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Nurses' implementation of evidence based practice in nursing process and its associated factors in South Wollo Zone public hospitals, Northeast Ethiopia: a mixed method study

Afework Edmealem^{1*}, Nurye Fentaw², Abebe Bekele², Belachew Tegegne³, Jemal Mohammed⁴ and Tiliksew Liknaw¹

Abstract

Background Evidence-based practice is clinical decision-making using the best evidence available in the context of individual patients' preferences and clinical expertise. It is serving as a crucial instrument for the health science disciplines to minimize the theory-practice gap although the level of practice is unknown. Thus, this study aimed to assess nurses' implementation of evidence-based practice in nursing process and its associated factors in South Wollo Zone Public Hospitals.

Methods An explanatory sequential mixed method was employed from April 1 to May 29, 2023, among 419 nurses for the quantitative part and 15 others for the qualitative part. The data were collected using structured, pretested, self-administered questionnaires. Simple random and purposive sampling techniques were used to select participants for the quantitative and qualitative studies, respectively. The bivariable analysis was done primarily, and variables with a p -value < 0.25 were further examined using a multivariable logistic regression model to control con-founders. Then, variables having a p -value less than 0.05 with a 95% CI were used to declare significantly associated factors. The key informants were interviewed using pre-made interview guidelines, and then open code software was utilized to conduct a thematic analysis.

Result Nurses who had poor implementation of evidence-based practice in the nursing process were 228 [54.42%; 95% CI: (49.8–59.3)]. Similarly, the key informants concluded that the implementation of evidence-based practice in the nursing process was low. Participants who were 31–40 years old [AOR = 0.61, 95% CI: (0.38–0.99)], 41–50 years [AOR = 0.32, 95% CI: (0.15–0.65)], working at general hospitals [AOR = 3.37, 95% CI: (1.39–8.18)] and comprehensive specialized hospitals [AOR = 7.29, 95% CI: (3.06–17.31)], lack of training about evidence-based practice (AOR = 2.50, 95% CI: (1.36–4.56)), and lack of internet access [AOR = 2.46, 95% CI: (1.43–4.23)] were factors associated with poor levels of nurses' implementation of evidence-based practice in the nursing process. The absence of computers, libraries, and updated guidelines were other factors identified on the quality analysis.

*Correspondence:
Afework Edmealem
afeworkedmealem@dmu.edu.et; afeworkyalem@gmail.com

Full list of author information is available at the end of the article



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Conclusion Nurses' implementation of evidence-based practice in the nursing process was low. Age, working in general hospitals, and comprehensive and specialized hospitals, lack of training, and internet access were factors that had significant associations. Hence, hospital managers should give an attention to internet access and training about utilization of evidence-based practice in nursing process, particularly for those aged above thirty years old.

Keywords Evidence-based practice, Nurses, Nursing process, Ethiopia

Introduction

Evidence-Based Practice (EBP) is a method of clinical practice in which clinicians use the most recent research and their clinical knowledge to arrive at recommendations for a given client while taking into account their preferences and values [1, 2]. According to the International Council of Nurses, EBP is a tool used by the nursing discipline to reduce the theory-practice gap [3]. Its influence on nursing care dates back to Florence Nightingale in the first decade of the 19th century and grew between 1900 and 1970 with the founding of the American Nursing Association in 1920 and the first nursing research journal in 1952 [4].

Nowadays, EBP has become a crucial instrument of health care practice, and health professionals are expected to use the best evidence on a wide range of health science issues. It is stated that in order to improve procedures and close gaps, health practitioners should use evidence [3]. Improved patient outcomes, health service quality, patient safety, and clinical effectiveness, as well as improved professional performance, could exist with the integration of the best available research evidence, clinical expertise, patient values and preferences [5, 6].

Nursing process is an organizing framework for professional nursing practice, which is a critical reasoning process to provide the best care to the client [7]. Efficient nursing process implementation improves care quality, speeds up the healing process, and reduces hospital stays while increasing patient satisfaction and service use [8]. It was believed that its implementation should be on the basis of updated guidelines and evidences [8, 9].

Although EBP has been regarded as a crucial component to enhancing the quality of healthcare services and achieving excellence in patient care, EBP implementation in clinical settings has proven difficult in many countries due to different factors such as lack of time and lack of skills to find and manage research evidences [10, 11]. Due to this, healthcare system administrators and other professionals have failed to ensure the ongoing performance improvement [12].

The proportion of nurses who had poor implementation of evidence-based practice was 58% in the nationwide survey in Taiwan [13]. It was found to be significantly low in sub-Saharan countries (54%) [14], including Ethiopia (47%) [15]. Another systematic review and meta-analysis done in Ethiopia reported that 57.06%

of health care professionals had poor implementation of EBP [16]. Studies attempt to show significantly associated factors behind this low achievement. Problems at the individual level include a low level of knowledge, a lack of familiarity with EBP, an inability to synthesize the available literature, and resistance to change [17–19]. Organizational factors associated with poor level of implementation of EBP include lack of access to scientific literatures, computers, readily available research reports, and increased workload [20–22]. Educational status, work experience, marital status and favorable attitude were the other mentioned factors [15, 23]. The nursing process enables nurses to perform their activities with scientific evidence and helps them to function as an autonomous and distinct profession; however, little is known about the implementation of the nursing process in accordance with EBP [24].

One of the most important frameworks for nurses is the nursing process. They can provide holistic care when they use the nursing process as a tool. Therefore, the implementation of EBP in the health care delivery system is essential, as it could improve the quality of care and patient safety [25]. However, there was a shortage of studies on the extent of EBP implementation with regard to the nursing process among nursing professionals in Ethiopia. Thus, this study aimed at bridging this gap and exploring factors.

Methods and materials

Study area and period

The study was conducted in South Wollo Zone. There is one comprehensive specialized, four general, and nine primary hospitals. There are a total of 714 nurses who are working in these hospitals [26]. The study was conducted from April 1 to May 29, 2023.

Study design

An explanatory sequential mixed method was employed. First, the quantitative data were collected and analyzed. Then, to elaborate on the findings, particularly the associated factors, the qualitative data were collected and analyzed.

Source and study population

All nurses working at South Wollo Zone Public Hospitals were source population while those available at all

hospitals during the data collection period were study population.

Inclusion and exclusion criteria

All nurses working in South Wollo Zone public hospitals and who are recruited permanently were included in this study. All nurses who were taking sick, annual and maternal leave were excluded.

Sample size determination

The sample size for the quantitative part was determined by using the single population proportion formula. According to a recent Ethiopian study, the proportion of nurses who had poor implementation of EBP was 45% [27]. The margin of error was 5% at a 95% confidence level. The sample size for the secondary objective was calculated by using sex, work experience, and the current position of nurses, and it was 213, 200, and 140, respectively.

$$n = \frac{\left((Z_{\alpha/2})^2 p(1-p) \right)}{d^2} = \frac{\left((1.96)^2 \times 0.55(1-0.55) \right)}{(0.05)^2} = 380.3 \approx 381$$

Where;

- N- sample size.
- Z $\alpha/2$ - Level of confidence at 95%.
- P= population proportion = 45%.
- d- Margin of error = 5%.

After calculating the sample size for all objectives, the highest sample size was obtained from the first objective. By adding 10% non-response rate (38), the final sample size was 419. The sample size for the qualitative part was determined by saturation of ideas, and here, 15 key informants (5 from each level of institutions) participated in the interview.

Sampling technique and sampling procedure

The total sample size was allocated to each hospital proportionally based on the total number of nurses in each hospital. After that, samples from each hospital were again proportionally allocated to each working unit. Finally, participants were selected from each working unit by using simple random sampling using the list of nurses from the Human Resource Department (Fig. 1). Purposive sampling was used to select managers and department heads for key informant interviews.

Study variables

The dependent variable was nurses' implementation of EBP in nursing process while the independent variables were sociodemographic characteristics (sex, age, educational status, and work experience, position,

salary), knowledge of participants towards EBP, attitude of participants towards EBP, and presence of language difficulty, and organizational factors (training, internet access, and support from managers, working institution, working unit, availability of time to search evidences, having authority to change practice, presence of computer, and presence of library).

Data collection tool

A structured self-administered questionnaire prepared in English was used for quantitative data collection, and interview guides (Supplementary File 1) in Amharic were used for qualitative data collection with the help of audio recorders and a note book. This study assessed nurses' implementation of evidence-based practice in nursing process using EBP implementation tool containing eighteen lists of activities. Frequency of each of activity for the last two months (8 week) had been assessed and responses labeled zero to four. The scales rated as 0 for those not implemented EBP at all, 1 for those implemented 1–3 times, 2 for those implemented 4–5 times, 3 for those implemented 6–7 times, and 4 for those implemented ≥ 8 times. After sum-up the value of each scale replied by participants, the maximum score was 66 and the minimum was 5 from the possible total score of 72. It was adapted from a study conducted in Iran with a validity of 0.96 and a reliability of 0.83 of Cronbach's alpha value [28]. Similarly, the qualitative section has sociodemographic items and interview guides.

Operational definitions

Implementation EBP in nursing process tool have eighteen lists of items, each scaled from 0 to 4, then sum up for a possible minimum score of zero and a maximum of 72. The data was distributed normally as Skewness 0.38 and Shapiro Wilk, test found 0.34 so mean (40 ± 11) was used to make cutoff point in to good and poor implementation status. Hence, participants who scored less than the mean (41) were considered as having "poor implementation of EBP in nursing process. Respondents who scored below the mean (< 15.6) from the total knowledge score were categorized as having "Inadequate knowledge about EBP in nursing process". Furthermore, respondents who scored below or equal the mean (≤ 22) from attitude assessment questions were categorized as having "unfavorable attitude towards implementation of EBP in nursing process" [29]. Primary hospitals are referral centers for health centers and render general medical services like basic surgical, medical, maternal, and pediatric care to all patients, with approximately 25–50 beds. General Hospital are referral centers for primary hospitals and provide services such as general medicine, general surgery, obstetrics, gynecology, pediatric clinics along with few basic diagnostic and therapeutic services, with

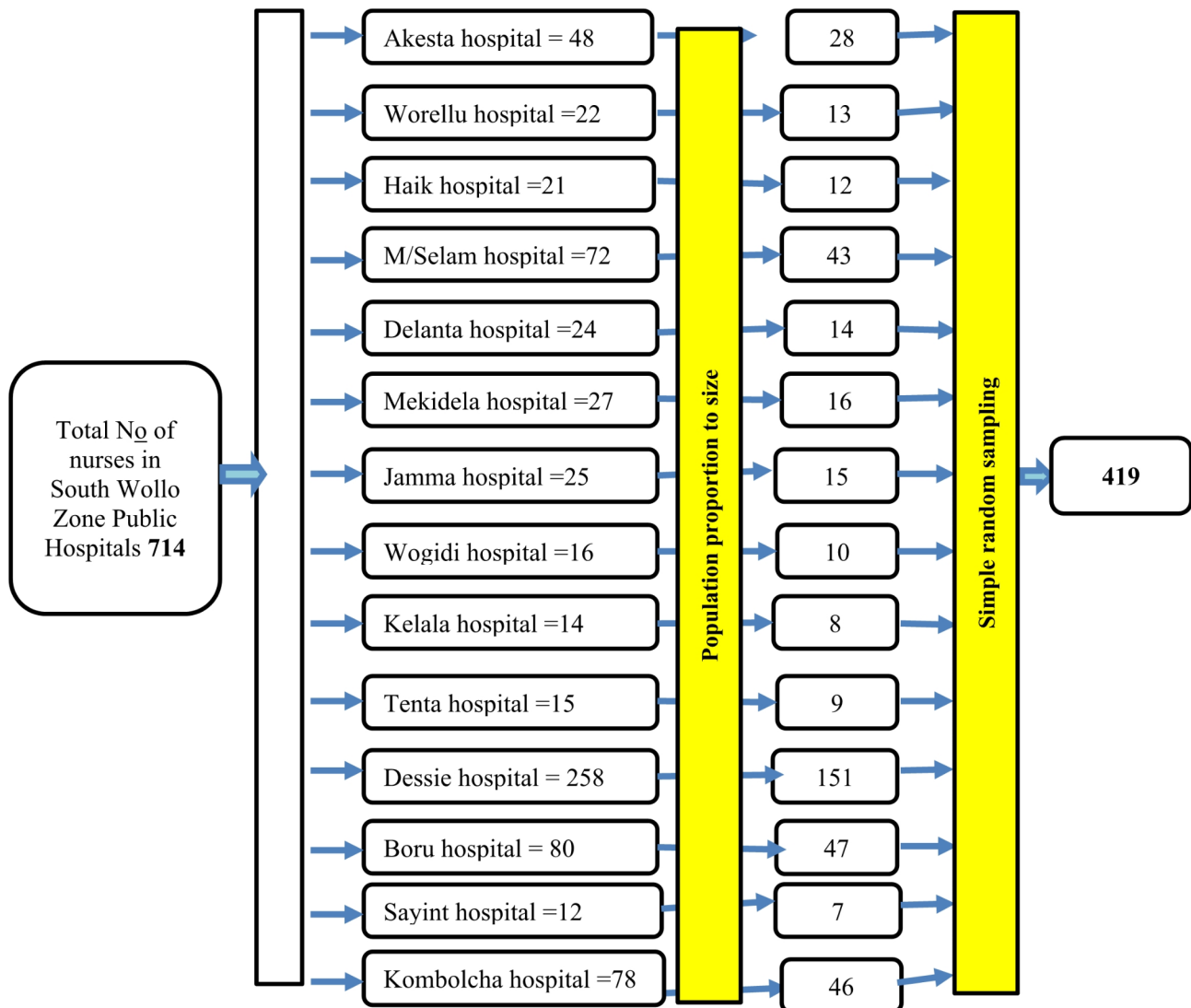


Fig. 1 Schematic presentation of sampling technique in a study to assess implementation of EBP in nursing process and its associated factors among nurses working at South Wollo Zone Public Hospitals

the capacity of 50 to 200 beds. Comprehensive Specialized Hospital care for patients who presented with variety of life discrepancies requiring complex and sophisticated attention, with greater than 200 beds and with all inhouse medical facilities [30].

Data collection procedure

Fourteen BSc nurses from health centers were trained as data collectors and two as supervisors. Questionnaires were distributed to participants with adequate time allocation, and supervisors followed the data collection process closely. A key informant interview was held in a safe and silent space with the help of audio recorders and a note book, and an average 20-minute probing time was employed in accordance with the participant's response.

Participants were allowed to express what they had to say openly without restriction concerning the issue.

Data quality control

The tool was pre-tested on 10% of nurses (38) at Kemis-sie Hospital for its appropriateness two weeks before the actual data collection. During data collection, the supervisors followed the day-to-day data collection process and ensured the completeness and consistency of the self-administered questionnaires each day before transferring them into computer software. Problems concerned with data collection were corrected early, and a non-overlapping numerical code was given for each question to enter in Epi-Data Manager version 4.6.

A silent place was chosen, high-quality audio recorders were used, and no book was used to describe exceptional

events and emotions. Open-ended questions were forwarded for key informant interviews, and probing was done accordingly. The key informant's interview was held without interruption, and additionally, issues that were not addressed were forwarded again by the principal investigator. In order to improve the data's dependability, the initial data, codes, classifications, and topics were kept.

Data processing and analysis

After data collection, responses were checked and entered into a computer using the Epi Data Manager statistical package, and SPSS version 26 was used for data analysis. Descriptive statistics (frequencies and percentages) were calculated for all variables. Initially, assumptions were checked prior to the binary logistic regression analysis. The logistic regression analysis model was fit

Table 1 Socio-demographic characteristics of study participants working at South Wollo Zone hospitals 2023 (N=419)

Variables	Categories	For quantitative	
		Frequency (N)	Percentage (%)
Sex	Male	183	43.7
	Female	236	56.3
Age	≤30	162	38.7
	31–40	184	43.9
	41–50	57	13.6
	> 50	16	3.8
Marital status	Single	91	21.7
	Married	303	72.3
	Divorced and widowed	19	4.5
	Windowed	6	1.5
Educational status	Diploma	62	14.8
	Bachelor degree	331	79.0
	Master's degree	26	6.2
Experience	< 5years	323	77.1
	5–10 years	14	3.3
	> 10 years	82	19.6
Average working time/day (in hour)	≤8	404	96.4
	> 8	15	3.6
Average monthly income	≤6500	85	20.3
	6501–9000	215	51.3
	> 9001	119	28.4
Type of public hospital currently working	Primary hospital	54	12.9
	General hospital	168	40.1
	Comprehensive specialized hospital	197	47.0
Working unit	Inpatient	291	69.5
	Emergency	65	15.5
	Out Patient (OPD)	63	15.0
Position	Clinical professional role	402	95.9
	Managerial role	17	4.1

with a Hosmer and Lemeshow test of 0.89. Then, bivariable logistic regression analysis was carried out to see the association between the outcome and each explanatory variable. Sixteen variables with p -value less than 0.25 in bivariable logistic regression were exported to multivariable logistic regression analysis and a p -value < 0.05 was used to declare a statistical significance with respective crude and adjusted odds ratios.

For qualitative data, key informant interviews in the Amharic version of audiotape records were transcribed and translated to English, then entered into open code software for thematic analysis. The translation and transcription were done by the principal investigator after repeated listening based on Jefferson' transcription code. Firstly, we went over the transcripts, listened to the recorded interviews, and then read them again to make sure we understood the information. Then, we categorized, classified, and highlighted all significant meaning units, text, and content linked to the study's objectives. Since we were using open code software, we were free to make changes and additions to the codes at any time while they were being written. After analysis, the results were presented and triangulated to support the quantitative findings.

Result

Socio-demographic characteristics of study participants

A total of 419 study participants were involved in this study, with response rate of 100%. Of all, two hundred thirty-six (56.3%) were females, while nearly four fifth (79%) were bachelor degree holders, and only 26(6.2%) were masters. Majority of participant's (72.3%) were married, and 404 (96.4%) were working for 8 and less hours. The median working experience was 9 years. Regarding salary, more than half (51.3%) were paid 6501–9000 Ethiopian Birr (ETB) per month, and the median salary was 8017 ETB (Interquartile Range (IQR) -1985). (Table 1)

Knowledge about EBP, language skill, and availability of time

Among all, 151 [36%, 95% CI: (31.4–40.6)] of them had inadequate knowledge about EBP in nursing process. Nearly two fifth (39.6%) had difficulty of interpreting literatures while two hundred eighty-four (67.8%) reported that they have no enough time to search evidences from different sources. (Table 2)

Attitude towards EBP implementation in nursing process among nurses

Among all, 94 [22.4%, 95% CI: (18.4–26.4)] of them had unfavorable attitude towards implementation of EBP in nursing process. (Table 3)

Table 2 Knowledge about EBP, language skill, and availability of time for study participants in South Wollo Zone Public hospitals, Northeast Ethiopia

Variables	Category	N (%)
Heard of the term evidence-based practice or related terms?	Yes	295(70.4)
	No	124(29.6)
Source of information?	Education	96(22.9)
	Colleague	154(36.8)
	Training	58(13.8)
	Other	5(1.2)
		195(46.5)
Able to identify a site for evidences	Yes	195(46.5)
	No	53.5
From where you found clinical information when you need to update yourself?	PubMed	86(20.5)
	CINAHL	7(0.3)
	textbooks	68(16.2)
	Medscape	23(5.5)
	HINARY	6(1.4)
	Up-to-date	22(5.3)
	Other	5(1.2)
		145(34.6)
Face difficulty understanding research reports?	Yes	145(34.6)
	No	274(65.4)
Reason for facing difficulty	Difficulty understanding statistical data	80(19.1)
	Difficulty understanding epidemiological terms	56(13.4)
	Language problem	18(4.3)
	Other	6(1.4)
Know the steps for EBP practice?	Yes	180(43)
	No	239(57)
How many steps are there for evidence-based practice?	3	81(19.3)
	4	71(16.9)
	5	30(7.2)
Know implications of research information for clinical practice	Yes	364(86.9)
	No	55(13.1)
What is the importance?	Improve patient outcomes	117(27.9)
	Increases the quality of care	140(33.4)
	Means for learning	29(6.9)
	All	100(23.9)
Know how to implement EBP sufficiently to change practice	Yes	358(85.4)
	No	61(14.6)
Over all knowledge about EBP	Poor	151(36)
	Good	268 (64)
Do you have language problem?	No	252 (60.4)
	Yes	166 (39.6)
Availability of time to search	No	284 (67.8)
	Yes	135(32.2)

Organizational factors

Three hundred fifty-two (84%) of the participants didn't take training about EBP in the nursing process, while nearly four fifth (79.5%) had no internet access. Two hundred fifty (59.7%) reported that they have no ability to influence the existing clinical practice. Similarly, two hundred sixty-one (62.3%) did not get support from their managers to implement EBP in the nursing process. Furthermore, nearly half (49.6%) reported that there were no guidelines for EBP in the nursing process. (Table 4)

Nurses' implementation of evidence-based practice in nursing process

According to the result, participants who had poor implementation of evidence-based practice in nursing process were 228 [54.42%, 95% CI: (49.8–59.3)]. (Fig. 2)

Factors associated with nurses' implementation of EBP in nursing process

Variables which had an association with implementation of EBP in nursing process at p value < 0.25 in bivariable logistic regression were age, level of institution,

Table 3 Attitude towards EBP implementation in nursing process for study participants in South Wollo Zone Public hospitals, Northeast Ethiopia (N=419)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Implementing EBP in nursing process will improve the care that I deliver to my patients.	2 (0.50)	6 (1.4)	67 (16)	268 (64)	76 (18.1)
Evidence-based practice in nursing process is relevant to my profession.	1 (0.2)	10 (2.4)	80 (19.2)	261 (62.4)	66 (15.8)
Critically appraising evidence in nursing process is an important step in the EBP process.	0 (0)	14 (3.3)	134 (32.0)	218 (52.0)	53 (12.6)
Research articles from trusted sources about nursing process are relevant to daily practice	1 (0.2)	31 (7.4)	170 (40.6)	167 (39.9)	50 (11.9)
comments provided by colleagues about nursing process that are based on established evidence could be accepted	1 (0.2)	51 (12.2)	177 (42.2)	140 (33.4)	50 (11.9)
Clinical decision-making practice based on evidence about nursing process is time-saving	6 (1.4)	53 (12.6)	172 (41.1)	129 (30.8)	59 (14.1)
Overall attitude score	Favourable attitude			325	77.6
	Unfavourable attitude			94	22.4

Table 4 Organizational factors associated with implementation of EBP in nursing process in South Wollo Zone Public hospitals, Northeast Ethiopia (N=419)

Variables	Category	Frequency(N)	Percentage (%)
Presence of library	Yes	378	90.2
	No	41	9.8
Take training on EBP	Yes	67	16
	No	352	84
Internet access	Yes	86	20.5
	No	333	79.5
Support from managers	Yes	158	37.7
	No	261	62.3
Availability of computer	Yes	82	19.6
	No	337	80.4
Availability of guideline	Yes	211	50.4
	No	208	49.6
Able to influence the existing clinical practice	Yes	169	40.3
	No	250	59.7

availability of internet access, training on EBP, and support from managers. All these variables were entered into multivariable logistic regression to identify factors. However, in multivariable logistic regression, only age, level of institution, internet access and taking training on EBP were associated with implementation of EBP in nursing process at P value of 0.05. Accordingly, 61% of nurses whose age was 31–40 years old were less likely to have poor implementation towards EBP in the nursing process [AOR=0.61, 95% CI: (0.38–0.99)]. Furthermore, participants who were working at general, and comprehensive and specialized hospitals were 3.4 times [AOR=3.37, 95% CI: (1.39–8.179)] and 7.3 times [AOR=7.29, 95% CI: (3.07–17.31)] more likely to have poor implementation of EBP in the nursing process, respectively, compared

to those working at primary hospitals. Similarly, participants who didn't take training about EBP were 2.5 times more likely to have poor implementation of EBP in the nursing process [AOR=2.50, 95% CI: (1.36–4.56)]. Moreover, nurses who didn't have internet access were 2.5 times more likely to have poor implementation of EBP in the nursing process when compared to those who had internet access by any means [AOR=2.46, 95% CI: (1.43–4.23)]. (Table 5)

Qualitative findings

The qualitative data gained from 15 key informants. Of them, ten were males while eight of them were a master's degree holder. Two of them were managers, and the rest 13 were supervisors (department heads). Moreover, twelve were working in inpatient departments. (Table 6)

The open code analysis output showed that a number of codes with a variety of repetitions merged to form nine subthemes, and again, these subthemes merged to produce three main themes: level of implementation of EBP, factors affecting implementation of EBP, and opportunities to implement EBP. (Table 7).

Theme 1: nurses implementation of EBP in nursing process

The majority of key informants reported that implementation of EBP in nursing process is suboptimal.

"As to my observation in the last 11 years, most of us including me are initiated to see the updated information such the nursing diagnosis terms from accessible sources. If one can not update him/her self, how can he/she implement EBP in nursing process or nursing care. In general speaking, nurses' implementation of EBP in nursing process is very low. Nurses' update themselves only when they are trained officially." (A 36 years old head nurse).

"The answer for the question for how much nurses implements EBP in nursing process is sub optimal because

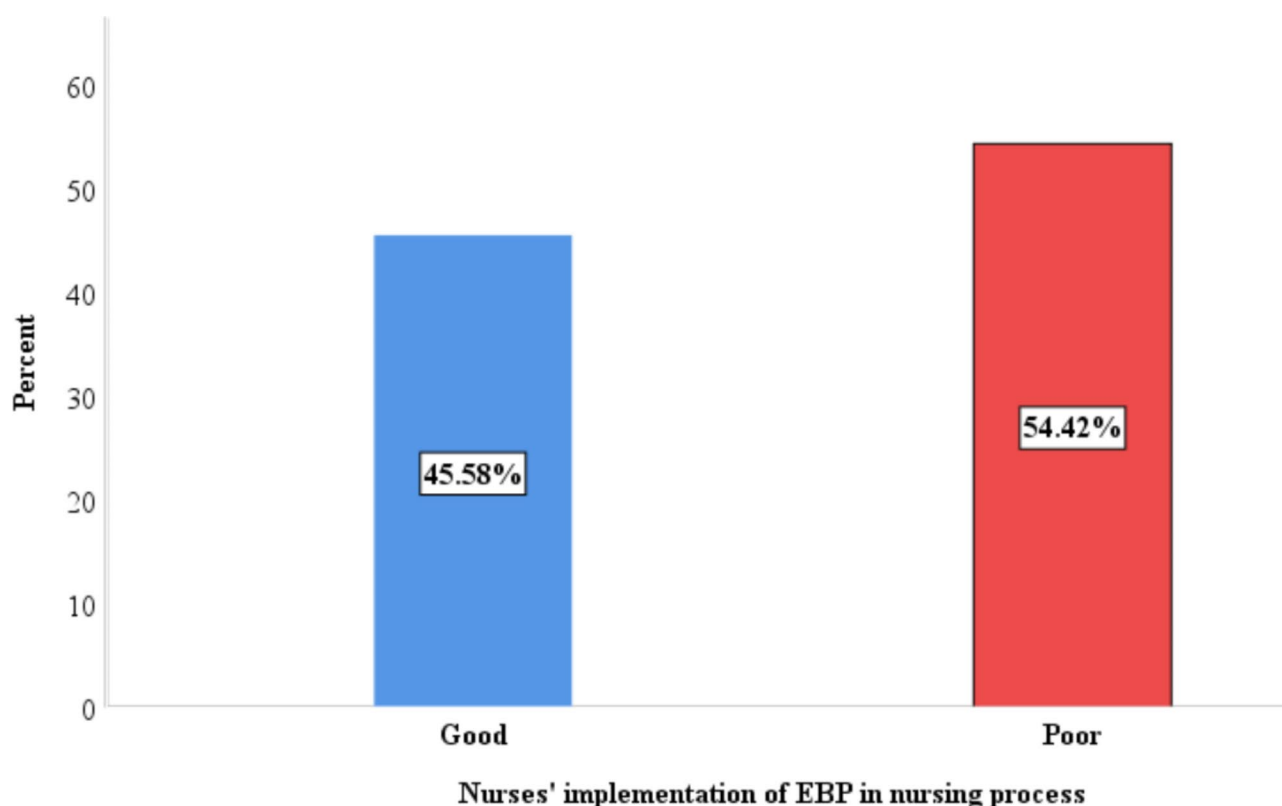


Fig. 2 Percentage of nurses' implementation of EBP in nursing process in South Wollo Zone Public Hospitals, Northeast Ethiopia, 2024

Table 5 Binary logistic regression analysis of factors affecting nurses' implementation of EBP in nursing process at South Wollo Zone hospitals (N=419)

Variables	Category	Nurses' implementation of EBP in nursing process		COR (95% CI)	AOR (95% CI)
		Poor	Good		
Age	≤30	68	94	1	1
	31–40	107	77	0.52(0.34–0.79)	0.61 (0.38–0.99)
	41–50	42	15	0.26(0.13–0.50)	0.32 (0.15–0.65)
	> 50	11	5	0.33(0.11–0.99)	0.47 (0.15–1.50)
Level of health institution	Primary	47	7	1	1
	General	101	67	4.45(1.90–10.44)	3.37 (1.39–8.18)
	Comprehensive	80	117	9.82(4.22–22.8)	7.29 (3.07–17.31)
Availability of internet access	Yes	28	58	1	1
	No	200	133	3.12(1.89–5.14)	2.46 (1.43–4.23)
Training on EBP	Yes	21	46	1	1
	No	207	145	3.13(1.79–5.46)	2.50 (1.36–4.56)
Support from Managers	Yes	134	127	1	1
	No	94	64	1.39(0.93–2.07)	

if nurses' are trained well on the updated and new evidences, they can implement it. The problem is nurses are not able to update themselves and implement EBP in nursing process."(28 years matron).

Theme 2: factors associated with implementation of EBP in nursing process

Subtheme 1: sociodemographic characteristics

Qualitative data support the quantitative finding, as the majority of key informants mentioned that younger nurses, those with masters and above, could exercise evidence-based practice in the nursing process.

Table 6 Sociodemographic characteristics of key informants in South Wello Zone Public hospitals, Northeast Ethiopia, 2023

Variable	Category	Frequency
Sex	Male	10
	Female	5
Age	<= 30 years	2
	31–40 years	9
	41–50 years	4
Educational status	Bachelor degree	8
	Master's degree	7
Current position	Head	13
	Matron	2
Work experience	< 5 years	1
	5–10 years	6
	> 10 years	8
Type of hospital they are working	Primary hospital	5
	General hospital	5
	Comprehensive specialized hospital	5
Working unit	Inpatient	12
	Emergency	3

Like, “I believe it is not well practiced in our hospital setup; nurses may also not be familiar with it except for masters and some other highly active professionals. What differentiates masters and youngsters in this regard, he said once more. Those who are older and more remote from recently updated internet-available scientific explanations are less active in using their handphones to access updated evidence than newly graduated nurses. They may not even own a smartphone and may not be comfortable with how to use one, which prevents them from using evidence-based nursing practices.”(38 years old head nurse).

Subtheme 2: personal interest and skill related factors

The finding from qualitative analysis illustrated that knowledge and attitude of nurses towards EBP were among the determinant factors of implementation of EBP in the nursing process. The majority of the informants reported that low awareness of nurses about EBP, not updating oneself, lack of interest in using evidence among nurses, inability to understand scientific papers due to language barriers, misunderstanding of findings, and poor habit of reading were among the factors that were categorized under the subtheme personal interest and skill related factors. One replied for the question,

“what are the factors affecting the implementation of EBP in the nursing process?” as

“Nurses are rarely encouraged to take advantage of opportunities to do it, and some are unaware of its relevance. I believe it has to do with our bad reading habits. Even many of us didn't know where to look for scientific explanations and recommendations.”(37 years old head).

Subtheme 3: organizational factors

The majority of key informants reported that the hospital environment is not convenient to exercise EBP. There is a lack of technologically advanced materials, organizations are not supportive of EBP, there is a lack of training about EBP, there is a lack of free internet access, and computers are among the factors affecting the implementation of evidence-based practice, which are under the subtheme organizational factors. Additionally, key informants probed to justify the relationship between nurses' implementation of EBP in the nursing process and internet access. The majority of key informants replied that the current charge for internet access with mobile data is not affordable for many nurses.

“I am aware of how expensive it is to utilize mobile data for any web access requirements. To be completely honest, it is currently impossible to even fully recharge a mobile phone for call service. Every department should have access to computers and the internet within the hospital's compound.”(38 years old key informant).

The majority of respondents explained the possible reasons behind many of the organizational problems, as the majority of key informants said financial constraints and the poor attention of higher officials regarding them were prior problems. One replied for the question, “what makes it difficult to avail resources that are important to implementing EBP?” as

“I believe there should be funding for it, but instead, the budget was allocated mostly for medical expenses and other matters, and administrative bodies, including myself, paid it less attention.” (Key informant 6 (matron), whose age is 46 years old).

Theme 3: opportunities of nurses to implement EBP in nursing process

Having a chance to work with expertise, going to other health care setting for experience sharing, meeting

Table 7 Themes and subthemes from open code analysis of nurses' implementation of EBP and associated factors in South Wollo Zone Hospitals, Northeast Ethiopia

Main themes	Subthemes
Nurses' implementation of EBP in nursing process	Its implementation
Factors affecting nurses' implementation of EBP in nursing process	Personal interest and technical skill related factors
	Organizational factors
Opportunity of nurses to implement EBP in nursing process	Sociodemographic opportunities
	Opportunities to implement EBP

different individuals and attending seminars and workshops were the opportunities that enable nurses to implement EBP in nursing process.

"I tried to apply EBP while caring for my patients, particularly while using the nursing process as a framework. I gathered some updated information while reading articles during my thesis work for six months. I also got updated information during my postgraduate class. If I don't have these opportunities, it is difficult to provide care with the updated information."(Key informant 12, whose age is 37).

, replied

"As to me, nurses applied EBP in nursing process and other nursing services when someone told them the updated information in a certain circumstance. The main circumstance at which nurses update themselves is training. Nurses under my supervision are highly cooperative if they are told new information."(Key informant 10, whose age is 47).

"Nurses who are working with senior physicians are more likely implement EBP since they got updated information while they working with them. Without having such opportunity, it is difficult for nurses to seek evidences and apply accordingly"(Key informant 6, whose age is 34).

Discussion

This study aimed at assessing nurses' implementation of evidence-based practice in the nursing process and associated factors in South Wollo Zone hospitals. The current study revealed that 54.42% [95% CI: (49.8–59.3)] of nurses had poor implementation of evidence-based practice (EBP) in the nursing process, which was supported by qualitative findings as the majority of key informants reported that implementation of evidence-based practice in the nursing process among nurses was low in their institution.

The proportion of study participants who had poor implementation of EBP in this study is slightly higher than studies conducted in Ethiopia, 47% in north Gondar [31], 45.5% in West Arsi [32] and 48.2% at Jimma [33]. The possible justification for this might be the difference in the leadership, administration and socio demographic characteristics. Nurses are motivated and improve their commitment to their duty when there is a good leader [34, 35].

On the other hand, the finding of this study is lower than those of the studies conducted in the Amhara region among nurses and midwives (65.2%) [36] and in South-west Ethiopia among health care workers (63.8%) [37]. The variation might be due to differences in the study population, as in the current study conducted among nurses, the formers included other health care workers. The difference might be occurred since nurses have

different knowledge and attitude towards EBP compared to others [38]. Furthermore, the result of this study is higher than the utilization level of health professionals in the study done in northwest Ethiopia [29]. The variation might be due to a difference in study population as it was conducted among health care workers at different institutional setups, which was only among nurses in the current study.

This study revealed that the odds of having poor implementation of EBP in the nursing process among nurses aged 31–40 years and 41–50 years were 61% and 32% less likely, respectively, when compared to that of nurses aged ≤30 years. This finding is supported by evidence that using updated evidence and technologies was declining as the age advanced and undoubtedly brought challenges for a generation born outside of the digitalized world prior to the internet age [39]. Unlikely, the majority of key informants replied that those who are old are fixed to old ways, and their participation in using currently available evidence and technologies in the nursing process is less likely.

Nurses who were working at general hospitals were 3.4 times more likely to have poor implementation of EBP in the nursing process, when compared to nurses who were working at primary hospitals. Similarly, nurses who were working at comprehensive specialized hospitals were 7.3 times more likely to have poor implementation of EBP in the nursing process, when compared to nurses who were working at primary hospitals. This may be due to the relatively high work load and patient flow in general and specialized hospitals [40]. Additionally, lack of support and mentoring, burnout and exhaustion, lack of continuing education, and fragmented nursing might be other reasons for the poor implementation in specialized and general hospitals [41].

Moreover, the odds of having poor implementation of EBP in the nursing process among nurses who didn't take training were 2.5 times more likely compared with those who took training. It was mentioned by the majority of key informants as one of the problems related to the implementation of EBP in the nursing process. It was a determinant factor in a systematic review of low- and middle-income countries in Zambia [42] and Gondar [43]. The possible reason for this might be the poor trend of low- and middle-income countries to update nurses with refresher training [44].

Nurses who have no internet access were 2.5 times more likely to have poor implementation of EBP in the nursing process when compared to those with internet access by any means. In the same way, lack of free internet access was among the challenges for EBP in the nursing process mentioned by key informants. They reflected that the current charge for internet access with mobile data is not affordable for many nurses. Studies showed

similar evidence in this regard [28]. Nowadays, guidelines, scientific evidence, and books are available online rather than in paper form. This makes internet access a crucial way to use them well.

Strength and limitation of the study

The study assessed factors using a mixed method design and focused on the implementation of EBP in a specific nursing clinical care, the nursing process. Moreover, the study was conducted in multiple healthcare settings.

Conclusion

Nurses' implementation of EBP in the nursing process was low. Being 30 years of age and above; working at a general and comprehensive specialized hospital; lack of training about EBP; and internet access were among the variables that were significantly associated. The qualitative findings support the low nurses' implementation of EBP in the nursing process and mentioned lack of internet access, the presence of computers, libraries, and updated guidelines as critical factors affecting the EBP in the nursing process. Hence, hospitals needed to have internet access to enhance access to updated medical evidences, particularly for those aged above thirty years old. In addition, the Ministry of Health, nursing professional associations, and partners should provide capacity building (such as training, mentorship, etc.) on EBP and infrastructures and resources (libraries, computers, and other digital devices) for nurses to utilize updated guidelines in each hospital. Moreover, we recommend quality offices within health facilities to support nursing managers in improving nursing care process utilization through different quality improvement projects and clinical audits.

Acronyms and Abbreviations

AOR	Adjusted Odds Ratio
CI	Confidence Interval
EBP	Evidence Based Practice
SPSS	Statistical Package for Social Sciences

Supplementary Information

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Supplementary Material 1

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Author contributions

NF and AB conceived, designed, and collect the data. AE performed analysis, interpretation of data, advised and supervised the design conception. BT and TL drafted the manuscript. All authors read and approved the final Manuscript.

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Data availability

Data is provided within the manuscript.

Declarations

Ethics approval and consent to participate

Ethical approval was written with reference number TCOM/Res/1217/2015 on February 5, 2023, from the Tropical College of Medicine ERC (Ethical Review Committee). Permission was obtained from each hospital administrator after explaining the purpose and all the processes to set the appropriate data collection time by considering workload. All methods were carried out in accordance with relevant guidelines and regulations. Each participant gave their informed consent before taking part in the research. The individual participant had not been subjected to any harm as far as confidentiality is concerned.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Nursing, Debre Markos University, Debre Markos, Ethiopia

²Tropical College of Medicine Dessie Campus and Dessie Comprehensive Specialized Hospital, Dessie, Ethiopia

³Department of Nursing, Injibara University, Injibara, Ethiopia

⁴Department of Nursing, Wollo University, Dessie, Ethiopia

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