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# Assessment of knowledge, attitude, practice and associated factors towards traditional medicine among health professionals in Dire Dawa, East Ethiopia: A cross-sectional study

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## Abstract

**Background**: The World Health Organization defines traditional medicine (TM) as "health practices, approaches, knowledge, and beliefs applied to diagnose, prevent, and treat disease." Evidence indicates 80% of the world's population, including Africa, continue to utilize TM. Unfortunately, studies on TM practices among health professionals in Ethiopia are limited. Therefore, this study aimed to assess the knowledge, attitudes, practices, and associated factors towards traditional medicine among healthcare professionals in Dire Dawa, Ethiopia.

**Methods**: A cross-sectional study was conducted among systematically selected 231 healthcare professionals in April 2018. Data entry and analysis were performed using Epi Data and SPSS version 20, respectively. Binary logistic regression analysis was performed to identify these factors. An adjusted odds ratio with a 95% confidence interval (CI) was used to determine statistical significance.

**Results**: In this study, 219 health professionals from nine public health facilities (two hospitals and seven health centers) with an age range of 20–52 years were participated. A total of 110 (50.2%) of the health professionals had ever used TM. While 145 (66.2%) had a positive attitude towards TM, and 71.7% had a positive perception on education toward TM. Those who with a positive attitude towards TM were 2.53 times more likely to practice TM than those with a negative attitude (p = 0.002).

Conclusion: A significant proportion of healthcare professionals know traditional medicine (TM) and have a positive view of its practice. However, there is a gap regarding the source of knowledge acquisition, with the majority from their families. Therefore, it is essential to integrate TM into Ethiopia's formal education and healthcare system.

**Keywords**: Practice, traditional medicine, healthcare professionals

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## 1. Introduction

Traditional medicine (TM), defined by the World Health Organization (WHO), encompasses knowledge, practices, attitudes, and beliefs that employ the use of plants, animals, mineral-based, spiritual, and other techniques to prevent, diagnose, and treat diseases [1-3]. TM is also known as an alternative medicine, and its practices include ethnomedicine, ethnobotany, and anthropology [4]. Evidence shows that the study of traditional medicine started 5000 years ago in the world; for instance, ancient Sumerian studies started 5000 years ago on TM, and this `study was able to describe the well-established medical uses of plants [5].

Unfortunately, In Ethiopia, the documentation of traditional medicine (ETM) has been inadequate, and traditional healers often employ herbal remedies in Ethiopia [6], there is no clear cut off point for traditional medicine practice, but it is believed to be 849 dates back during the rule of Abba Yohannes the head of Ethiopian orthodox church [6]. At this time, there was an epidemic of plague and famine, which resulted in certain public health problems leading to the practice of TM. The most common traditional medicines practiced in Ethiopia for the treatment of diseases are herbs or plants, spiritual healing, and bone setting [7].

Herbal medicine was used before the advancement of modern medicine for many reasons, such as its intrinsic qualities, uniqueness, and holistic approach as well as its accessibility and cost-effectiveness, which made traditional medicine acceptable and practiced in both developed and undeveloped countries [8]. The WHO estimated that almost 80% of the population in Africa, Latin America, and Asia continue to practice TM, while many of these countries have developed policies as part of their primary health care systems in order to alleviate the public health problems of their countries [2, 3]. In addition, a significant number of industrialized nations are using traditional medicine on a regular basis to meet their medicinal demand: 48% in Australia, 42% in the United States, 70% in Canada, and 49% in France. while in developing countries, 71% in Chile, and 40% in Colombia [3, 9, 10]. In Ethiopia, TM remains part of their lives; of the total population, almost 90% practice traditional medicine [10, 11].

Traditional practitioners and healers are assumed to be a first-line healthcare providers, and modern healthcare systems are derived from traditional practices through the modernization of health services. The World Health Organization (WHO) has developed policies and regulations to encourage its use. However, this was not associated with its use [12, 13]. For healthcare providers in developing countries, there is no training or research directed toward knowledge, practice, and attitude owing to a lack of resources or budget, which may help them increase service and link with the modern healthcare systems [3].

Over the past ten years, traditional medicine has become very popular in Ethiopia, partly because of the long, unsustainable economic situation in the country. Knowledge is acquired in different ways: culturally, through reading and education, oral family routes in adulthood, friends, observation of practice, and religious books [13]. For this reason, in our country, the integration between the modern healthcare system and traditional medicine has not been well investigated, especially the knowledge, attitude, and practice of health professionals; therefore, this study will assess and provide information about healthcare professionals' knowledge, attitudes, practices, and factors associated towards TM at public health facilities in Dire Dawa, Ethiopia.

## 2. Methods

### 2.1 Study area and study period

Dire Dawa lies in the eastern part of Ethiopia, which is 515 km away from Addis Ababa the capital city of Ethiopia. It is also located at latitudes and longitudes of 9°36′N, 41°52′E and 9°36′N, 41°52′E, respectively. According to the official websites of the Dire Dawa Administration (DDA) for 2022, a total of 521,000 populations, and the administration is subdivided into urban and rural kebeles [14].

### 2.2 Study design

A cross-sectional study was conducted among health professionals at public health institutions.

### 2.3 Source population

All health professionals working at public health facilities in Dire Dawa City Administration

### 2.4 Study population

All health professionals who are selected systematically from all health facilities

### 2.5 Inclusion and exclusion criteria

The inclusion criteria were as follows: all healthcare professionals who had been involved in patient treatment and care in different units of public health facilities during data collection, willing to participate in the study, and had worked for at least six months prior to data collection. The exclusion criteria were as follows: severely sick or unable to communicate during data collection time.

### 2.6 Sample size determination

The study sample size was determined by using single population proportion formula with the assumptions of a 95% level of confidence interval (CI), 5% margin of error, and 56%

proportion of traditional medicine practice, and 71% of positive traditional medicine attitude, which was taken from a previous study conducted in Ethiopia [15, 16] with 10% non-response rate.

$$n = \frac{(Z\alpha/2)^2 P(1-P)}{d^2} = 316$$

Hence the source population was 473, which is below 10, 000 then using the correction formula =231 was finally taken as sample size.

**2.7 Sampling procedure**

There were nine public health facilities in the town (i.e., Addis Ketema = 29, Melka Jebdu = 32, Dechatu = 24, G/Kore = 26, Leghare = 38, G/Gerda = 24, Sabiyan = 38, Goro = 23, and Dilchora hospital = 239), and 473 health professionals. Based on the proportional formula, samples were distributed to each facility.

$$n_j = \frac{n\, N_j}{N}$$

Where,

n=sample size required for the survey, which was previously calculated (231 professionals).

Nj = total profession of the jth health facilities.

N = N1+N2+ … +N9 total professionals of health facilities in the Dire Dawa town.

Nj1= n Nj= 231(26)/473 = 26+, +, +, +, +, +, + 231/473 = 231 N

(i.e., Addis Ketema = 14, Melka Jebdu = 16, Dechatu = 12, Gende Kore = 13, Leghare = 18, Gende Gerda = 12, Sabiyan = 18, Goro = 12, and Dil Chora = 116) and the study units were identified by calculating the Kth interval, and it was every other professional from their list. The first sample from each facility was determined using the lottery method

**2.8 Study variables**

***2.8.1 Dependent variable***

Knowledge, attitude and practice of health professional toward traditional medicine

***2.8.2 Independent variables***

Different studies have shown different independent variables associated with the perception and practice of traditional medicine by considering the following variables as independent

variables: sociodemographic factors, accessibility (time, money, distance), acceptability, and type of disease.

### 2.9 Operational definitions

**Traditional medicine:** any kind of service or medication provided by traditional healers.

**Knowledgeable:** If the participant was able to answer knowledge questions above the mean score.

**Positive attitude:** If the participant is able to answer correctly above the mean score

**Negative attitude:** If the participant is able to answer correctly below the mean score

**Practice by health professionals:** if a professional currently uses traditional medicine or after being health professional.

### 2.10 Data collection tools

We used a self-administered structured questionnaire adapted from a previously published study [17]). The questions aimed to gather information from the selected study participants regarding the relevant socio-demographic characteristics of the respondents, knowledge, attitude, and practice of traditional medicine. The principal investigators and supervisors supervised the data-collection process. They ensured the clarity of the questions and clarified any ambiguity during data collection through strong communication with the data collectors.

### 2.11 Data quality controls

Data quality was ensured using different mechanisms. The data collection tool (questionnaire) was adopted from other published studies, adequate orientation was provided to supervisors and data collectors, a pre-test was performed at Dire Dawa Health Center, and necessary corrections were made based on the pre-test. Supervisors and principal investigators checked the completeness of the questionnaires on daily bases. Incomplete questionnaires were identified, and the data collectors were asked to refill them again if the respondents were voluntary; otherwise, the questionnaires were discarded and the complete data were fed to the computer by two different data entry clerks.

### 2.12 Data processing and analysis

Data were checked for completeness and accuracy by the principal investigator and supervisor. Data were exported to SPSS version 20.0 for analysis. Descriptive statistics such as proportions, appropriate graphic presentations, and measures of central tendency and dispersion were used to describe the data. Bivariate analysis of the demographic and other factors associated with KAP in patients with TM was performed. To ascertain this association,

variables found to be significant in bivariate analyses were used to construct a multivariate model. Using multivariate logistic regression analysis, odds ratio along with a 95% confidence interval (CI) at $P < 0.05$, was set to identify factors associated with traditional medicine among health professionals.

## 3. Results

### 3.1 Socio-demographic characteristics of the study participant

A total of 231 health professionals from nine governmental health facilities (two hospitals and seven health centers) were recruited for this study, with a response rate of 219 (94.8%). The ages of the participants ranged from 20 to 52 years (mean, 30.4 years). While 120 (54.8%) of the respondents were female, regarding the religious distribution of respondents, about 108 (49.3%) were Orthodox, followed by Muslim and Protestant, which constitute 76 (34.7%) and 28 (12.8%), respectively. Regarding marital status about 110 (50.2%) of the study participants were married and 104 (47.5%) were single. About half 108 (49.3%) of study subjects were nurses, and the other professions were pharmacy technologists 25 (11.4%), health officer 23 (10.5%), midwives 22 (10%), laboratory technicians 20 (9.1%), medical doctors (GP) 12 (5.5%), and others in descending order (Table 1)

Table 1: Socio-demographic characteristics of health professionals in Dire Dawa City Administration (n = 219).

| **Variable** | **Category** | | |
|---|---|---|---|
| | | Frequency | Percent (%) |
| Age | </=30 years | 139 | 63.5 |
| | >30 years | 80 | 36.5 |
| Sex | Male | 99 | 45.2 |
| | Female | 12 | 54.8 |
| Ethnicity | Somali | 11 | 5.00 |
| | Oromo | 84 | 38.4 |
| | Amhara | 91 | 41.6 |
| | Others | 33 | 15.1 |
| Religion | Muslim | 76 | 34.7 |
| | Orthodox | 108 | 49.3 |
| | Protestant | 28 | 12.8 |
| | Others | 7 | 3.20 |
| Marital status | Single | 104 | 47.5 |
| | Married | 11 | 50.2 |

| | | | |
|---|---|---|---|
| | Divorced | 3 | 1.40 |
| | Widowed | 2 | 0.90 |
| Educational level | Diploma | 57 | 26.0 |
| | Degree | 162 | 74.0 |
| Profession | Medical doctor | 12 | 5.50 |
| | Health officer | 23 | 10.5 |
| | Nurse | 108 | 49.3 |
| | Laboratory technologist | 20 | 9.10 |
| | Midwife | 22 | 10.0 |
| | Pharmacy technologist | 25 | 11.4 |
| | Others | 9 | 4.10 |
| Income category | </=5000 | 188 | 85.8 |
| | >5000 | 31 | 14.2 |
| Reason for utilization of TM | | | |
| Accessibility | Yes | 87 | 39.7 |
| Affordability | No | 132 | 60.3 |
| | Yes | 115 | 52.5 |
| Acceptability | No | 104 | 47.5 |
| | Yes | 131 | 59.8 |
| | No | 88 | 40.2 |

### 3.2 Knowledge

A large proportion of health professionals 193 (88.1%) knew about traditional medicine and regarded a source of knowledge some proportion of the study participants had more than one sources: from their families 113 (58.6%), followed by the media 33 (17.1%), and friends 31 (16.1%). Others obtained from books, magazines, and formal education (Table 2). Based on this study, only 38 (17.4%) of health professionals had a history of attending education or training in traditional medicine. Approximately, 163 (74.4%) of respondents preferred the use of modern medicine for their ailment treatment. With this, 13 (5.9%) preferred TM and the remaining 43 (19.6%) preferred to use one of the two modalities as needed.

The main reason for the preference for TM, as stated by the respondents, was its effectiveness 69.6%, followed by the lower cost of TM 44.6%, with the remaining preference for its quality, no/less side effect profile, and when modern medicine failed to cure the illness. Around 111 (50.7%) of the studied health professionals responded that both modern and traditional

medicine could be used together. However, only 64 (29.2%) of participants stated that traditional medicine practitioners (TMPs) had adequate knowledge. 177 (78.1%) of participants claimed that TMP should receive support from the government on particular topics such as dosage and side effects 140 (81.9%), hygienic preparation of medicine 134 (78.4%), diagnosis of health problems 121 (70.8%), revelation of indigenous knowledge, and sustainable use of medicinal plants 113 (66.1%) (Table 2).

Table 2: Knowledge of health professionals towards TM in public health facilities n Dire Dawa City Administration (n = 219)

| Variable | ***Category*** | ***Magnitude*** | |
|---|---|---|---|
| | | Frequency | Percentage |
| Knowledge about traditional medicine | Yes | 193 | 88.1 |
| | No | 126 | 11.9 |
| Source of knowledge | Family | 113 | 58.6 |
| | Media | 33.0 | 17.1 |
| | Friends | 31.0 | 16.1 |
| | Books/magazine | 14.0 | 7.30 |
| | Formal education | 8.00 | 4.10 |
| Education or Training about TM | Yes | 38.0 | 17.4 |
| | No | 181 | 82.6 |
| Importance of TM | very good | 22.0 | 10.0 |
| | Good | 121 | 55.3 |
| | Bad | 76.0 | 34.7 |
| Health care service preference | Modern | 163 | 74.4 |
| | TM | 13.0 | 5.90 |
| | Both | 43.0 | 19.6 |
| Uses of TM and Modern together | Yes | 111 | 50.7 |
| | No | 108 | 49.3 |
| TMPs knowledge | Yes | 64.0 | 29.2 |
| | No | 154 | 70.3 |
| TMPs should get support | Yes | 171 | 78.1 |
| | No | 48.0 | 21.9 |
| Type of support | Yes | 140 | 81.9 |
| Dose and advise | No | 31.0 | 18.1 |
| Hygienic preparation | Yes | 134 | 78.4 |
| Dx of health problems | No | 37.0 | 21.6 |
| Indigenous knowledge | Yes | 121 | 70.8 |
| Sustainable use of drugs | No | 50.0 | 29.2 |
| | Yes | 113 | 66.1 |
| | No | 58.0 | 33.9 |
| | Yes | 113 | 66.1 |
| | No | 58.0 | 33.9 |

### 3.3 Attitude

Of the total study population, 145 (66.2%) of them had a positive attitude towards traditional medicine. To clearly identify independent associated factors, bivariate analysis was conducted, and those variables showing independent association and/or p-value </= 0.25 were further analyzed in multivariate analysis. Multivariate analysis results revealed that acceptability, practice, and gender were independently associated with respondents' attitudes. Those male respondents have 2.72 odds of having a positive attitude towards traditional medicine than those of the female (AOR = 2.72, 95% CI 1.46–5.08).

Those study participants who reported acceptable practice of were 2.38 times more likely to had a positive attitude towards traditional medicine than those who said it was not acceptable (AOR = 2.38, 95% CI 1.29–4.37). And also, the likelihood of study participants who had ever practiced traditional medicine to had a positive attitude towards TM was 2.35 times higher than those who didn't use traditional medicine (AOR = 2.35, 95% CI (1.29–4.29) (Table 3).

Table 3: Bivariate and multivariate logistic regression analysis attitude of health professionals towards TM, in public health facilities in Dire Dawa City Administration (n = 219)

| Variables | Category | Attitude to TM | | Crude OR | Adjusted OR |
|---|---|---|---|---|---|
| | | Positive (%) | Negative (%) | 95% CI | 95% CI |
| Age | <= 30 | 89 (64.0) | 50 (36.0) | 0.76 (0.42, 1.38) | 0.85 (0.45, 1.62) |
| | >30 | 56 (70.0) | 24 (30.0) | 1.00 | 1.00 |
| Sex | Male | 76 (76.8) | 23 (23.2) | 2.44 (1.35, 4.41) | 2.72 (1.46, 5.08) * |
| | Female | 69 (57.5) | 51 (12.0) | 1.00 | 1.00 |
| Practice | Yes | 83 (75.5) | 27 (24.5) | 2.33 (1.31, 4.15) | 2.35 (1.29, 4.29) * |
| | No | 62 (56.9) | 47 (43.1) | 1.00 | 1.00 |
| Accessibility | Yes | 54 (62.1) | 33 (37.9) | 0.74 (0.42, 1.30) | 0.77 (0.41, 1.44) |
| | No | 91 (68.9) | 41 (31.1) | 1.00 | 1.00 |
| Acceptability | Yes | 95 (72.5) | 36 (27.5) | 2.01 (1.13, 3.55) | 2.38 (1.29, 4.37) * |
| | No | 50 (56.8) | 38 (43.2) | 1.00 | 1.00 |

*P-value < = 0.05, TM=Traditional Medicine

### 3.4 Practice

Of the total study population, 110 (50.2%) of them had ever practiced traditional medicine after becoming health professionals. To clearly identify independent associated factors, a bivariate analysis was conducted, and variables showing an independent association ($p \leq 0.25$ was further analyzed in multivariate analysis to avoid confounding factors. A multivariate analysis

was conducted, and the results showed that accessibility and positive attitudes were independently associated with respondents' traditional medicine practices (Table 4).

Those study participants who reasoned that accessibility was the main reason for high utilization of traditional medicine had better practice than those who did not, where the odds of yes for accessibility as a reason were 2.09 times greater than those who did not (AOR = 2.09, 95% CI (1.18–3.69)). The second factor associated with traditional medicine practices was respondents' attitudes. The study participants with a positive attitude towards traditional medicine were 2.53 times more likely to utilize or practice traditional medicine than those with a negative attitude (AOR = 2.53, 95% CI (1.04–4.58) (Table 4).

Table 4: Bivariate and multivariate logistic regression analysis on the TM practice of health professionals in public health facilities in Dire Dawa City Administration (n = 219)

| Variables | Category | TM practice | | Crude OR 95% CI | Adjusted OR 95% CI |
|---|---|---|---|---|---|
| | | Yes (%) | No (%) | | |
| Sex | Male | 53 (53.5) | 46 (46.5) | 1.27 (0.75, 2.17) | 1.29 (0.72, 2.30) |
| | Female | 57 (47.5) | 63 (52.5) | 1.00 | 1.00 |
| Educational level | Diploma | 32 (56.1) | 25 (4 3.9) | 1.37 (0.75, 2.53) | 1.46 (0.79, 2.71) |
| | Degree and above | 78 (48.1) | 84 (51.9) | 1.00 | 1.00 |
| Income | >5000 | 98 (52.1) | 90 (47.9) | 1.7 (0.79, 3.75) | 1.81 (0.81, 4.06) |
| | <= 5000 | 12 (38.7) | 19 (61.3) | 1.00 | 1.00 |
| Marital status | Married | 45 (43.3) | 59 (56.7) | 0.59 (0.34, 1.02) | 0.59 (0.34, 1.01) |
| | Other | 65 (56.5) | 50 (43.5) | 1.00 | 1.00 |
| Accessible | Yes | 52 (59.8) | 35 (40.2) | 1.89 (1.09, 3.28) | 2.09 (1.18, 3.69) * |
| | No | 58 (43.9) | 74 (56.1) | 1.00 | 1.00 |
| Attitude | Positive | 83 (57.2) | 62 (14.0) | 2.33 (1.31, 4.15) | 2.53 (1.40, 4.58) * |
| | Negative | 27 (36.5) | 47 (63.5) | 1.00 | 1.00 |

*P-value < = 0.05, TM-traditional medicine

## 4. Discussion

Much effort has been made to improve traditional medicine (TM) and many countries are integrating their healthcare services with TM. In different countries, traditional healers are legally supported to open their own service centers to provide health services, including in Ethiopia. However, the descriptive results of this study showed that integration was not sufficient and only 38 (17.4%) health professionals received formal education or training on

traditional medicine. Similar to this study, previous experience with positive outcomes had a positive effect on the development of positive attitudes. This finding was supported by a study conducted in India at the hospital level. Among doctors who had previous experience, 67% had positive attitudes towards traditional medicine ($p<0.01$) [18].

In this study, the overall traditional medicine practices of health professionals was low 110 (50.2%) when we compared with the study conducted in Shirka district, Arsi zone among health professionals was 79% [19], which may be due to many factors: one is the study period difference between the two studies; the second is the very nature of study participants and wide coverage and accessibility of the modern health care service for study participants. Accessibility and attitude of the respondents were the only two variables independently associated with traditional medicine practices. Those study participants reasoned that accessibility as the main reason for the high utilization of traditional medicine had better practice than those who did not utilization.

The second associated factor for traditional medicine practice was the attitude of the respondents; those study participants with a positive attitude towards traditional medicine were 2.53 times more likely to utilize/practice traditional medicine than those with a negative attitude (AOR= 2.53, 95% CI (1.04 – 4.58). A study conducted in Malaysia among pharmacy students showed only 25.3% participants had knowledge of traditional medicine, and while 73.7% knowledge [20]. According to study conducted in Palestine, in 2007 among university students shows that among 2007, 33.9% of all respondents used herbal remedies in self-therapy [21]. Another community based cross-sectional study conducted in Jimma, Ethiopia, showed that 143(11.4%) of participants were reported at least with one occurrence of the disease and 39% were practiced self-medication [22]. A study conducted in China, Hong Kong, shows that 3.9% [4] of participants had positive attitude and preferred traditional medicine for their medical problems, and the preference for TM was higher among women, older persons, while individuals with higher education levels and those younger than 14 years were noted less preference for TM [23].

Evidence shows that traditional medical practices remain acceptable and are practiced globally. Those study reasoned that accessibility was the main reason for high utilization of traditional medicine, and appears to be the main source of healthcare services for Africans communities, and more than 80% of the population use traditional medicine as a first line of treatment [22-23;25]. The WHO reports showed TM practices or uses in Uganda and Tanzania at 60 per cent, in Benin and Rwanda at 70%, and in Ethiopia 90% [27]. Based on the study conducted in the

Amhara Regional State of Ethiopia, which showed more than 80% of the participants have good knowledge but poor both on the attitude and utilization of TM [26]. The majority of the Ethiopian population uses TM for their fulfillment of primary healthcare [6], and open disclosure should exist between patients and healthcare providers in order to avoid potential drug-drug interactions. A successful integrated healthcare system would facilitate more efficient use of domestic medical resources and enhance self-sufficiency in health development in low-resource countries.

**Strength and limitations:** This cross-sectional study involved different health professional at public health facilities that are reflective of the professionals. This study used the participants' self-reports and perceptions to assess the practice of TM. Despite this limitation, this study provided insights into TM.

## 5. Conclusion and recommendation

### 5.1. Conclusion

The overall practice of traditional medicine in this study was high among health professionals working in Dire Dawa. The knowledge and attitude of healthcare professionals toward this particular finding was high. However, there is a gap regarding the source of knowledge acquisition, with the majority from their families, while only 4.1% learned from formal education. Therefore, it is essential to integrate TM into Ethiopia's formal education and healthcare system, which may be beneficial in improving Ethiopia's healthcare system.

### 5.2. Recommendation

Ethiopian health policy should pay attention to traditional medicine and encourage researchers to devote themselves to every aspect of traditional medicine to be more scientific. However, much is expected to achieve the goal of integrating traditional medicine into modern health care. To effectively integrate into healthcare systems, this study suggests that such integration should begin at the grassroots level, which involves incorporating traditional medicine into their formal education curricula. In addition, this study suggests the need for more evidence-based knowledge and research.

**List of abbreviations:**

TM = traditional medicine; TMP = Traditional Medicine Practice; ECSA=Ethiopian Central Statistical Agency; KAP= Knowledge, Attitude and Practice; WHO=World Health Organization; CAM=Complementary and Alternative Medicine; TMP=Traditional Medicine Practitioner.

## Declaration

### Ethical considerations

Ethical approval was obtained from the ethics review committee on June 10, 2018. Official permission letters obtained from the department was then circulated to all targeted health facilities. Informed consents were obtained from all participants after the purpose of the study was explained.

### Availability of data and materials

The data and materials used to analyze the study are available from the corresponding author (A. F. I.) upon reasonable request.

### Sources of funding:

This research received funding from the Dire Dawa University.

### Competing interests

The authors declare that there is no conflict of interests.

### Authors' contribution

This study was conducted in collaboration with all authors. The author (M. S. H.) participated in all phases of preparation, starting from the inception of the project title, collection of data, analysis and interpretation of results, and writing and finalizing the research proposal. The author (A. F. I.) participated in the analysis, finalizing the research, manuscript preparation, critical review of the manuscript, and journal selection for publication. The author (F. B.) participated as advisor of the research work. The authors (Y. T., and H. M.) critical edited and reviewed the manuscript. All the authors read and approved the final manuscript for publication.

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**Consent for publication**: Not applicable

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