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Evidence-Based Practice and Associated Factors Among Health Care Providers Working in Public Hospitals in Northwest Ethiopia During 2017

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ABSTRACT

Background: Despite the fact that evidence-based practice (EBP) is believed to be associated with improved health, safety, and cost outcomes, most medical practice in low- and middle-income countries such as Ethiopia is not evidence-based. Understanding the extent of and barriers to EBP in Ethiopia is important for learning how to best to improve quality of care. Few studies have assessed EBP in Ethiopia. **Objective:** This study aimed to assess reported level of EBP and associated factors among health care providers working in public hospitals in northwest Ethiopia.

Methods: A cross-sectional study was conducted with 415 randomly selected nurses, midwives, and physicians using stratified sampling (97.6% response rate). Data were collected using a structured, self-administered questionnaire that was developed by reviewing the literature and adapting the Melnyk and Fineout-Overholt EBP Implementation Scale. After validating scales, bivariate and multivariate linear regression models were used to identify factors associated with EBP implementation.

Results: The mean EBP implementation score was 10.3 points out of a possible 32 points and 60% of respondents scored below average. Most (60.2%) respondents reported poor confidence in their ability to judge the quality of research and half (50.1%) said that they were unable to find resources for implementing EBP. The most frequently mentioned barriers to EBP were lack of training (81.2%), poor health facility infrastructure (79.3%), and lack of formal EBP/patient education units in facilities (78.0%). The factors found to be significantly and independently associated with EBP implementation were years of work experience ($\beta = -0.10$; $P < 0.05$); having been trained as a bachelor's degree-level nurse ($\beta = 3.45$; $P < 0.001$) or a bachelor's degree-level midwife ($\beta = 2.96$; $P < 0.001$), a general practitioner ($\beta = 7.86$; $P < 0.001$), or a specialist physician ($\beta = 15.04$; $P < 0.001$) rather than a diploma-level nurse; working in a pediatrics ward ($\beta = -1.74$; $P < 0.05$); and reporting as barriers either a lack of clarity on the importance of EBP ($\beta = -0.93$; $P < 0.05$) or a lack of orientation sessions on new health priorities ($\beta = -0.91$; $P < 0.05$). **Conclusions:** Health professionals had low levels of EBP implementation and poor EBP skills. These problems were particularly acute for providers with lower levels of training. A large number of respondents reported structural and institutional barriers to EBP. These results suggest that clear leadership and ongoing, cross-disciplinary, skill-building approaches are needed to increase EBP implementation in Ethiopia. (*Curr Ther Res Clin Exp.* 2020; 81:XXX-XXX)

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Introduction

Initially coined in 1992, by David Eddy, a US physician, evidence-based practice (EBP) (also called evidence-based medicine)^{1,2} is a method of practicing medicine that involves using the most up-to-date guidelines, research, and practices to inform clinical decision making for individual patient care.^{1,2} Its use is intended to avoid bias and to promote the clinical application of the most recent, rigorous research for informed clinical decision making.³

EBP is believed to create better-informed practitioners, increase consistency of care, and promote client-focused care.⁴ Although the evidence is mixed, and somewhat thin, there is some support for claims that EBP improves health outcomes and experiences of care.⁵ It has also been argued that EBP can reduce health care spending by decreasing the use of ineffective tests, procedures, and medications.⁶ In addition, recent rapid changes in medicine, information technology, patient knowledge, clinicians' specialties and settings, and reimbursement patterns have reinforced the need to use evidence-based approaches to care and have stimulated demand for greater use among policy makers.^{7,8}

In addition to this increased demand for EBP, there has recently been an increased supply of tools that facilitate acquisition of empirical information. With the explosive growth of open-source publishing, smartphones, and decision-making software and applications, scientific evidence for guiding clinical practice is now more accessible than ever. However, despite these advances, EBP is not the norm globally.^{9–12} Uptake of EBP remains particularly challenging in low-income countries where health systems struggle from a lack of standardization and limited integration of EBP training during medical school and beyond.^{13–15} Medical practice in these settings is often based on professionals' personal experience and the use of out-of-date guidelines, leading to poor quality care that is costly, time-consuming, and an intensive use of resources.¹⁶ Overall, there is a deficit in the utilization of best current evidence among health professionals in low-income countries.^{17,18}

Researchers have found a multitude of potential barriers to EBP in low-resource settings.^{19–21} First, the breadth of often conflicting information in primary research can be confusing and overwhelming. The implications of research findings for clinical practice and their relevance for practice is often difficult to describe and apply to different cultural contexts.²² This challenge may be exacerbated in low-income settings where use of outdated guidelines and tools is common.^{23,24}

Another common barrier to EBP is the lack of health information technology resources (eg, hardware, software, or Internet connectivity) necessary to use online tools, often referred to as the digital divide.^{25,26} Accessing hard copies of clinical guidelines or attending in-person training may be similarly challenging, particularly for clinicians working in rural areas.²⁷ Even when information is readily available, clinicians may not be aware of EBP and may lack the training and skills required to access, process, and validate the medical literature.^{28,29}

Once information has been obtained, there remain several barriers to incorporating it into clinical practice. First, the clinical infrastructure necessary for implementing EBP such as equipment, medications, and support staff, may not be available.²¹ Second, severe provider shortages in low-income countries means that providers often have very large patient loads and work under intense time pressures, which may pose a barrier to taking the time to explore and review evidence in the course of practice.^{21,30–33} In addition, because health care providers often work in teams, lack of supportive leadership or a conducive workplace culture might pose a barrier to changing practice.²¹ Finally, as in high-income settings, patients may demand services that conflict with current evidence and providers may also have negative attitudes toward

EBP, seeing it as reducing their autonomy and limiting their clinical choices.³⁴

Given the potential importance of EBP for improving health outcomes and decreasing costs, and the many barriers to its use, understanding how EBP is implemented and perceived in low-income settings is critical for improving health care in these settings. However, research on EBP in low-income countries is relatively sparse. The most recent global systematic review on barriers to EBP found that of the 106 studies reviewed; fewer than 20 had been conducted in low- or middle-income countries. In a review of barriers to EBP in low- and middle-income countries specifically, only 1 sub-Saharan African country was included, and in our review of the literature we could only find 6 previous studies on this topic conducted in Ethiopia.^{19,35–38} To address this gap in the literature, this study aimed to assess the level of EBP among health care providers in a region of Ethiopia and to determine the factors associated with their use of EBP. The hope is that the study will provide useful information for increasing EBP implementation in Ethiopia.

Methods

Study setting

The study was conducted in February 2017 in 13 public primary and secondary hospitals located in the Amhara region of Ethiopia: Debre Markos Referral Hospital, Shegaw Motta Primary Hospital, Yejubie Primary Hospital, Lumame Primary Hospital, Bichienna Primary Hospital, Mertulmaria Primary Hospital, Fenotselam Hospital, Burie Hospital, Durbete Primary Hospital, Merawi Primary Hospital, Feresbet Primary Hospital, Adet Primary Hospital, and Felege Hiwot Referral Hospital. In total, these hospitals had 1010 health care providers, including 716 nurses, 140 midwives, and 154 physicians at the time of the study.

Study design and population

An institution-based, cross-sectional study design was used to assess EBP knowledge, skills, attitudes, and practices in health care providers who had 6 months or more of work experience as a nurse, midwife, or physician. Guest physicians, volunteer nurses and midwives, and health care providers who were ill or on annual leave during data collection were excluded from the study.

Sample size and sampling procedure

The sample size for assessing the level of EBP among health care providers was calculated using the single-population-proportion formula with the assumption that 57% of health care providers applied current evidence in clinical practice. This figure was taken from estimates found in a previous Ethiopian study.³⁹ The sample size (N=415) for determining the factors associated with EBP was calculated using a double-population-proportion formula.

Stratified random sampling was used to select study participants from each hospital and from each professional category. Taking the total number of physicians, nurses, and midwives in the 13 hospitals into consideration, proportional-to-size allocation was used to determine the number of participants to be selected from each hospital and then to determine the number of participants from each profession within the hospitals. Within hospitals, simple random sampling (lottery method) was used to select health care providers in each professional category from facility staff lists.

Data collection instrument and quality control

We collected data using a self-administered, structured questionnaire that was developed through a review of the literature and then adapted for the Ethiopian context (see Appendix 1 in the online version at doi: [10.1016/j.curtheres.2020.100613](https://doi.org/10.1016/j.curtheres.2020.100613)). The first stage of instrument development involved a meeting with experts from the Debre Markos University nursing, public health, and midwifery departments to review draft questionnaire items and the Melnyk and Fineout-Overholt EBP Implementation Scale, which we had decided to be our primary source.³⁹ In the meeting, experts provided input on each item's relevance, face validity, and decipherability in the Ethiopian working environment. Items were added, deleted, and modified accordingly. Item modification primarily involved changing information sources and health facility locations for scale questions that asked about where respondents searched for or shared information.

The adapted instrument contained questions on sociodemographic characteristics; the respondents' profession, level of training, and work unit; and their EBP-related knowledge, skills, attitudes, and implementation based on the Melnyk and Fineout-Overholt the evidence-based practice beliefs and implementation scales and questions used in previous studies.^{18,40–43} The questionnaire was translated into Amharic and then back-translated to English by professional translators to check for fidelity in the translation. The research team then pretested the questionnaire at Dangila Hospital, located in Awi Zone, with 42 health care providers (10% of the sample size). Based on the pretest results, the questionnaire wording was modified for clarity. The data collected in the pretest was analyzed in SPSS software (IBM-SPSS Inc, Armonk, New York) to find items that adversely affected the Cronbach's alpha coefficient for scales or that had a large number of nonresponses. Four items from the EBP implementation scale were deleted in this process.

Study variables and measurement

The dependent variable of the study was the level of EBP implementation, which was measured by a scale containing questions adapted from the Melnyk and Fineout-Overholt EBP Implementation Scale that asked how often the respondent had carried out a particular activity during the past 2 months. Possible responses ranged from never to 8 times or more.⁴⁴

Although the Melnyk and Fineout-Overholt EBP Implementation Scale has been validated previously with a Cronbach's alpha of 0.96,^{11,44} we attempted to validate it for the Ethiopian context using principal components analysis with oblique (promax) rotation to identify underlying factors in the scale. We retained two factors that had Eigen values > 1, and confirmed their presence by examining scree plots. The first factor involved the searching for and collecting new information (Eigen value 3.64, variance 50%). The second factor involved using evidence to change clinical practice (Eigen value 1.86, variance 23%). We retained the scale items with factor loadings > 0.40, and those that did not load on multiple factors. These 8 items, which were on 5-point scale with values that ranged from 0 to 4 were then summed for each respondent to create a total EBP implementation score with values that ranged from 0 to 32. The new 8-item adapted EBP implementation scale was found to be internally consistent, having a Cronbach's alpha of 0.83.

We also attempted to perform a similar exercise for the questionnaire items involving EBP knowledge, attitudes, and skills; however, none of these scales were valid. The principal components analysis found a large number of viable factors for the relatively small number of items in the scales. More importantly, most items either cross-loaded on several factors or loaded on none. We,

therefore do not create scales from these items but rather, report on them individually.

Our other explanatory and control variables were the respondents' sociodemographic and professional characteristics, their working unit, and training background.

Data collection

Thirteen bachelor's of science-level health professionals were recruited from the Debre Markos University Laboratory and Pharmacy Department to act as data collectors. The principal investigator trained the data collectors and the project investigators, who supervised the data collectors, on the goals of the project and on data quality.

Data collectors hand-delivered the pretested self-administered questionnaire to respondents in their working environments and retrieved them the same day. Each questionnaire had an information sheet attached with instructions to ensure that all respondents received the same directions and an informed consent form for respondents to read and sign if they agreed to be part of the study.

Data processing and analysis

The principal investigator checked the collected data for completeness and consistency daily. The data were then entered into EpiData version 3.1 software (EpiData Association, Odense, Denmark) and exported to SPSS version 23 and Stata version 16 (Stata-Corp, College Station, Texas) for analysis. We generated descriptive statistics of the study variables and fitted linear regression models to identify factors associated with EBP. We ran bivariate regressions with all 26 demographic, occupational, and barrier predictor variables. Those that were associated with EBP implementation in bivariate analysis at *P* values of 0.25 or lower were included in a full multivariable linear regression model.

We then performed tests for multicollinearity, including variance inflation factor reports and condition number tests because of the potentially high overlap between the explanatory variables; for example, age and work experience, and gender and profession. Age, marital status, and years of work experience variables were highly collinear. Variables with high variance inflation factor scores and condition indices such were removed from the linear regression model, which was then run for 4 specifications of our outcome variable: the validated 8-item EBP Implementation Scale, the first and second factors in the scale, and the original 19-item scale. We report regression coefficients for these models. Variables with estimated coefficients that had *P* values ≤ 0.05 were considered statistically significant associated factors in this study.

Results

Sociodemographic and professional characteristics

A total of 415 health professionals were recruited from hospitals located in the Amhara region. Of the total, 405 respondents were able and willing to participate, for an overall response rate of 97.6%.

The majority of participants were men (62.7%) and most (58.3%) were in the 26 to 30 years age group with a median age of 27 years (interquartile range = 25–29 years) (see [Table 1](#)). Most participants were single (51.4%) and almost all were Orthodox Christian (92.6%). Nurses constituted the majority of our sample (70.6%), followed by physicians (15.6%) and midwives (13.8%). The majority of respondents (64.5%) had a bachelor's of science degree level of education or higher and most (75.8%) had only 1 to 5 years of work experience. The plurality (22.2%) of participants worked on surgical wards, whereas the rest worked in diverse settings, including

Table 1
Sociodemographic characteristics of health care providers in northwest Ethiopia public hospitals, 2017.

Variable	Result*
Sex	
Male	254 (62.7)
Female	151 (37.3)
Age, y	
20–25	116 (28.6)
26–30	237 (58.5)
31–35	36 (8.9)
≥ 36	16 (4.0)
Marital status	
Single	208 (51.4)
Married	115 (28.4)
Separated	82 (20.2)
Religion	
Orthodox	375 (92.6)
Muslim	19 (4.7)
Protestant	11 (2.7)
Current educational qualification	
Diploma nurse	126 (31.1)
BSc nurse	160 (39.5)
Diploma midwife	18 (4.4)
BSc midwifery	38 (9.4)
General practitioner	42 (10.4)
Specialist physician	21 (5.2)
Work experience, y	
≤ 5	307 (75.8)
> 5	98 (24.2)
Profession	
Nurse	286 (70.6)
Midwife	56 (13.8)
Physician	63 (15.6)
Working unit	
Adult OPD	67 (16.6)
Pediatrics OPD	22 (5.4)
Medical ward	60 (14.8)
Surgical ward	90 (22.2)
Gynecology and obstetrics ward	68 (16.8)
Pediatrics ward	54 (13.3)
Antiretroviral therapy	10 (2.5)
Emergency	34 (8.4)
Working hours, h	
8	336 (83.0)
> 8	69 (17.0)

BSc = bachelor of science; OPD = outpatient department.

* Values are presented as n (%).

adult outpatient (16.6%), gynecology and obstetrics wards (16.9%), pediatrics wards (13.3%), and emergency departments (8.4%).

Knowledge about EPB

The majority of respondents (88.1%) said that they had heard of the term *evidence-based practice* and 64.4% reported that they knew where to find clinically related journals, articles, and guidelines (Table 2). When asked about their sources of EBP information, of those who heard about EBP, 50.3% learned about it at college or university. More than half (58.3%) said that they knew how to implement EBP in their work. However, 43.7% said that they face difficulty understanding research articles, mostly due to problems with language (53.4% of those with difficulty) and trouble understanding epidemiology terms (32.4% of those with difficulty).

Attitudes about EBP

Almost all participants (85.4%) strongly agreed with the statement that EBP improves the care delivered to patients (Table 3) and 91.4% agreed or strongly agreed that recent guidelines would improve care. However, almost 40% of participants either agreed or

strongly agreed that implementing EBP was difficult because it was time consuming and the majority (84.7%) agreed with the statement that EBP was not relevant to their work.

EBP skills

Most (60.2%) respondents reported poor confidence in their ability to judge the quality of research; almost half (47.7%) said they were unable to find appropriate research articles, and half (50.1%) said that they were unable to find the best resources for implementing EBP (Table 4). In contrast, a large majority of respondents (85.7%) said that they were able to efficiently search for evidence, and to formulate clear questions for addressing a patient problem (76.3%).

Level of EBP implementation

Reported levels of EBP implementation were low (see Table 5). The mean EBP score in our sample was 10.3 points out of a possible high EBP score of 32 (in other words, 32% of the possible points). Sixty percent of respondents scored below this average. Low levels of EBP implementation persist whether we examine the original 19-item EBP scale (mean score 31% of total score), or the factor scores produced by the principal components analysis: The mean utilization of evidence factor score was 15% of the possible score, whereas the average searching for information score was 48% of the total possible score.

These low scores are consistent with the reported frequencies for individual items on the EBP implementation scale. Overall, we find that respondents report modest to high levels of searching for evidence, particularly in the form of guidelines and protocols, but very low levels of incorporating new evidence into practice or sharing evidence with colleagues. When asked about their practices over the past 2 months, 39.7% reported that they had collected data from patients and formulated clinical questions only 1 to 3 times during the past 2 months, and almost half (45.9%) said that they had searched for relevant evidence from recent national guidelines and literature to solve clinical questions 3 or fewer times.

Almost half (49.6%) had not read and appraised a clinical research study during the past 2 months; and slightly more than half (52.8%) reported that they had not applied findings of literature searches in their daily clinical practice. There were almost no reports of formal sharing of research studies among respondents (<12%), and informal sharing of information among colleagues occurred less than twice a month on average. Most participants (85.7%) said that they had used recent national guidelines and treatment protocols in providing care for patients during the past 2 months, but most had not changed (62.5%) or evaluated (59.0%) their practice based on recent literature, nor had the majority (55.3%) added new types of care based on recent literature.

The most frequently used clinical websites were UpToDate (www.uptodate.com) and Medscape (www.medscape.com): 61% and 37.5% of respondents had accessed UpToDate and Medscape, respectively, 4 or more times during the past 2 months. In contrast, only 3.2% of participants said that they had searched PubMed and only 0.9% had searched the World Health Organization's HINARI Access to Research for Health Programme that frequently.

Barriers to practice

Participants were asked questions about the organizational, patient, and personal provider factors that posed barriers to incorporating EBP into their clinical practice. The most frequently reported barriers were a lack of training on EBP (81.2%), poor infrastructure

Table 2
Knowledge about evidence-based practice.

Item	Result*
Have you heard of the term <i>evidence-based practice</i> or related terms?	
Yes	357 (88.2)
No	48 (11.9)
Can you identify a site where clinical journals, articles, and guidelines are published?	
Yes	261 (64.4)
No	144 (35.6)
Do you have difficulty understanding research reports?	
Yes	177 (43.7)
No	228 (56.3)
Reasons for difficulty	
Understanding statistical data	29 (14.2)
Understanding epidemiological terms	66 (32.4)
Language problems	109 (53.4)
Do you know how to implement evidence-based practice sufficiently to change practice?	
Yes	236 (58.3)
No	169 (41.7)

* Values are presented as n (%).

Table 3
Attitudes about evidence-based practice (EBP).

Item	Strongly disagree n (%)	Disagree	Neutral	Agree	Strongly agree
Implementing EBP will improve the care that I deliver to my patients	1 (0.2)	3 (0.7)	3 (0.7)	52 (12.8)	346 (85.4)
EBP is not relevant to my profession	18 (4.4)	22 (5.4)	22 (5.4)	54 (13.3)	289 (71.4)
Critically appraising evidence is an important step in the EBP process	2 (0.5)	4 (1.0)	12 (3)	104 (25.7)	283 (69.8)
Training should be given about EBP	2 (0.5)	3 (0.7)	5 (1.2)	82 (20.2)	313 (77.4)
Recent national guidelines improve clinical care	7 (1.7)	9 (2.2)	19 (4.7)	118 (29.2)	252 (62.2)
EBP takes too much time so it is difficult to implement	65 (16.0)	131 (32.3)	52 (12.8)	55 (13.6)	102 (25.2)

Table 4
Evidence-based practice skills.

Item	Yes n (%)	No
Can you search for the best evidence to answer clinical questions in a time-efficient way?	347 (85.7)	58 (14.3)
Can you formulate a clear question based on a specific patient problem?	320 (79)	85 (21)
Can you access the best resources to implement evidence-based practice?	202 (49.9)	203 (50.1)
Do you have the ability to implement recommendations of research studies into clinical practice?	309 (76.3)	96 (23.7)
Do you have the ability to find appropriate research reports?	212 (52.3)	193 (47.7)
Do you feel confident in judging the quality of research reports?	161 (39.8)	244 (60.2)

(eg, lack of computers and Internet access) (79.3%), lack of a formal patient education department for incorporating patient preferences into care (78.0%), and difficulty finding recent guidelines and protocols (64.4%) (Table 6). Almost half of respondents (49.6%) said that the available national treatment guidelines and protocols were difficult to understand.

Hospital management and culture was also a frequently mentioned barrier. Less than one-quarter (23.5%) of respondents agreed with the statement that hospital management was supportive of EBP, or that team managers initiate EBP (23.4%). The vast majority (84.2%) agreed that a lack of interdisciplinary discussion during patient management made it difficult to apply evidence to practice and more than half (52.6%) said that they did not have the authority to change practice.

Factors associated with EBP implementation

Five variables were significantly and independently associated with EBP implementation in our final, reduced multivariable linear regression model: work experience, educational qualifications, working unit, reporting that the importance of EBP was not clear, and reporting a lack of orientations on new health priorities as a barrier to care (see Table 7). These variables retained significance across most model specifications.

Years of work experience exhibited a small negative association with EBP implementation ($\beta = -0.10$; $P < 0.05$). There was a large and significant difference in EBP implementation scores by level of professional training, with clinicians who have bachelor's- and master's-level training displaying much higher scores than those with diploma-level training. For example, having received a bachelor's of nursing degree instead of a nursing diploma was associated with a 3.45-point increase on the implementation scale ($P < 0.001$). Those who had been trained as general practitioners had scores that were almost 8 points higher than diploma nurses ($P < 0.001$) and those trained as specialist physicians, scores that were 15 points higher ($P < 0.001$).

The department in which the respondent worked was also significantly associated with higher EBP implementation scores, with respondents who worked in pediatric wards having significantly lower scores ($\beta = -1.74$; $P < 0.05$) compared with respondents who worked in the surgical ward.

Respondents who said that a lack of orientation sessions about priority health issues was a barrier to EBP had lower EBP implementation scores than those who did not ($\beta = -0.93$; $P < 0.05$). Similarly, those who said that the importance of evidence for practice was not made clear had significantly lower scores ($\beta = -0.91$; $P < 0.05$). Other frequently reported barriers were not significantly associated with higher EBP scores.

Table 5
Health care providers' evidence-based practice (EBP) during the past 2 months: Frequencies and factor loadings on items of the EBP implementation scale (N = 405).

Item	0 %	1–3	≥ 4	Factor 1: Search Factor loading*	Factor 2: Utilize
Collected data and formulated a clinical question [†]	2.5	39.8	57.8	0.92	
Searched for evidence from national guidelines and literature [†]	2.7	43.2	54.1	0.90	
Read and critically appraised a clinical research study	49.6	36	14.3		
Applied findings of clinical literature into clinical practice [†]	52.8	36.5	10.6		0.49
Looked at recent national guidelines and new treatment protocols [†]	3.7	39.8	56.5	0.71	
Shared evidence from study as report or presentation to staff	89.1	7.9	3		
Shared new national guidelines or treatment protocols with colleagues	25.7	57	17.3		
Used a recent guideline to change practice	14.3	52.6	33.1		
Changed existing clinical practice based on clinical studies [†]	62.5	27.4	10.1		0.74
Evaluated clinical practice based on recent studies [†]	59	28.9	12.1		0.90
Added new types of healthcare based on literature [†]	55.3	34.8	9.9		0.87
Changed care based on discussion with patient/family member	24.9	51.1	24		
Changed practice based on info. received from in-service training/conference	23.7	50.1	26.2		
Evaluated patient outcomes after practice change	16.3	53.6	30.1		
Accessed national guidelines	5.2	28.9	65.9		
Accessed UpToDate? [‡]	9.4	29.6	61	0.58	
Accessed PubMed?	91.1	5.7	3.2		
Accessed Medscape?	27.2	35.3	37.5		
Accessed HINARI? [§]	98.5	0.49	0.9		
Summary of The evidence-based practice beliefs and implementation scales	Mean	SD	Min	Max	
Eight-Item Validated EBP Scale	10.3	5.6	1	32	
Original 19-item Scale	21.2	11.4	2	69	
Factor 1: Searching for Information Score	2.1	1.1	0.06	4.2	
Factor 2: Utilizing Evidence Score	0.68	0.8	-0.06	4.3	

* Results of polychoric principal components analysis followed by promax rotation. Factors < 0.40 and factors that loaded ≥ 0.40 on more than 1 factor are not shown. The eigenvalue for factor 1 was 3.64, variance 50%, and for factor 2 eigenvalue 1.86, variance 23%.

[†] Items constituted the EBP score.

[‡] www.UpToDate.com.

[§] Hinari Access to Research for Health programme.

Table 6
Barriers to evidence-based practice (EBP).

Item	Agree n (%)	Disagree
Hospital infrastructure, such as computers, Internet, and new treatment guidelines, is not adequate for implementation of EBP	321 (79.3)	84 (20.7)
Lack of training about EBP makes it difficult to implement	329 (81.23)	76(18.77)
Problems understanding English makes it difficult to use the literature	115 (28.4)	290 (71.6)
Patient illiteracy makes it difficult to discuss information regarding management	250 (61.7)	155 (38.3)
Low patient awareness about their disease management makes it difficult to implement EBP	220 (54.3)	185 (45.7)
Lack of an organized patient education department makes it difficult to incorporate patient preferences into practice	316 (78.0)	89 (22.0)
There is sufficient information to find new guidelines/protocols	261 (64.4)	144 (35.6)
There is a lack of regular orientation about new health priority issues	246 (60.7)	159 (39.3)
There is sufficient time to find new guidelines/protocols or online research findings	215 (53.1)	190 (46.9)
It is difficult to find recent national treatment guidelines and protocols	311 (76.8)	94 (23.2)
It is difficult to understand national treatment guidelines and protocols	201 (49.6)	204 (50.4)
The culture of our team is not receptive to changing practice	140 (34.6)	265 (65.4)
There is a lack of authority in the workplace to change practice	213 (52.6)	192 (47.4)
Hospital managers are supportive of EBP	95 (23.5)	310 (76.5)
Team managers initiate the use of EBP	93 (23.0)	312 (77.0)
The importance of evidence for practice is not made clear	176 (43.5)	229 (56.5)
An absence of interdisciplinary discussion during patient management makes it difficult to apply evidence to practice	341(84.2)	64 (15.8)

As noted above, we were not able to validate the knowledge, skills, and attitudes scales and so we were not able to include them in our multivariable regression models. When we look at the scale items individually, we find that 5 of the 6 EBP skills items had significant positive associations with implementation levels. The only nonsignificant skills item was having the ability to search for evidence to answer a clinical question. None of the attitude items had significant associations with implementation levels, and only 1 of the knowledge items (knowing where to find information) displayed had a significant positive association with implementation.

Discussion

This study sought to understand the extent to which EBP is implemented by health care providers in northwest Ethiopia and

what barriers existed among physicians, nurses, and midwives in applying EBP in their practice.

We found low levels of EBP implementation. The mean score was only 32% of the possible score and only 40% of respondents scored above the mean. These findings are in line with other studies of EBP in Ethiopia that have found low levels of EBP among clinicians. For example, a recent study in eastern Ethiopia found that only 32.3% physicians reported integrating EBP into clinical practice.³⁶ Earlier EBP studies in Ethiopia that have found low levels of EBP implementation include a study conducted among nurses at Ethiopia's largest referral hospital (42.4% EBP implementation),³⁹ and a study in North Gondar (47% EBP implementation).³⁵ It is difficult to compare our estimates to those found in these studies as all studies use slightly different scales and define levels of EBP differently.

Table 7
Factors associated with high evidence-based practice (EBP) among health professionals working in public hospitals in northwest Ethiopia, 2017.

Variable	Bivariate	Full model	Final model	Factor 1: Search	Factor 2: Utilize	Original 19-item scale
Male	2.13***	0.48	0.31	0.04	0.12	0.36
Marital status						
Single	0.64	(base)				
Married	-1.13†	-0.08				
Widowed/divorced/separated	0.43	1.25*				
Age group, y						
21–25	-0.16					
26–30	0.15					
31–35	0.60					
≥ 36	-1.37					
Working experience, y	-1.75**	-0.94†	-0.10*	-0.01	-0.01	-0.24**
Educational qualification						
Diploma nurse	-5.15***	(base)	(base)	(base)	(base)	(base)
BSc nurse	-0.04	3.36***	3.45***	0.69***	0.23**	6.74***
Diploma midwifery	-2.86*	-0.46	0.73	0.16	0.29	2.12
BSc midwifery	-0.24	1.32	2.96*	0.61*	0.33	6.83**
General practitioner	6.23***	7.60***	7.83***	1.71***	0.38**	16.07***
Specialist physician	13.41***	14.76***	15.04***	2.63***	1.32***	36.55***
Profession						
Nurse	-5.20***	(base)				
Midwife	-0.89	1.90				
Physician	9.02***	0.31				
Working unit						
Adult OPD	4.18***	(base)	(base)	(base)	(base)	(base)
Pediatric OPD	0.53	-0.76	-0.72	-0.10	-0.10	-0.51
Medical ward	-0.94	-1.22	-1.25	-0.18	-0.28*	-1.11
Surgical ward	-0.62	-0.82	-0.61	-0.03	-0.24	0.02
Gynecology and obstetrics	-1.14‡	-1.17	-0.78	-0.18	-0.19	-1.18
Pediatrics ward	-2.38**	-1.77*	-1.74*	-0.23	-0.27	-1.82
Antiretroviral therapy	-1.56	-0.26	-0.21	0.16	-0.18	0.08
Emergency	1.22	0.16	0.34	0.17	-0.07	0.76
Barriers						
Language barrier	-1.45*	-0.06	-0.08	-0.10	0.04	0.19
Lack of regular orientation	-2.71***	-0.90*	-0.93*	-0.08	-0.15	-1.61*
Different accessing guidelines	-0.86†	-0.09	-0.07	-0.01	-0.01	-0.75
Different understanding of guidelines	-1.629**	-0.51	-0.54	-0.13	-0.06	-1.09
Unsupportive culture	-1.13†	-0.59	-0.52	0.04	-0.17*	-0.47
Lack of authority	-1.82**	-0.18	-0.19	-0.01	-0.04	-0.06
EBP importance not clear	-2.43***	-1.02*	-0.91*	-0.11	-0.20**	-0.94
Lack of interdisciplinary discussion	-1.42†	-0.36	-0.42	-0.06	-0.09	-0.76

BSc = bachelor of science degree; OPD = outpatient department.

* $P < 0.05$.** $P < 0.01$.*** $P < 0.001$.† $P < 0.10$.‡ $P < 0.20$.

The mean EBP implementation score masks large variation on individual implementation items. When we examine the 2 factors that were produced in our principal components analysis, we find that scores on questions regarding the incorporation of evidence into clinical practice was much lower than scores on questions about seeking out and collecting evidence. Similarly, although almost all respondents said that they were using national and treatment guidelines in their practice regularly, the incorporation of evidence into practice was mixed, with only 47.2% saying that they had recently incorporated information from searches into their clinical practice, and only 37.5% reporting that they had changed their practice based on recent literature.

Although responses to questions about attitudes were mostly positive, 1 attitude scale item deviated from the positive trend: 84.7% of participants agreed that EBP was not relevant to their work. This finding was likely an artifact of the instrument wording rather than a true sentiment as this was one of the few negatively worded items in this part of the questionnaire (See Appendix 1 in the online version at doi:10.1016/j.curtheres.2020.100613).

Respondents self-reported relatively poor EBP skills and a lack of skills and problems with comprehension were reported as major barriers to practice. Although the vast majority of respondents

knew how to conduct searches, almost half had trouble finding the best information for changing practice, and few were confident in judging the quality of research. These results suggest that low implementation of EBP was not due to providers' inability to search for information but rather to problems in finding and selecting the most relevant information, gauging the quality of research, and translating information obtained into modified or new practice. Poor skills were significantly and negatively associated with EBP implementation in multivariable analysis.

Neither the organizational culture of hospital management nor professional teams were conducive to EBP implementation. Less than one-quarter of respondents reported that hospital management was supportive of EBP or that team managers initiate EBP. Additionally, many clinicians said that a lack of authority to make changes to their clinical practice was a barrier to EBP implementation. Respondents also mentioned structural barriers, including unreliable Internet access. Workflow and patient-load issues were not reported as major barriers to EBP use. Only 38.8% of participants agreed that EBP takes too much time to implement and this variable was not significantly associated with implementation. This finding is surprising because lack of time has been found to be an important barrier to the implementation of EBP in low- and

middle-income countries.^{19,21} It would be informative to conduct further qualitative research to better understand how time constraints limit providers' ability to search for information given the high number of patients that they see. Such qualitative work could reveal how providers define EBP and why EBP is not being implemented at a higher level by providers in northern Ethiopia.

When examining factors associated with EBP implementation, we find that the level of professional training had the largest and most consistent influence on EBP implementation levels, with clinicians who had longer, more extensive training displaying higher implementation scores than clinicians who had received diploma-level training. These differences in training had a much stronger influence on EBP implementation levels than demographic factors or reported barriers to implementation.

A lack of orientation sessions about priority health issues, and poor articulation of the importance of EBP were the barriers most consistently associated with implementation levels. Other significant drivers of EBP implementation were work experience, with every year of work experience associated with a 0.10-point decrease in implementation scores, and working in a pediatric ward. It is not clear why clinicians in the pediatrics wards have such relatively low rates EBP but this finding deserves further evaluation particularly because it suggests that services for children may be particularly prone to a lack of evidence-based care.

Implications

Our findings suggest that more training on the processes for incorporating evidence into practice is needed, particularly for pre-service diploma-level nursing and midwifery programs. In addition to trainings, mechanisms for the Ministry of Health to provide ongoing, structured updates on new evidence and changing priorities may also be necessary. The high proportion of respondents who report having recently viewed and used national guidelines in their practice suggest that providers are open to using evidence to guide clinical decision making if the information is properly vetted and the changing of practice is sanctioned. Mechanisms to provide evidence updates might include newsletters, orientation meetings, or text messages to provide up-to-date information. This kind of clear messaging from the Ministry of Health about the importance and appropriateness of EBP would reduce 1 of the primary barriers to EBP found in this study. The additional resources this might require could be mitigated by pooling resources across different Ministry of Health programs and targeting medical and nursing education interventions, as has been suggested previously for increasing EBP in low-income countries.¹⁴ The Ministry of Health could also incentivize providers to seek information and to apply EBP by strengthening institutional requirements for continuing medical education.⁴⁵ Information sessions on EBP may need to include specific guidance for diploma nurses and midwives on how they can propose changes in clinical practice.²¹

Lastly, although it was not the focus of our study, the findings from our principal components analysis of the EBP knowledge, attitudes, skills, and practices scales may suggest that current EBP scales may not be valid in their current form for Ethiopian health care providers. All 4 of the knowledge attitudes or skills scales displayed problems with multiple underlying factors and split factor loadings. Only the implementation scale had a coherent underlying structure but that structure only emerged after removing more than half of the scale's original items. As noted above, researchers in Ethiopia have used different scale items and different ways of measuring high EBP, which makes comparing studies difficult. Further research to validate a comprehensive EBP scale for Ethiopia may be needed so that there is a standard measure for tracking EBP and evaluating the effectiveness of interventions to improve practice.

Limitations

This study had several limitations that should be considered. First, we used self-reported survey questions rather than observation, which may lead to misestimate actual practice. In addition, we did not collect qualitative data, which could have given us a richer understanding of respondents' conceptualizations of EBP and their work context. Such clarification of respondents' understandings of EBP would have been particularly useful in this study because the dichotomous response choices to the skills and knowledge items in our questionnaire were suboptimal and led to difficulty interpreting responses. The lack of detail in the response categories may have contributed to our inability to validate these scales. An additional limitation is that our self-reported questionnaire measures are prone to social desirability bias, which may mean that we have overestimated the level of EBP implementation. We must also note that our study takes place in a particular region of Ethiopia and may not be generalizable to other regions of the country or to other east African settings. Finally, we used cross-sectional design that cannot address temporal relationship between outcome variables and contributing factors.

A significant strength of this study is that it takes place across several health care facilities and studies a range of professions.

Conclusions

This study found that health professionals in our sample had low levels of EBP implementation and that conducting searches and gathering information was rarely translated into changes in clinical practice. Clinicians whose professions require longer training and clinicians who report stronger EBP skills had higher levels of EBP practice. A large proportion of respondents reported serious barriers to EBP implementation, among the most common being a lack of training, poor health facility infrastructure, difficulty obtaining guidelines, and lack of formal EBP/patient education units in facilities. The results suggest that Federal Ministry of Health should provide additional pre-service and in-service training, tools, and guidance for health professionals to enhance their EBP skills, signal the importance of EBP, and improve access to evidence. Care should be taken to ensure equal access to these resources across professional cadres and facility units. Policy makers should also prioritize creating mechanisms for regular ongoing updates that contain practical guidance on how to change practice based on new evidence. Providing this kind of additional support to health care providers so that they can better access, understand, apply, and embed new evidence within their practice is critical for improving patient care.

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G. D. Ayalew, D. Jara, and G. Alem developed the project and took part in data collection, data analysis, and developing the initial drafts of the manuscript and revising subsequent drafts. H. Mu-

lugeta, F. Wagnew, and T. Zewdu assisted in data collection and data analysis. G. D. Ayalew, D. Jara, R. Bigley, and S. Burrowes prepared the final draft of the manuscript. All authors read and approved the manuscript.

Conflicts of Interest

The authors have indicated that they have no conflicts of interest regarding the content of this article.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.curtheres.2020.100613](https://doi.org/10.1016/j.curtheres.2020.100613).

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