sales.

Caretakers and child factors were identified by the study to influence bypassing PHC services for common child illnesses. Our study found that child gender affects the decision to choose a health care provider. Bypassing public PHC services for common childhood illness was more for boys than girls and this could be attributed to the society pediatrics' gender bias, explained by existence of strong son-preference in Sudan, in line with studies of gender bias and health seeking actions in other African countries including Egypt, Tunisia, Morocco, and Nigeria [21-23]. Same findings are evident also from several studies from Asia including Nepal, Pakistan and China and Republic of Korea [24-26]. All the studies suggested that gender role affects the entire steps of child health care seeking action. This study suggests that proportion of caretakers bypassing PHC statistically significantly differ by child age group which was noted to be higher among younger age. This observation was also reported by many other countries. Whereas a study conducted in Tanzania showed no significant difference between the caretakers bypassing their nearest facility according to child's age [15].

Among caretaker's socio-demographic characteristics, only occupation and economic status of the respondents was significantly associated with self-referral (bypassing). These findings are in accordance with other studies from Kenya, Papua New Guinea, China and Nepal [27-31]. Even though, the association was not statistically significant, other caretakers socio-demographic factors also positively affected bypassing behavior especially age and education. Several studies have reported positive association between caretakers' education and bypassing PHC services. Surprisingly, this study suggested that bypassing behavior was not significantly different across education status groups and uneducated bypassed the primary levels of healthcare more than highly educated caretakers. These findings can be explained by some reasons including the fact that respondents have no trust in the care they would receive at PHC level and lack of adequately designed and performing referral system.

Bypassing behavior was strongly related to particular illness symptoms and their perceived severity. Our study indicated that presenting symptoms with diarrhea ($P = 0.00004$) and fever ($P = 0.04$) were significantly associated with bypassing PHC services. This might be due to caretaker's sensitivity towards diarrheal and fever symptoms than coughing. Our research findings suggested that children suffering from severe illness such as SOB and vomit everything were associated with bypassing public PHC facilities and self-referral to secondary health care facilities. This could be because caretakers are expected to seek higher quality health services for severe illnesses. It might also be due to the previous experience of caretakers with inadequately performing referral services. These findings were also reported in other countries [29, 30, and 7].

Results of assessment of the selected public PHC facilities

showed that 25% of the facilities were reported either closed, cadre is not available or not functioning. Closed was indicated by either short opening hours or closed on the day of the visit. Assessors also found that 6.25% were open but medical cadres were not available. Moreover, local community reported to assessment team that 12.5% of the facilities were not functioning for long time ago.

Findings on the performance of health workers revealed that all the four components of the case management were still weak particularly systematic assessment and classification. These results were comparable to those obtained during other assessments such as in Rwanda and Kenya [32, 33]. Poor compliance of health workers to IMCI guidelines was obviously noted. For example, health providers checked for all danger signs in only 12.5% of the children observed, and they did not check for all major symptoms in the children. Less than quarter of the health care providers followed all the assessment steps in the national IMCI guidelines accurately. Less than one-third were correctly classified. However, percentage of health care providers who treated sick children correctly approached 90% based on the disease. Communication and counseling are crucial for proper continuous care at home as well as appropriate family behavior. Nevertheless, this study showed that only 40% of the health care providers communicated with caretakers appropriately and provided counseling regarding important issues. Gaps reported in the performance of health workers could be clarified by lack of training as only one third of the observed health workers were trained on IMCI guidelines. Moreover, quality of training was also an issue, as 8 out of 15 and 6 out of 8 procedures of case assessment and case management respectively were performed more properly among HCP who did not receive IMCI training. Other explanation could be poor monitoring and supervision, in addition to the resistance from the health care providers themselves to apply IMCI because it is time consuming and a burden to their workload [32].

The support system of the study primary health facilities were not adequately functioning. This study showed that only 12.5% of assessed primary health facilities had 95% of the essential equipment and material. Similarly, 12.5% of health facilities had 78% of the essential IMCI drugs. No health facility reported having all items of the essential equipment and IMCI drugs. All items of Pre-referral drugs were available in only one primary health facility (4%). These findings were consistent with other studies conducted in Morocco and Tanzania [34] but not with study from Rwanda [32].

Findings of the two study methods were consistent and supporting each other. All determinants of bypassing behavior reported were mainly quality dimensions, availability, accessibility, adequacy, acceptability and affordability of services. Both methods showed that either PHC services were not available or study respondents were not aware about the existing services or they perceived that the hospital was nearer. If this indicates anything, it showed inequitable distribution of health services and discrepancy

between services distribution and referral policy. Also the two study approaches were reporting consistent findings with regard to the poor quality of PHC services indicating weak PHC services monitoring and control.

5. Conclusion

This is one of the first researches to study magnitude of and factors influencing the bypassing PHC services for common childhood illnesses in Sudan. This study has shed light on the magnitude of the problem and different individual, illness, provider and system factors that prevent caretakers from using closer PHC services and directly choose secondary hospital.

This study indicated that almost 9 of 10 care takers interviewed had directly chosen the secondary level without referral despite extra time and cost. Among those who were referred, for only 30% the source of referral was public PHC facilities. The main reason given for directly choosing the hospitals was better quality of care.

Child factors including age and sex were both found to be significantly associated with bypassing public PHC services for common child illness.

This study suggested that bypassing PHC services for common child illness was not statistically different between caretaker age, nationality, relationship, and education group, unlike occupation and economic status that were found to be significantly associated with bypassing behaviour. Lack of knowledge about existing PHC services among the study participants and perception of hospital's closeness also emerged to influencing choice of PHC services.

The main reasons given for bypassing the nearer PHC services were unavailability of doctors, health insurance services as well as high cost of services.

Institutional assessment reported that quarter of selected health facilities were either not adequately functioning or not functioning at all. Still there is gap in the performance of health workers in implementing IMCI guidelines in addition to health system supporting IMCI implementation

Recommendations

In order to reduce the bypassing phenomenon in Sudan we recommend Federal and State Ministry of Health, in collaboration with all relevant stakeholders, to implement the following recommendations based on the findings of this study.

Intervention recommendation

- Ensure availability of doctors (expand the implementation of family medicine policy, revisit staffing of PHC)
- Scale up of health insurance coverage including NGOs services
- Enhance implementation of free care policy
- Improve the working setting and strengthening health system at the PHC facilities
- Scale up coverage and quality of IMCI training and

strengthening supervision in the PHC services where IMCI is implemented to improve the performance of health workers

Enabling environment recommendations

- Develop an overarching Policy that ensures quality, equity and gate keeping
 - Promote Community mobilization (Focus IEC programme)
 - Improve and support implementation of referral system
- Monitoring and evaluation and research recommendation:
- Strengthening of monitoring and supervision to ensure the quality and availability of the PHC services,
 - Conduct more analytical studies on health-seeking behaviour and utilization of PHC services.

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