



Health Professionals Perception and Satisfaction on Quality of Laboratory Malaria Diagnostic Service; the Case Awi Zone, North Ethiopia

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Abstract

Background: Inappropriate perception and inadequate satisfaction of health workers pose significant challenges on malaria diagnostic services in the fight against malaria. Such information however is a gap in most rural health facilities.

Objective: The study assessed Health Professionals perception and their satisfaction towards malaria quality diagnostic service in Northern Ethiopia.

Methods: A cross-sectional facility-based study was conducted in 2013 among 136 participants (110 clinicians and 26 laboratory professionals) engaged in malaria management. Level of perception and satisfaction was measured using a validated structured questionnaire. The structured data were entered using Epi-Info version 3.5.3 and analyzed by SPSS version 20.

Result: About 61% (67/110) of the clinicians and 50% (13/26) of laboratory professionals were satisfied with the quality of work. Those clinicians who request laboratory malaria diagnosis based on sound clinical judgment were more satisfied (AOR=3.12, 95% CI = 1.06 to 9.13) than their counterparts while those who trust laboratory malaria diagnostic result as just reliable were 68.0% (AOR=0.32, 95% CI = 0.13 to 0.83) less likely to be satisfied than the referent groups. Laboratory professionals with no limiting factors for laboratory diagnosis were 30.6 times (AOR=30.6, 95% CI = 1.83 to 511.8) more satisfied on the service compared with those who had constraints in their health facility.

Conclusion: The level of health professional satisfaction in the current study was not encouraging and is lower than some previous studies focusing on general services in the country. Thus, targeting the identified limiting factors are crucial steps to consider in the fight against malaria.

Keywords: Health professional; Malaria; Awi zone; Ethiopia

Abbreviations

AAU: Addis Ababa University; AOR: Adjusted Odds Ratio; COR: Crude Odds Ratio; HO: Health Officer; LAB: Laboratory; PA: Principal Author; RDT: Rapid Diagnostic Test; TAT: Turn Around Time; WHO: World Health Organization

Introduction

It is estimated that three-fourths of the land below 2000 meters is malarious with two-thirds of the Ethiopian population being at risk. The problem of malaria is very severe in Ethiopia where it has been the major cause of illness and death for many years [1]. This makes malaria the single most important health problem in Ethiopia and underlines the significant role of careful clinical examination and laboratory investigation in the control and prevention of malaria [2]. WHO recommends that before giving treatment, clinical malaria should be confirmed by parasite based diagnosis [3]. Nonetheless, in many countries, laboratory services are grossly neglected and under-utilized, and often treat patients according to their empirical clinical judgment leading to the misuse of drugs and other resources [4].

On the other hand, lack of professional development/opportunity for training, lack of additional

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benefit and appreciation or recognition from management, infrastructure/physical facility, supply of electricity and water, insufficient reagents and equipment, and also shortage of manpower affects the timely patient management [5,6].

Parasitological diagnosis like microscopy or rapid diagnostic tests are precise indicators of prevalence and incidence for effective control of malaria indicating that laboratory diagnosis is an important component of case management and control of malaria [5,6]. In Ethiopia, except for health posts, all health care facilities provide laboratory services. The laboratory services, however, vary at different organizational levels [7]. The dependence of patient management on laboratory data highlights the need for ensuring the quality of these services. Delays in reporting laboratory results can cause a concomitant delay in the diagnosis and management of patient [8,9].

Measurement of health professional satisfaction brings preferences into the quality assessment process and corrects for mistaken assumptions about which particular aspects of service providers value most [4,10]. Such information however is limited in the studied site and thus the study assessed of the perception and satisfaction of health professionals towards malaria laboratory diagnosis and ultimately to improve patient management as well as allow health workers including responsible bodies to uncover the limiting factors in the overall quality of malaria laboratory diagnosis services.

Methods

Study area and population

The study was conducted in Awi Zone Amhara National Regional State, North Western Ethiopia, at a distance of 420 km from Addis Ababa. The zone has high risk malaria areas. This paper is based on the first quantitative and qualitative study of a representative sample of patient participants drawn from three randomly selected malaria endemic woredas of the eleven woredas of Awi zone from November to December 2013. All the 12 health centers available in the three woredas, namely Dangla, AnkeshaGuagusa and Chagni at the time of the study were included.

Sample size determination, data collection, processing and analysis

Pretested structured and validated questionnaire was used to collect the data from clinicians and laboratory professionals. The interview instrument was initially prepared in English and translated into the local language (Amharic and Awigna) as appropriate and back translated into English and the tool was found highly consistent. Pilot testing of the instrument and field work was done by the Principal Author (PA), a native speaker of the local language. A total of 136 participants (110 clinicians, 26 laboratory professionals), who were directly engaged in malaria detection and treatment were included in the study.

The important variables included in the tools were the level of satisfaction (Routine test turnaround time for malaria, Quality/reliability of lab malaria result, Matching of clinical data with lab results of malaria diagnosis, availability of lab malaria test result, courtesy of clinical lab staffs, enough equipment to provide malaria lab service, availability of supplies and reagents and human resource to provide malaria diagnostic lab service), and socio-demographic variables. In addition, unequal workload, lack of professional development, lack of appreciation, poor working condition and lack

of training information were collected using a 5-point Likert scale ranging from poor (1 point) to excellent (5 points) was used for few items. All the respondents were interviewed on a one-to-one basis by the principal author and notes were taken for all administered open-ended questions which were transcribed thematically according to the emerged team. The interviews lasted for about 60 min and were conducted after the clinic hours.

The structured data were coded and edited manually initially, and then entered and organized using Epi Info version 3.5.3 and exported to SPSS version 20 for descriptive and inferential analyses. The mean Likert scale score or weighted average was used to categorize the satisfaction level as satisfied when the score is \geq the mean score while the value below the mean score was taken as dissatisfied. The overall rate of satisfaction by Likert scale was calculated as $(\text{No. of excellent rating} \times 5) + (\text{No. of very good rating} \times 4) + (\text{No. of good rating} \times 3) + (\text{No. of fair rating} \times 2) + (\text{No. of poor rating} \times 1)$ divided by the total number of responses for the specific item [11].

Both bivariate and multivariate logistic regressions were employed to examine the associations between the outcome variables (perception and satisfaction towards lab malaria diagnostic services) with the various independent factors (socio-demographic and other important variables mentioned above), and the results are presented using Odds Ratios (ORs) and Confidence Intervals (95% CI).

Result

Socio-demographic characteristics of the study participants

Of the 136 health workers 135 participated in the study with a response rate of 99.3%. Males were slightly over half (53.2%) and 48 (46.8%) were females aged between 18 and 55 years. Results of the salient features of the respondents are presented in the following orders: Information on health facilities with their corresponding respondents; clinicians view towards malaria diagnosis and their mean rating score for measuring items of satisfaction including the major determinant variables; and limiting factors for laboratory professional respondents satisfaction on malaria diagnostic service with their major determinants.

Information on health facilities with their corresponding respondents

Altogether 12 health centers which were directly engaged in malaria detection and treatment were included in the study and the detail is shown in (Table 1). As displayed in the table, the types of health workers interviewed in the entire health centers at the time of the study were laboratory workers and clinicians which included nurses and health officers only.

Clinicians view towards laboratory malaria diagnostic service

About two-thirds (62.7%) of respondents requested malaria laboratory diagnosis frequently and over half (52.0%) mentioned for confirmation of malaria diagnosis. Forty-one (37.3%) requested laboratory diagnostic services less frequently since they depended on clinical sign and symptoms of malaria (81.0%). The vast majority (93.6%) trusted the lab results and the reasons provided were presence of competent, motivated and skilled laboratory staffs in nearly quarter of them (23.8%) and about the same number of respondents mentioned the use of more than one testing methods (microscopy and RDT) as their major reason. Over half (54.1%) clinicians

Table 1: Information on health facilities with their corresponding respondents, North Ethiopia, 2013.

Health Centers Names	Number of health professionals interviewed in each health facility
Agew Gimjabet,	4 Lab Workers, 13 Clinicians
Wumbry- Wundigy	1 Lab Worker, 8 Clinicians
Chagni	5 Lab Workers, 19 Clinicians
Gissa	2 Lab Workers, 8 Clinicians
Azena	3 Lab Workers, 13 Clinicians
Ayehu	1 Lab Worker, 5 Clinicians
Degera	1 Lab Worker, 7 Clinicians
Buya	1 Lab Worker, 5 Clinicians
Gumdry	2 Lab Workers, 9 Clinicians
Chara,	2 Lab Workers, 8 Clinicians
Affessa	2 Lab Workers, 9 Clinicians
Abadra	2 Lab workers, 6 clinicians
Total	26 Lab workers, 110 clinicians

All clinicians available in the health centers were health officers and nurses only

perceived that they had high priority for patient satisfaction in their health facility (Table 2).

Table 3 displays the response scale of eight items for perception and satisfaction towards lab malaria diagnostic service. The highest mean rating score was noted for courtesy of clinical laboratory staffs which was 4.4 and the lowest rating score was for adequacy of human resource to provide malaria lab diagnostic service and accounted for 3.4. The weighted average for routine Test Turnaround Time (TAT) for malaria, Quality/reliability of lab malaria result, matching clinical data with lab results of malaria diagnosis, availability of lab malaria test result, enough equipment to provide malaria lab service, enough supplies and reagents to provide malaria and diagnostic laboratory service were 3.7, 3.8, 3.7, 4.1, 3.6, and 3.7, respectively.

The overall mean score or cut-off point obtained for the given variables was 30. Based on this, 60 (61.2%) of clinician respondents were satisfied on the health center’s laboratory malaria diagnostic service whereas only 13 (50.0%) of laboratory professional were satisfied on the malaria lab diagnostic service they are providing (Figure 1).

As shown in Table 4, requesting lab investigation and trusting the lab result were the predictors for the outcome variables. Those clinicians who requested lab malaria diagnosis based on good clinical judgment were 3 times more likely to be satisfied (AOR=3.12, 95% CI = 1.06 to 9.13) in malaria lab diagnostic service than those who request frequently for every febrile illness. Likewise, those clinicians who trust lab malaria diagnostic result as just reliable were 68.0% (AOR=0.32, 95% CI = 0.13 to 0.83) less likely to be satisfied than those who trust the result as very reliable. On the other hand; age, sex, marital status, ethnicity, work area, professional rank, current status, and work experience in the health profession field of clinicians had no statistically significant influence on their satisfaction.

Laboratory professionals’ satisfaction on malaria diagnosis service

The limiting factors for satisfaction of laboratory professional respondents on malaria diagnostic service are depicted in Table 5. Over three quarters (76.9%, 20/26) strongly agreed that lack of professional development is a major limiting factor affecting the

Table 2: Clinicians’ utilization and satisfaction on laboratory malaria diagnosis in selected health centers, North Ethiopia, 2013 (n=110).

Respondents’ Characteristics	Frequency	Percent
Requesting lab confirmation		
For all febrile illnesses (frequently)	69	62.7
Based on clinical judgments	41	37.3
Reason for requesting frequently		
To confirm malaria	39	52
For differential diagnosis	9	12
Combined	27	36
Reason for requesting less frequently		
Based on sign and symptom of patients	42	81.0
Only when laboratory is open	1	1.9
Only if patients ask	1	1.9
When managing fewer patients	8	15.4
Trust laboratory results		
Reliable	55	50
Just reliable	48	43.6
Not reliable	7	6.4
Reason for very reliable response		
Presence of competent, motivated & skilled staffs	15	23.8
The lab has adequate equipment	13	20.6
The lab uses more than one testing	15	23.8
Combined	20	31.7
Reason for just reliable response		
Complexity of identifying the parasites	28	43.1
Incompetent lab personnel	1	1.5
Lab personnel are over worked	16	24.6
Poor state of microscopes and/or reagents	13	20
Other	7	10.8
Importance of patient satisfaction		
High priority	59	54.1
Mid-level priority	49	44.9
Low priority	1	0.9

quality of malaria diagnosis service. Lack of in-service training 14 (53.8%), excessive work load 12 (46.2%) and lack of appreciation by the management 6 (23.1%) were strongly stated by respondents as additional factors for dissatisfaction.

Laboratory professionals that had no constraints for laboratory diagnosis were 30.6 times (AOR=30.6, 95% CI = 1.83 to 511.8) more likely to be satisfied with the service than those who had constraints in their health facility. Other presumed factors like age, sex, marital status, ethnicity, work area, level of education, responsibility in the laboratory, and experience on malaria diagnosis did not show any significant association with the satisfaction of lab professionals (Table 6).

Discussion

Medical personnel’s satisfaction with laboratory service is of utmost important as a feedback for quality of laboratory services [12]. In this study, 61.2% clinicians were satisfied with malaria laboratory

Table 3: Mean rating score for measuring items of satisfaction for clinicians' in selected health centers in North Ethiopia, 2013 (n=98).

Respondents' perception and satisfaction	Excellent	Very good	Good	Fair	Poor	Weighted average
	N (%)	N (%)	N (%)	N (%)	N (%)	
Routine test turnaround time for malaria	15 (15.3)	45 (45.9)	35 (35.7)	3 (3.1)	-	3.7
Quality/reliability of lab malaria result	17 (17.3)	52 (53.1)	25 (25.5)	4 (4.1)	-	3.8
Matching clinical data with lab results of malaria diagnosis	11 (11.2)	53 (54.1)	32 (32.7)	2 (2.0)	-	3.7
Availability of lab malaria test result	34 (34.7)	41 (41.8)	21 (21.4)	2 (2.0)	-	4.1
Courtesy of clinical lab staffs	46 (46.9)	45 (45.9)	6 (6.1)	1 (1.0)	-	4.4
Enough equipment to provide malaria lab service	21 (21.4)	39 (39.8)	23 (23.5)	5 (5.1)	10 (10.2)	3.57
Enough supplies & reagents to provide malaria diagnostic lab service	24 (24.5)	40 (40.8)	22 (22.4)	2 (2.0)	10 (10.2)	3.67
Enough human resource to provide malaria diagnostic lab services	13 (13.3)	35 (35.7)	34 (34.7)	9 (9.2)	7 (7.1)	3.4

Table 4: Univariate and Multivariate analysis for some determinant variables of clinicians' perception and satisfaction in selected health centers, North Ethiopia, 2013 (n=110).

Characteristics	Outcome		COR (95% CI)	AOR (95% CI)
	Satisfied (≥ 30)	Dissatisfied (≤ 29)		
	n (%)	n (%)		
Sex				
Male	32 (57)	24 (43)	1	
Female	34 (63)	20 (37)	1.32 (0.58-2.99)	
Work area				
Rural	42 (60)	28 (40)	1	
Urban	24 (60)	16 (40)	1.00 (0.44-2.43)	
Current status				
HO	6 (43)	8 (57)	1	1
Nurse	60 (62.5)	36 (37.5)	2.22 (0.69-10.3)	2.25 (0.51-10.0)
Work experience in the health profession field				
2-Jan	20 (52.6)	18 (47.4)	1	1
5-Mar	26 (66.7)	13 (33.3)	1.94 (0.73-5.2)	2.62 (0.82-8.43)
10-Jun	11 (61.0)	7 (39.0)	1.48 (0.44-4.99)	1.66 (0.43-6.36)
>10	9 (60.0)	6 (40.0)	1.42 (0.39-5.24)	2.01 (0.43-9.53)
Request for lab malaria diagnosis				
For all febrile illnesses	38 (55)	31 (45)	1	1
Based on clinical judgments	28 (68)	13 (32)	1.76 (0.83-4.85)	3.12 (1.06-9.13)
Trust lab malaria diagnosis result				
Very reliable	39 (71)	16 (29)	1	1
Just reliable	24 (50)	24 (50)	0.38 (0.16-0.89)	0.32 (0.13-0.83)
Not reliable	3 (43)	4 (57)	0.19 (0.02-2.26)	0.09 (0.01-1.36)

Table 5: Limiting factors for laboratory professional respondents' satisfaction on malaria diagnostic service in selected health centers, North Ethiopia, 2013 (n=26).

Characteristics	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
	N (%)	N (%)	N (%)	N (%)	N (%)
Excessive workload	12(46.2)	9(34.6)	1(3.8)	2(7.7)	2(7.7)
Lack of career development	20(76.9)	4(15.4)	-	1(3.8)	1(3.8)
Unappreciated by the management	6(23.1)	10(38.5)	4(15.4)	5(19.2)	1(3.8)
Poor working condition	4(15.4)	9(34.6)	-	9(34.6)	4(15.4)
No opportunity of job training	14(53.8)	11(42.3)	-	-	1(3.8)

service delivery. When compared with the finding of Tanzania (75.0%) and eastern Ethiopia (80.0%), our finding is relatively low probably due to the variation in the areas covered [7,12,13].

Quality and reliability of results and routine Test Turnaround (TAT) are the most important component of malaria laboratory services for clinicians [9]. In addition, TAT is one of the most

Table 6: Univariate and Multivariate analysis for some determinant variables of lab professionals' perception and satisfaction in selected health centers, North Ethiopia, 2013 (n=26).

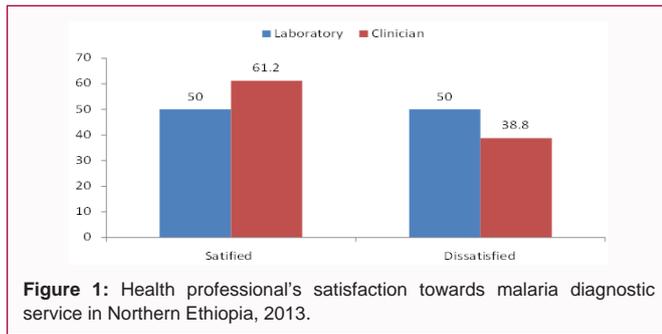
Variable	Outcome		COR (95% CI)	AOR (95% CI)
	Satisfied (≥ 22)	Dissatisfied (≤ 21)		
	n (%)	n (%)		
Age				
18-25	10 (50)	10 (50)	1.00 (.161-6.2)	
26-35	3 (50)	3 (50)		
Sex				
Male	8 (50)	8 (50)	1	
Female	5 (50)	5 (50)	1.00 (.206-4.856)	
Marital status				
unmarried	11 (57.9)	8 (42.1)	1	1
Married	2 (28.6)	5 (71.4)	0.291 (0.045-1.898)	0.489 (0.041-5.86)
Ethnicity				
Awi	5 (35.7)	9 (64.3)	1	1
Amhara	8 (66.7)	4 (33.3)	3.600 (0.710-18.254)	8.011 (0.483-132.938)
Work area				
Rural	9 (52.9)	8 (47.1)	1	
Urban	4 (44.4)	5 (55.6)	0.711 (0.14-3.606)	
Level of education				
Lab technician	12 (52.2)	11 (47.8)	1	
Lab technologist	1 (33.3)	2 (66.7)	0.458 (0.036-5.789)	
Responsibility				
Lab head	4 (36.4)	7 (63.6)	1	
Unit leader	2 (66.7)	1 (33.3)	3.5 (0.236-51.899)	
Subordinate	7 (58.3)	5 (41.7)	2.45 (0.456-13.161)	
Experience on malaria diagnosis				
Adequate	6 (75)	2 (25)	1	1
Medium	6 (40)	9 (60)	0.222 (0.033-1.493)	0.16 (0.008-3.219)
Inadequate	1 (33.3)	2 (66.7)	0.167 (0.009-2.984)	0.203 (0.004-9.439)
Training for lab malaria diagnosis				
Yes	6 (60)	4 (40)	1	
No	7 (43.8)	9 (56.2)	0.519 (0.104-2.581)	
Lab constraint out come				
Yes	3 (21.4)	11 (78.6)	1	1
No	10 (83.3)	2 (16.7)	18.333 (2.522-133.26)	30.6 (1.83-511.8)

noticeable aspects of laboratory service and is often used as a key performance indicator. In this study quality/reliability of lab malaria result of 95.9% and routine TAT for malaria of 96.9% were found indicating that clinician satisfaction was acceptable.

Regarding compatibility of laboratory results with patient condition, majority of the clinicians were satisfied and this finding is better than previous study conducted in Gondar university hospital nurses and physicians [14]. The discrepancy observed is due to the fact that the study in Gondar University Hospital assessed all types of laboratory services while in our study only malaria diagnostic service was considered.

WHO recommends any clinical malaria to be confirmed by parasite-based diagnosis before treatment in microscopic health

facilities [3]. In accordance with the WHO recommendation, nearly two-thirds of the clinicians complied with the guideline and requested for parasitological confirmation of suspected malaria despite the availability of the lab services in all the facilities enrolled. It is apparent that clinicians, who treat patients according to their empirical clinical judgment exclusively leads to misdiagnosis, wastage of resource and misuse of drugs [4,13] suggesting that confirmatory diagnosis is crucial [15]. Nevertheless, in facilities where parasitological diagnosis is not possible, WHO also recommends treatment solely on the basis of clinical symptoms [3]. In our study, those clinicians who requested lab malaria diagnosis based on clinical sign and symptom of patients were more satisfied than those who requested lab services always for any febrile illness and deserves the attention of clinicians for proper utilization and management of the available resources.



Based on the open-ended findings, both clinician and lab professionals were less satisfied in terms of equipment, supplies and reagents, lack of on job training, career development and shortage of human resource to provide malaria diagnostic lab services. These factors identified as bottlenecks to the provision of high-quality laboratory services in our study as well as in most developing countries [16] underline the need for more attention of government as well as stakeholders working in the fight against malaria. Furthermore, client satisfaction on malaria diagnostic service was stated invariable by all respondents as a key indicator for measuring service quality. Because sometimes death due to malaria was reported mainly due to transport and financial constraints as well as unavailability of drugs temporarily which is concordant with the study from Zanzibar where death due to malaria occurred due to delay of mothers to bring their children to health facility [17] again a finding which needs the attention of the concerned authorities.

Conclusion

The observed level of health professional satisfaction in the current study though encouraging when compared with some previous studies conducted in Gondar University referral Hospital, North Ethiopia, it is still low. Targeting the identified limiting factors are therefore some of the crucial steps to consider in improving the laboratory diagnostic service in the fight against malaria.

Strength and Limitations

This study was done during the malaria season and it is the first of its kind, using structured and open-ended questionnaires including suggestions from the respondents as a means to scale up in the enhancement of malaria laboratory diagnostic service. Nonetheless, it was not easy to measure the temporal relationship since both exposure and outcome variables were collected simultaneously, inadequacy of sample size of laboratory professionals were also some of the limitation of the study.

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Ethical Considerations

The study protocol was approved by the Research and Ethical Clearance Committee of the Medical Laboratory Science Department; Addis Ababa University and permission was obtained from Amhara Regional Health Bureau and the respective administrative offices.

After the study had been explained to participants, an informed consent was obtained from each of them.

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