

Health care providers' clinical knowledge on selected maternal and child health conditions and staff attendance in Ethiopia

Theodros Getachew^{1,2}, Atkure Defar^{1,2}, Abebe Bekele¹, Terefe Gelibo¹, Habtamu Teklie¹, Alemayehu Ambel² and Colin Andrews²

¹Health system and reproductive health research directorate, Ethiopian Public Health Institute, Addis Ababa, Ethiopia.

²College of Medicine and Health Science, Institute of Public Health, University of Gondar, Gondar, Ethiopia

³World Bank, development research group, DC, USA.

Corresponding author: tedi.getachew@yahoo.com

Abstract

Introduction: Health systems and services depend critically on the size, skills, and commitment of the health workforce. The major objective of this study is to assess the health care provider's clinical knowledge on selected disease conditions and staff attendance in Ethiopia to provide quality health services.

Methods: The assessment is part of the 2014 Ethiopia Service Provision Assessment Plus (ESPA+) Survey. From a total of 1,327 health facilities, 4,807 healthcare providers were assessed. All Hospitals, selected health centers, and private clinics were included. Health posts were not assessed. The approach, in general, follows the World Bank's Service Delivery Indicators (SDI) methodology.

Results: Diagnostic accuracy of service providers based on the average of four disease conditions, namely malaria, pulmonary tuberculosis, postpartum hemorrhage, and birth asphyxia is 71 %. Overall, the adherence of providers to clinical guidelines concerning client history taking, physical examination, and investigation of pulmonary tuberculosis case is 47 %, 59 %, and 55 % respectively. There is no major variation of this adherence by facility type, region, and providers' category. Overall, staff absenteeism was 33 % irrespective of the reason. Out of which unapproved was 9 %. This is maximum for the health posts (16 %). The approved reasons included that staff was absent due to: sickness or maternity leave (4 %), training or seminar (7 %), official mission (4 %), and other approved reasons (8 %). Health providers in Afar region (18 %) followed by South Nation Nationalities People (16 %), Dire Dawa and Benishangul Gumuz (14 % each), and Harari (13 %) regions were more likely to be absent.

Conclusion: Overall diagnostic accuracy based on the average of four disease conditions was low. It varied by disease condition, professional category, and facility type. Adherence to clinical guidelines on client history taking, physical examination, investigations, and treatment and general management of the disease condition. There is a considerable practice gap in adhering to the required clinical guidelines. The staff attendance suggests that there is room to improve staff availability at the facility.

Keywords: Clinical knowledge, absenteeism, Ethiopia.

Introduction

The major health problems of the country remain largely preventable communicable diseases, reproductive health-related problems, and nutritional disorders. Despite the fact that major progresses have been made to improve the health status of the population in the last two decades, Ethiopia's population still face a high rate of morbidity and mortality and the health status remains relatively poor. Figures on vital health indicators from EDHS 2016 show an Infant Mortality Rate (IMR) of 48/1000 (CSA 2016).

Multiple factors would have significant influence: i.e available infrastructure; staff deployment and presence; and availability and quality of services provided. Nearly all countries are challenged by health work force shortage, skill mix imbalance, maldistribution, negative work environment, and weak knowledgebase (Cohen 2004). Performance relates to health worker productivity and the quality of the care

they provide is among the major once (McPake 2013). Although routine reporting will contribute to this understanding, national surveys are also required to complement available routine reporting.

Health systems and services depend critically on the size, skills, and commitment of the health workforce (Kinfu 2009). It is now evident that in many low- and middle-income countries, meeting key Millennium Development Goal targets, specifically those relating to health, requires a significant increase in the numbers of health workers (Clancy 2009; Wallace, 2004; Sheldon, 2005). The global work force shortage is estimated at around 2.3 million physicians, nurses, and midwives, (Scheffler 2009) and over 4 million health workers overall (Richard, 2008). In some parts of the world, notably in sub-Saharan Africa, the current work-force needs to be scaled up by almost 140% to overcome the crisis (Bowe 2009). These shortages suggest that many countries have insufficient numbers of health professionals to deliver essential health interventions. However, simply assessing numbers of

health workers to a given threshold does not necessarily take into account all of a health system's objectives, particularly about accessibility, equity, quality, and efficiency.

Countries with critical shortages and imbalances of health workers also often lack the technical capacity to identify and assess crucial policy issues related to the health workforce. As a result, fundamental questions regarding the status of the workforce, its level of performance and the problems health workers face remain largely unanswered. Also, the lack of comprehensive, reliable and up-to-date data, and the absence of commonly agreed definitions and analytical tools, have made the task of monitoring the health workforce all the more difficult in all settings, from the global and regional to the national and subnational levels. Such challenges remain significant to many governments striving to maintain a sufficient, sustainable and effective health workforce in their respective jurisdictions. Overall, this assessment collects information that is adequate to roughly assess diagnostic accuracy and adherence to clinical guidelines as well as staff absenteeism in Ethiopia.

Materials and Methods

Study setting and period: Ethiopia is a Federal Democratic Republic government under the 1994 constitution and composed of nine Regional States and two City Administrations. The health sector has recently introduced a three-tier health care delivery system: level one is a Woreda/District health system comprised of a primary hospital, health centers and their satellite Health Posts connected by a referral system (FmoH, 2010). A total of 23,144 functional and formal sector health facilities are available in Ethiopia which included: 214 hospitals, 3,317 health centers, 15, 525 health posts, and 4,088 private clinics (grouped as higher, medium and lower clinics). The survey was conducted from 10 March to 25 July 2014.

Data Sources: The data used in this study came from the 2014 Ethiopian Service Provision Assessment plus Survey. The sample for the survey was a stratified random sample designed to provide representative results for Ethiopia, for different facility types and different management authorities, and each of the 11 regions of the country. The sample size determination has been achieved by controlling the survey precision at the region level and by facility type at the national level. The data are nationally and sub-nationally representative and internationally comparable. Whereas the numerators used in the analysis were %distribution of health providers interviewed. Health service provider is defined as one who provides consultation service, and counseling or education to clients. For example, health workers are not illegible

for observation or interview, if they only take measurement or complete registration. The sample of health service providers was selected from those who were present in the facility on the day of visit and who provided services. A maximum of fifteen providers were interviewed in each facility. In facilities where fifteen or fewer health care providers are available, all of the providers present on the day of visit are interviewed. In facilities where more than fifteen providers are available, they were selected for interview, if their work was observed and the remaining health care providers were randomly selected by their qualification, departments where they work, and the service that they provide. The assessment was done in all types of hospitals, selected health centers, and clinics. Providers' knowledge did not assess in the health posts.

Measurement: To achieve the objectives of the assessment and to capture information from the different categories, data were collected using a health provider questionnaire which was used to solicit information from a sample of health service providers on their qualifications, and service-specific "knowledge" questions, to assess individual health providers' knowledge in managing common health conditions. Assessment of adherence to clinical guidelines is based on required minimum knowledge; the assessment considered only the most critical items that need to be undertaken in each of the forthcoming questions. To assess provider's attendance, two visits were made to each health facility. The first visit was announced where the staff at the sampled facility were aware of the interviewers' visit. The second visit was unannounced and focused only on staff attendance while the staff was in their regular schedules. There was at least one-day gap between the first and the second visits. On the day of the unannounced visit, enumerators checked the availability of selected staff and coded the reasons if the staff members were not present.

Adherence to TB clinical guideline: If a provider considers the following clinical conditions for the given scenario, generally it is considered that the guideline of TB is adhered.

- TB history taking (Hx): Duration of cough; type of cough (productive, dry, etc.); presence of blood in sputum; pattern of sweats (night); weight loss; medication or treatment history.
- TB Physical Examination (PE): Take temperature; take respiratory rate; chest examination (auscultation or other).
- TB investigations or laboratory tests (Ix): Sputum for AFB (taken spot); HIV test.

- TB treatment and management (Mx): Combination therapy: 4 drugs for 2 months and 2 drugs for 6 months; refer to another provider or facility.
- TB health education (HE): Adherence to treatment; cough hygiene, diet.

Adherence to Malaria guideline: If a provider considers the following clinical conditions for the given scenario, generally it is considered that the guideline of malaria is adhered.

- Malaria history taking (Hx): Duration of fever; presence of fever and pattern; convulsions; history of vomiting; loss of appetite/ changes in eating habits; risk identification: address and bed net use.
- Malaria Physical Examination (PE): Take temperature; responsiveness or general condition; check for neck stiffness.
- Malaria with anemia or malaria laboratory investigations (Ix): Microscopy or blood film for malaria parasite (BF); rapid diagnostic test; hemoglobin.
- Malaria with anemia or malaria alone treatment or management (Mx): Artemether/lumefantrine (AL) 6 dose regimen, 2 tablets per dose (coartem); adequate fluid and nutrition; chloroquine; micronutrient supplement.
- Malaria with anemia or malaria health education (HE): Prompt return if symptoms worsen.

Adherence to Post-Partum Hemorrhage (PPH) clinical standards: If a provider considers the following clinical conditions for the given PPH scenario, generally it is considered that the standards of PPH are adhered.

- PPH history taking (Hx): Amount of bleeding; placenta delivery.
- PPH physical examination (PE): Take pulse rate; blood pressure; inspect laceration/tears of genital tract (cervical or vaginal or vulvo-perineal tears; do bimanual abdominal examination.
- PPH investigations or laboratory tests (Ix): Blood grouping and cross-matching; hemoglobin level.
- PPH treatment and management (Mx): secure intravenous line; do bimanual uterine massage and express any clots; put oxytocin drip 20 units in 50 ml

dextrose or normal saline to run at 20 drops per minute for about 2 hours; refer to other provider or facility.

Adherence to birth asphyxia clinical standards: If a provider considers the following clinical conditions for the given scenario, generally it is considered that the standard of birth asphyxia is adhered.

- Physical Examination (PE): Check heart rate (per minute); observe respiratory effort; muscle tone; test reflex irritability (nasal catheter); looking at neonate's color; score neonate using APGAR scale.
- Treatment and management (Mx): Clear airway using sucker; keep the baby warm; initiate resuscitation with bag and mask.

Data management and Analysis: Data were cleaned by checking of range, structure and selected set of checks for internal consistency. All data editing programs were conducted using CSPro software. Conventions were observed during the analysis of the survey data. Descriptive analysis was performed using CSPro tabulation. Unless otherwise indicated, the analyses considered only those items readily available and observed by the interviewers themselves during the survey.

Results

Diagnostic accuracy: A total of 3,492 health providers responded from 1,165 health facilities. Out of whom, 5 %were general practitioners or medical specialists; 12 %were health officers or integrated emergency surgical officers (IESO); 13 %were BSc nurses or midwives; and the majority (70%) were diploma nurses or midwives. The results are disaggregated by facility type, managing authority of the facility, region, location of the facility (as urban or rural) type, and health provider category. Figure 1 presents diagnostic accuracy for pulmonary tuberculosis (PTB), malaria, postpartum hemorrhage (PPH), and birth asphyxia. In general, diagnostic accuracy for PTB is 86 %, for PPH (71 %), for birth asphyxia (56 %), and for malaria (71 %). The overall diagnostic accuracy, i.e. the average of the four disease conditions is 71 %.

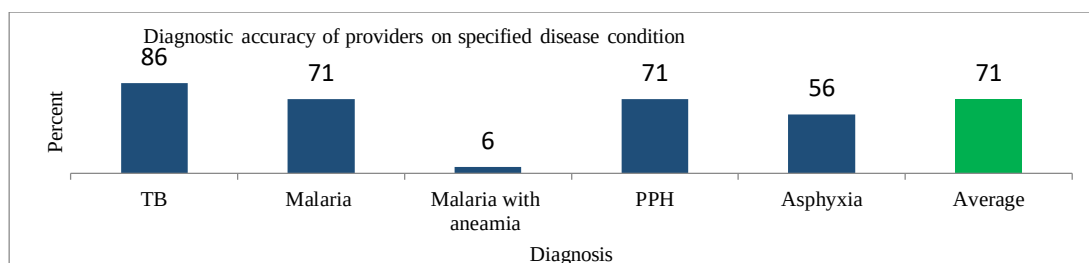


Figure 1: Diagnostic accuracy of interviewed health care providers on specified disease conditions among facilities excluding health posts, 2014.

Table 1: Percentage of health care providers responding diagnostic accuracy by background characteristics, Ethiopia 2014

Background characteristics	TB	Malaria with anemia	Malaria	Malaria with anemia or malaria	PPH	Asphyxia	Average of 4 conditions: TB, malaria with anemia, PPH and asphyxia	Average of 4 conditions: TB, malaria with anemia or malaria, PPH and asphyxia	Number of health workers
Facility type									
Referral Hospital	90	8	54	61	75	63	59	72	147
General Hospital	86	7	63	69	77	56	56	72	391
Primary Hospital	88	10	65	74	79	57	59	74	120
Health Center	85	6	67	72	72	58	55	72	2,314
Higher Clinic	89	8	52	57	64	57	55	67	84
Medium Clinic	92	3	67	69	66	50	53	69	164
Lower Clinic	83	3	72	76	52	45	46	64	272
Managing authority									
Government/ public/	85	6	67	72	73	58	56	72	2,835
Other governmental (military, prison, federal police)	95	4	83	87	64	34	49	70	15
Private for profit	88	4	63	67	61	51	51	67	567
NGO (mission/ faith-based, nonprofit)	83	5	77	81	70	45	51	70	75
Region									
Tigray	81	6	63	67	73	62	55	71	291
Afar	87	8	74	81	63	45	51	69	42
Amhara	83	7	70	74	76	64	57	74	709
Oromia	88	5	70	73	72	56	55	72	1,042
Somali	87	8	64	71	75	39	52	68	111
Benishangul Gumuz	95	6	82	87	64	47	53	73	47
SNNP	86	7	72	78	62	50	51	69	726
Gambella	95	2	83	84	58	46	51	71	31
Harari	90	11	53	64	74	61	59	72	19
Addis Ababa	85	5	44	48	74	59	56	66	439
Dire Dawa	82	4	58	62	76	53	54	68	35
Urban/rural									
Urban	86	7	62	67	71	57	55	70	1,652
Rural	85	5	70	75	71	55	54	72	1,840
Provider category									
Medical specialist ¹	89	13	44	56	74	68	61	72	55
General Practitioner	94	10	64	72	93	76	68	84	134
Health officer / IESO	88	9	68	76	85	71	63	80	413
Nurse(BSc)	85	7	66	72	74	50	54	70	289
Nurse(Diploma)	84	5	67	71	63	52	51	68	1,926
Specialized Nurse2	90	9	64	73	67	51	54	70	115
Midwife (BSC)	79	4	55	58	92	60	59	72	44
Midwife (Diploma)	86	5	65	68	82	57	57	73	516
Total	86	6	66	71	71	56	55	71	3,492

¹MD specialist includes General Surgeon, Anesthesiologist, Obstetrician and gynecologist, Internist, Pediatrician, psychiatrist, Radiologist, and other Service Specialist.

²Includes neonatology nurse, ophthalmic nurse, nurse anesthetist, public health nurse etc...

SNNP – South Nation Nationalities People

A further look at the results background characteristics of the respondents gives more insight on the performance of the providers (Table 1). No marked variation is seen in the average diagnostic accuracy of the four diseases by managing authority, region, facility type, provider category, and location (urban or rural).

Adherence to clinical guidelines: The assessment of process quality is based on clinicians' adherence to clinical guideline on clients' history taking, physical examination, laboratory investigation, and treatment or management of the specified disease conditions. Overall, the adherence of providers to clinical guidelines with respect to client history taking, physical examination, and investigation of PTB case

is 47 %, 59 %, and 55 % respectively. There is no major variation of this adherence by facility type, region, and providers' category. Adherence to clinical guidelines for the management of PTB patient and health education is 30 % and 65 % respectively (Table 2). Overall, the adherence of providers to clinical guidelines with respect to client history taking, physical examination, and investigation for malaria or malaria with anemia is 34 %, 35 %, and 38 % respectively. There is no major variation on history taking, physical examination, and investigation with this disease condition by facility type, region, and providers' category (Table 2). Overall, the adherence of providers to clinical guidelines with respect to client history taking, physical examination, and investigation for PPH is 48 %, 44 %, and 51 % respectively. There is no major variation on history taking, and physical examination of PPH by facility

type, region, and providers' category. But general practitioner or medical specialists (72 %) are more likely to offer laboratory investigations than diploma nurses or midwives (47 %). Harari (70 %) and Dire Dawa (64 %) regions are more likely to investigate PPH than SNNP (44 %) and Benishangul Gumuz (46 %) regions. In general, adherence to treatment or management of PPH based on the standards is 36 %. There is no major variation on management of PPH by facility type, region, and providers' category (Table 2). Provider adherence to clinical guidelines with respect to physical examination of birth asphyxia is 33 %. Adherence to management of birth asphyxia is 61 %. There is no major variation on physical examination, and treatment or management of birth asphyxia by facility type, region, and providers' category (Table 2).

Table 2: Adherence to clinical guidelines (client history taking) by background characteristics, Ethiopia 2014

Background characteristics	Tuberculosis					Malaria with anemia					PPH				Birth asphyxia		No of health workers
	Hx ¹	PE ²	Ix ³	Mx ⁴	HE ⁵	Hx ⁶	PE ⁷	Ix ⁸	Mx ⁹	HE ¹⁰	Hx ¹¹	PE ¹²	Ix ¹³	Mx ¹⁴	PE ¹⁵	Mx ¹⁶	
Facility type																	
Referral Hospital	50	69	56	27	68	37	42	37	14	40	54	52	64	37	36	66	147
General Hospital	47	61	54	27	64	34	38	39	14	37	51	44	65	34	35	63	391
Primary Hospital	48	65	60	30	69	37	39	44	17	37	55	52	67	38	39	66	120
Health Center	47	57	55	30	65	34	35	39	18	33	48	44	48	37	33	63	2,314
Higher Clinic	47	59	59	33	66	35	37	37	15	41	44	39	58	29	36	58	84
Medium Clinic	52	61	56	35	66	36	37	41	15	31	48	46	52	32	30	49	164
Lower Clinic	47	54	51	34	62	32	32	33	18	32	45	40	33	32	27	47	272
Managing authority																	
Government/ public	47	59	55	30	66	35	36	39	17	34	49	45	52	36	33	63	2,835
Other governmental (military, prison, federal police)	59	68	69	40	71	48	39	52	21	42	49	35	56	26	30	49	15
Private for profit	47	57	54	33	64	33	34	36	16	33	46	42	45	32	30	52	567
NGO (mission/ faith-based, nonprofit)	52	62	55	33	58	33	37	37	18	31	47	46	53	33	29	54	75
Region																	
Tigray	40	61	54	34	59	32	35	42	16	37	47	43	58	36	33	60	291
Afar	47	60	60	33	66	39	36	44	19	30	52	45	49	27	29	57	42
Amhara	47	61	54	30	63	34	37	40	18	37	52	47	52	36	35	63	709
Oromia	46	57	55	28	66	35	34	38	15	32	44	43	50	37	31	62	1,042
Somali	45	60	55	23	64	33	36	39	14	35	53	43	55	32	34	58	111
Benishangul Gumuz	48	58	56	38	67	34	32	40	23	39	43	43	46	37	26	59	47
SNNP	52	57	55	35	69	36	36	37	22	32	49	44	44	35	33	60	726
Gambella	48	61	59	36	76	36	36	44	20	37	51	44	49	31	33	58	31
Harari	54	68	62	34	73	35	37	44	16	29	53	54	70	38	42	65	19
Addis Ababa	48	61	53	26	63	35	35	34	13	34	50	45	56	34	35	60	439
Dire Dawa	50	62	56	18	70	36	36	42	11	39	50	49	64	40	35	63	35
Urban/rural																	
Urban	47	60	55	28	64	34	36	39	15	35	50	44	56	35	34	60	1,652
Rural	48	57	54	32	66	35	34	38	18	33	47	45	46	37	32	62	1,840
Provider category																	
Medical specialist ¹⁷	51	69	64	31	62	36	43	42	14	47	56	44	62	35	40	64	55
General Practitioner	59	76	63	37	72	44	54	44	18	45	59	59	76	46	48	70	134
Health officer / IESO	53	71	60	34	69	40	41	45	18	43	51	52	63	42	40	66	413
Nurse(BSc)	49	59	54	28	65	32	35	42	16	37	50	45	53	33	31	57	289
Nurse(Diploma)	47	56	52	30	64	33	34	37	17	32	46	41	42	32	29	58	1,926
Specialized Nurse ¹⁸	53	58	57	32	65	38	35	37	21	41	38	44	37	35	28	61	115
Midwife (BSC)	44	65	52	23	64	32	34	32	12	38	61	52	78	45	42	72	44
Midwife (Diploma)	41	51	56	27	67	32	31	34	15	27	54	48	64	42	37	69	516
Total	47	59	55	30	65	34	35	38	17	34	48	44	51	36	33	61	3,492

Note: Hx = history taking, PE = physical examination, Ix = Investigations/tests, Mx = management/treatment, HE = health education.

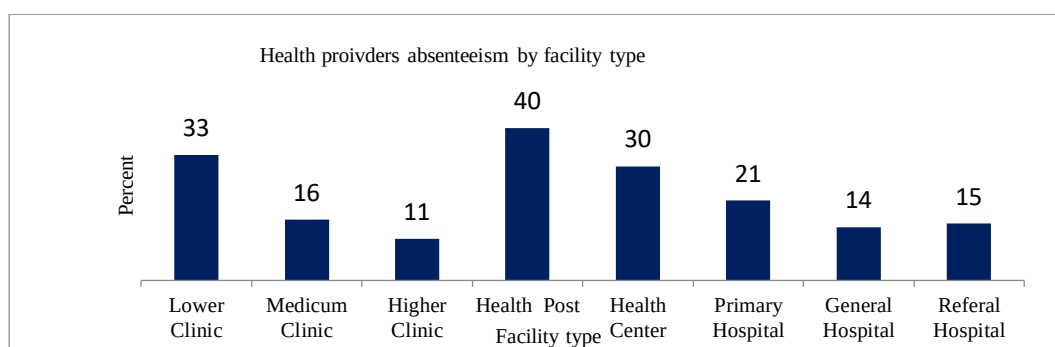


Figure 2: Health providers' absenteeism by facility type, ESPA+ 2014

Table 3: Reason for being absent at the facility by background characteristics, Ethiopia 2014

Background characteristics	Reasons for being absent							Total %absent	Total sample providers
	Sick / maternity	In training / seminar	Official mission	Other approved absence	Total approved absence	Not approved absence	Other		
Facility type									
Referral Hospital	1	3	2	4	11	4	0	15	15
General Hospital	2	3	1	7	12	2	0	14	60
Primary Hospital	3	7	2	8	19	2	0	21	23
Health Center	3	7	3	12	25	4	1	30	1,405
Health Post	5	9	5	4	23	16	1	40	1,483
Higher Clinic	1	1	3	4	9	1	2	11	66
Medium Clinic	2	3	5	4	14	2	0	16	116
Lower Clinic	3	2	6	13	23	8	2	33	214
Managing authority									
Government/ public	4	8	4	8	24	10	1	35	2,952
Other governmental (military, prison, federal police)	1	1	0	18	19	0	0	19	8
Private for profit	2	2	5	9	17	5	1	24	385
NGO (mission/ faith-based, nonprofit)	0	2	8	4	14	1	1	17	38
Region									
Tigray	2	11	3	8	24	3	1	28	205
Afar	2	10	4	6	22	18	0	40	44
Amhara	5	5	2	5	17	5	2	23	729
Oromia	3	11	5	8	27	9	0	37	1,248
Somali	7	5	0	9	21	2	0	23	100
Benishangul Gumuz	5	3	5	7	20	14	0	34	67
SNNP	6	3	6	9	25	16	1	42	792
Gambella	2	7	4	8	21	7	0	28	27
Harari	4	6	4	6	21	13	0	35	11
Addis Ababa	2	2	2	6	12	1	0	13	139
Dire Dawa	3	7	5	5	20	14	0	35	20
Urban/rural									
Urban	5	4	3	9	21	6	1	28	740
Rural	4	8	5	7	24	10	1	35	2,643
Provider category									
Medical specialist ²	0	1	3	8	12	7	0	19	41
General Practitioner	1	4	2	5	12	1	0	14	20
Health officer / IESO	4	6	7	7	24	1	1	26	145
BSc Nurse	4	4	5	21	34	1	0	35	67
Diploma Nurse	4	7	3	9	22	8	1	31	1,010
Specialized Nurse ³	3	7	0	12	22	5	1	28	72
BSC Midwife	5	2	0	18	25	1	0	27	21
Diploma Midwife	1	9	2	9	21	2	1	24	194
Pharmacy Professional ⁴	1	6	3	14	24	0	0	24	61
Med Lab Professional ⁵	4	6	6	12	27	2	1	30	433
Other Paramedics ⁶	0	0	0	4	4	0	0	4	1
Health Extension Worker	4	9	5	4	22	17	1	40	1,317
Total	4	7	4	8	23	9	1	33	3,383

¹Includes health providers who were on a different shift or doing field work.

²MD specialist includes General Surgeon, Anesthesiologist, Obstetrician and gynecologist, Internist, Pediatrician, psychiatrist, Radiologist, and other Service Specialist.

³Includes neonatology nurse, ophthalmic nurse, anesthesia nurse, public health nurse etc...

⁴Includes BSc or Diploma pharmacy

⁵Includes MSC, BSc or diploma laboratory technicians and Microbiologists

⁶Includes environmental health, health informatics, biomedical engineer, radiology technician/technologist, physiotherapy professional and dietician

Absenteeism rate: Staff absenteeism was calculated based on randomly selecting at most 10 staff per facility who were expected to be at the facility during the second visit. Staff who were not present because of duty rotation or working outside the facility (outreach or other) were considered as present. A total of 3,383 providers were randomly selected for the second unannounced visit. Of these, 33 % were absent regardless of the reason (Figure 2).

Reasons for being absent: Table 3 provides information on reasons for being absent. Twenty-three percent and 9 % of health providers were absent from health facilities due to approved and unapproved reasons respectively. The approved reasons included that staff was absent due to: sickness or maternity (4 %), training or seminar (7 %), official mission (4 %), and other approved reasons (8 %). About one of ten providers were absent without approval. Among all providers, health post staff (16 %) are more likely to be absent without approval than other facility types. Health providers in Afar region (18 %) followed by SNNP (16 %), Dire Dawa and Benishangul Gumuz (14 % each), and Harari (13 %) regions are more likely to be absent. Providers in government managed facilities (10 %) are more likely to be absent compared with facilities managed by other authorities.

Discussion

The objective is to broadly assess the quality of health service delivery. The disease conditions were selected based on their relevance to the overall disease burden including maternal and child health issues. The assessment looked at how these health conditions are handled and managed by the health provider. The assessment of clinical knowledge is based on case simulations (clinical vignettes) for four selected health conditions. The vignettes are shown to exhibit a strong connection between the inputs provided during consultation and the ability of the clinician to properly diagnose the presented illness (Leonard 2005).

The construction of the case simulations and analyses of the responses, in general, follow the World Bank's Service Delivery Indicators (SDI) methodology. However, there are some differences between the standard SDI methodology and the clinical knowledge module implemented as part of the Ethiopian Service Provision Assessment survey. First, adjustment to the clinical knowledge questionnaire was made based on the national guidelines. Second, only some of the simulation cases are implemented because others are indirectly addressed in other parts of the SPA+ questionnaire. Third, the very front line providers who are working in the health posts were not included in the assessment. These groups of providers were excluded because their primary role was not providing

curative services. The four case simulations included in the clinical knowledge assessment module are pulmonary TB (PTB), malaria (malaria with anemia), post-partum hemorrhage (PPH) and birth asphyxia. Each case simulation was presented to the selected health provider for the interview.

Overall, the clinical knowledge interview collected information to roughly assess diagnostic accuracy and adherence to clinical guidelines for the above four disease conditions in all types of hospitals, health centers, and clinics. For each health condition diagnostic accuracy is measured as follows. A score of one is assigned if the correct diagnosis is mentioned. In some cases, some respondents provided multiple diagnoses. However, the diagnosis is still taken as correct as long as it is mentioned, irrespective of what other alternative diagnoses were given. In addition, some respondents provided a different name for the same diagnosis. For example, two other types of specific responses were recorded for PPH diagnosis. These are uterine atony and genital tract injury. These two responses were therefore coded as correct diagnosis as they are even more precise in inferring to the primary cause of the diagnosis (PPH). Similarly, malaria is accepted as an alternative correct response for the "malaria-with-anemia" case study. As a result, two estimates are presented; one with malaria-with-anemia and another one for malaria irrespective of any other diagnosis.

Assessment of adherence to clinical guidelines is based on required minimum knowledge; the assessment considered only the most critical items that need to be undertaken in client history taking, physical examination, tests and investigations as well as treatment and general management and treatment of the specific disease condition. The objective of measuring adherence to clinical guidelines is to know if the health provider inquired the right questions while taking the client's history; undertook the required physical examination; conducted the right laboratory tests and investigations; and provided the correct treatment with the recommended health education. It should be noted that the implemented questionnaire actually included more relevant responses in each case. However; in the final analysis only those critical responses were considered.

This is the first published report on diagnostic capacity in Ethiopia and difficult to compare and discuss with other similar studies conducted in country, but other similar studies have been conducted in Kenya. There are no methodological differences in the study conducted but there is a difference in selecting disease conditions (Martin 2013). Therefore, only similar disease conditions that were assessed are compared.

The results presented in this study suggest problems with diagnostic accuracy, adherence to guideline, and staff absenteeism, particularly in the private sector except for absenteeism. Multiple conditions contribute to this problem, including inadequate education and training capacity, negative work environments, weak human resources regulatory and management systems, and inadequate financial and non-financial incentives (Chen 2004; Jimba 2010). Providers diagnostic accuracy for tuberculosis and malaria with an anemia in Ethiopia (86, 6 %respectively) is very low as compared to Kenya (97, 35 %respectively) (Martin 2013), the findings indicated that unapproved absenteeism in Ethiopia is higher than reports from Kenya (3.4 %) (Martin 2013).

A literature indicates that human resource programs (Rondeau 2001), human resource outsourcing (Kinange 2011), employer programs (Wendt 2010), and employee recognition (Hassink 2009) had no statistical association neither decreased absenteeism nor a sustained reduction in absenteeism. Research regarding factors such as workload (Rauhala 2007), job satisfaction (Cummings 2008), recognition (Werner, 1992), shift work, (Admi 2008) and consistent client assignment was explored with none demonstrating a sustained decreased absenteeism.

Finally, the developments of evidence-based protocols or standards for providing quality health services are urgently needed. This shows a huge gap and must be filled if basic standards for clinical assessment are to be met by the health care providers specifically in private sector.

Conclusion

Overall diagnostic accuracy based on the average of four disease conditions is low. It varied by disease conditions, professional category, and facility type. Adherence to clinical guidelines considering client history taking, physical examination, investigations, and treatment and general management of the disease condition has shown considerable practice gap.

Competing Interest: Authors declare that they have no competing interest.

References

- Admi H, Tzischinsky O, Epstein R, Herer P & Lavie P (2008). Shift work in nursing: Is it Really a Risk Factor for Nurses' Health and Patients' Safety? *Nursing Economics*, 26(4): 250-257.
- Bowen S & Zwi AB (2005). Pathways to "evidence-informed" policy and practice: a framework for action. *PLoS Medicine*, 2(7):1-14.
- Campbell J, Buchan J, Cometto G, David B, Dussault G, Fogstad H, et al. (2013). Human resources for health and universal health coverage: fostering equity and effective coverage. *Bulletin of the World Health Organization*, 91:853-863.
- Central Statistical Agency of Ethiopia and ICF International (2012). Ethiopia Demographic and Health Survey. Addis Ababa, Ethiopia, and Calverton, Maryland, USA: *Central Statistical Agency and ORC Macro*.
- Chen L, Evans T, Anand S, Boufford JI, Brown H, Chowdhury M, et al. (2004). Human resources for health: overcoming the crisis. *Lancet*, 364:1984-90.
- Clancy CM & Cronin K (2005). Evidence-based decision making: global evidence, local decisions. *Health Affairs*, 24(1):151-162
- Cummings GG, Olson K, Hayduk L, Bakker D, Fitch M, Green E, et al. (2008). The relationship between nursing leadership and nurses' job satisfaction in Canadian oncology work environments. *Journal of nursing management*, 16: 508-518.
- FmoH (2010). Health Sector Development Plan IV (HSDP IV) 2010/11 - 2014/15. Addis Ababa, Ethiopia: Federal Democratic of Ethiopia, Minister of Health.
- Hassink WHJ & Koning P (2009). Do Financial Bonuses Reduce Employee Absenteeism? Evidence From A Lottery. *Industrial and Labor Relations Review*, 62(3):327-342.
- Kinange UM & Murugaiah V (2011). Human Resource Outsourcing: A New Mantra for Business Sustenance. *Procedia – Social and Behavioural Sciences*, 25:227-232.
- Kinfu Y, Poz MRD, Mercer H & Evans DB (2009). The health worker shortage in Africa: are enough physicians and nurses being trained? *Bulletin of World Health Organization*, 87:225-30.
- Leonard KL & Masatu MC (2005). The use of direct clinician observation and vignettes for health services quality evaluation in developing countries. *Social Science and Medicine Journal - Elsevier*, 61(9):1944-51.
- Martin GH & Pimhidzai O (2013). Service delivery indicators: Kenya. Washington, DC: World Bank Group.
- McPake B, Maeda A, Araujo EC, Lemiere C, El Maghraby A, Cometto G, et al (2013). Why do health labour market forces matter? *Bulletin World Health Organization*, 91:841-6.
- Rauhala A, Kivimaki M, Fagerstrom L, Elovainio M, Virtanen M, Vahtera J, et al. (2007). What degree of work overload is likely to cause increased sickness absenteeism among nurses? Evidence from the RAFAELA patient classification system. *Journal of Advanced Nursing*, 57:286-295.
- Richard MS, Jenny XL, Yohannes K & Mario RD Poz (2008). *Bulletin of the World Health Organization*, 86(7):497-576.

- Rondeau KV & Wagar TH (2001). Impact of Human Resource Management Practices on Nursing Home Performance. *Health Services Management Research*, 14:192-202.
- Scheffler RM, Mahoney CB, Fulton BD, Poz MRD & Preker AS (2009). Estimates of health care professional shortages in Sub-Saharan Africa by 2015. *Health Aff (Millwood)*, 28:849–62.
- Sheldon TA (2005). Making evidence synthesis more useful for management and policy-making. *Journal of Health Services Research and Policy*, 10 (Suppl. 1):1–5.
- Wallace A, Croucher K, Quilgars D & Baldwin S (2004). Meeting the challenge: developing systematic reviewing in social policy. *Policy Politics*, 32:445–470.
- Wendt JK, Tsai SP, Bhojani FA & Cameron DL (2010). The Shell Disability Management Program: A Five-Year Evaluation of the impact on absenteeism and return-on-investment. *Journal of Occupational and Environmental Medicine*, 52, 5 (2010):544-550.
- Werner GA (1992). Employee Recognition: A Procedure to Reinforce Work Attendance. *Behavioural Residential Treatment*, 7(3):199-204.