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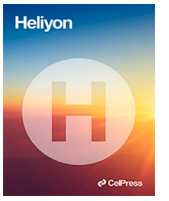

Clinical competency and associated factors among undergraduate nursing students studying in universities of Southern regional state of Ethiopia, 2021

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ABSTRACT

Background: Clinical practice is the means by which nursing students learn to apply the theory, facilitating integration of theoretical knowledge and practical skill in the clinical setting which becomes arts and science of profession. This correlation of theory and practice, and the building of meaningful experience, take place during clinical practice in the health care service. Even though, nursing students need to have clinical competency during practical setting, there were little available evidences regarding to their competency status in Ethiopia. Therefore, this study was aimed to assess magnitude of clinical competency and its predictors among undergraduate nursing students studying in universities of Southern regional state of Ethiopia in 2021 G C.

Methods: Multi-centered institutional based cross-sectional study was conducted among 414 undergraduate nursing students studying in eight universities of Southern regional state of Ethiopia in 2021 academic year. Systematic random sampling technique after proportional allocation to each selected university was used to select the study participants. Data were collected using pretested structured questionnaire by face to face interview after written informed consent was obtained from each participant. Data were cleaned, coded and entered into Epidata version 3.01 and analyzed using statistical package for social science (SPSS) software version 26. Descriptive statistic for all variables and bi-variable and multi-variables logistic regression analysis to identify factors associated with clinical competency was computed and expressed in odds ratio. The result

Abbreviations: **AOR**, adjusted odd ratio; **CI**, Confident interval; **COR**, crud odd ratio; **EBP**, evidence based practice; **SPSS**, Statistical Package for the Social Science.

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was presented in the form of text, tables and figures and those variables with *P*-value of <0.05 in multivariable analysis were declared as statistically significant.

Result: From 423 total calculated sample sizes, 414 of them were participated in this study giving a response rate of 97.8%. From those participants, 248 (59.9%) of them has clinical competency [95% CI: (55.18%, 64.62%)]. In multivariable analysis, studying in post basic program [AOR: 5.58], conducive clinical learning environment [AOR: 4.10], good staff-student interaction [AOR: 7.44], satisfaction [AOR: 20.66] and positive attitude towards clinical practice [AOR: 2.49] were factors significantly associated with clinical competency.

Conclusion: In this study, the overall magnitude of clinical competency was found to be unsatisfactory (59.9%). Studying in private program, non-conducive clinical learning environment, poor staff-student interaction, low satisfaction and negative attitude towards clinical practice were identified as factors associated with clinical incompetency. Policy makers, universities and teaching health facilities need to work collaboratively to create nurses with clinical competency by focusing on proper screening to select candidates for studying in private program, creating conducive clinical learning environment, integrating students with clinical staffs to facilitate learning and positive attitude change of students towards their profession to increase level of satisfaction.

1. Background

Nursing is both an art and a science of giving care and helping a patient by providing smooth relationship with him/her to achieve clients' optimal health [1]. Nursing students are expected to achieve the maximum level of clinical competency during the study time [2]. Since it is a practice-based profession, learning in the clinical environment is an important component of health sciences education [3]. Clinical practice helps nursing students to improve their skills and adapt to professional roles [4]. The outcome of effective learning in a clinical setting is achieving clinical competency, which is the ability to successfully apply professional knowledge, attitudes and skills to new situation [5]. Competency can also be described as a person's major and essential skills related to job performance [6]. Clinical competency is the ability to effectively integrate cognitive, affective and psychomotor skills while providing health care [7]. It is a basic requirement that nurses should have in clinical settings to improve quality of health care services [8]. Clinical learning experience as an integral aspect of skill development is essential for health science students to acquire clinical competency and abilities to learn independently, make decisions and express ethical commitments about the condition of the client while joining health care institutions [9].

Researcher evidences have shown that many graduate nurses' have clinical incompetency. The study done among 10 European countries showed that there were differences between the levels of clinical incompetency in each country and ranging from 39.9 to 50 [10]. Another study conducted in Annals' University of Finland among graduating nursing students showed the levels of clinical incompetency was 32.3% [11]. Similarly, the study conducted in Iran showed that 50% of nursing and midwifery students had clinical incompetency [12]. In Ethiopia, the magnitude of clinical incompetency was high ranged from 51.3 to 74.8% [3,13–17].

Currently, the poor quality of skills of health professionals is a great concern of Ethiopian government and public sectors. It is also an important cause of mal-practice and low client satisfaction as reported in many health facilities. Even if nursing faculties are responsible to train nurses who have high level of clinical competency to satisfy the needs of all concerned bodies, shortage of nurses having clinical competency is still the major challenge and serious issue particularly in sub Saharan Africa countries including Ethiopia [18]. Clinical practice problems of health professionals can negatively affect client care, other staff, team work and the work place in general. In Ethiopia, lack of nurse's clinical competency is one of the major reasons for changing of educational curriculum from three-year program to a four year program [19]. The following factors were identified in previously conducted researches as inhibiting clinical competency; high levels of stress and anxiety [16], poor interpersonal relationship [20], inadequate demonstration room in the university [21], theory-practice gap [22], inadequate clinical time [3], overcrowded clinical facilities [21], shortage of equipment and staff [21], and lack of feedback [23]. Even if efforts has been made to increase clinical competency of health science students, still it is a problem and hindering factors are poorly understood in Ethiopia. Therefore, the main aim of this study was to identify determinant factors of clinical competency among undergraduate nursing students studying in universities of Southern regional state of Ethiopia based on Benner's skill acquisition theory.

1.1. Conceptual framework

This study was based on Benner's Novice to Expert skill acquisition theory. Benner's skill acquisition theory introduced by Dr Patricia Benner in 1982 is generated from the Dreyfus Model of Skill Acquisition and essentially discusses how an individual gains new skills and knowledge from novice stage to expert stage [24]. Patricia Benner's model stands on how a nurse develop nursing knowledge, skill, clinical competence and comprehension of patient care through complete theoretical training and experiential learning from novice stage to expert stage [24]. Development through these phases is affected from clinical experience, length of working time in profession [24].

2. Methods

2.1. Study design, setting and sampling

Multi-centered institutional based cross-sectional study was conducted among under graduate nursing students of south region universities of Ethiopia from July July 15, 2021 to September September 30, 2021. Ethiopia has currently 10 regional administrative states and 2 city administrative states. There were a total of 51 higher educational institutions in Ethiopia and 12 of them were found in south regional state of Ethiopia. From those higher institutions only 8 of them have nursing schools in regular, private (the students in this program are self-sponsored and either generic or post diploma with minimum of 2 years work experience), and post-basic (the students in this program are government sponsored and must be post diploma with minimum of 2 years working experience) programs, namely; Wolkite University, Hawassa University, Wachamo University, Wolayita Sodo University, Arbaminchi University, Dilla University, Metu University and Mizan-Tepi University. There were a total of 1140 under graduate nursing students on 2021 academic year in those universities. Undergraduate nursing students studying at eight universities of southern regional state of Ethiopia in 2021 academic year were included in this study.

This study has two specific objectives; firstly to assess the magnitude of clinical competency and secondly to identify factors associated with clinical competency among undergraduate nursing students studying at universities in the Southern regional state of Ethiopia.

The required sample size for the first objective was calculated by single population proportion formula by using the prevalence of clinical competency as 48.7% based on study conducted at University of Gonder and Bahir Dar University [3], 95% confidence interval, 5% (0.05) margin of error and adding 10% for possible non response rate which becomes 423. Sample size for the second objective was computed by double population proportion formula using Epi-info 7 software, 95% confidence interval, 5% (0.05) margin of error, 90% power, 1:1 ratio of exposed to non-exposed outcomes and adding 10% for possible non response rate based on the study conducted at University of Gonder and Bahir Dar University; Ethiopia. Comparison was made on the calculated values and the maximum value of 423 was taken as the final sample for this study.

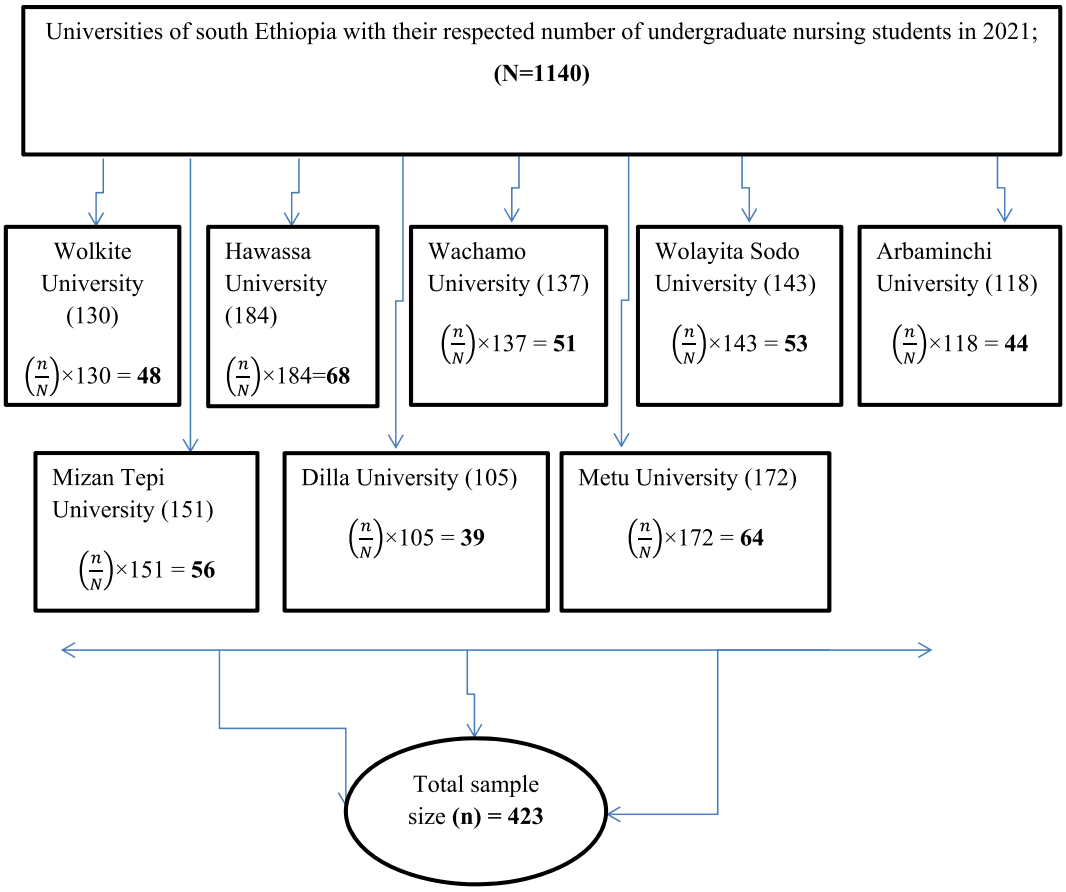

Fig. 1. Schematic presentation of sampling procedure to select the study participants of undergraduate nursing students studying at universities in Sothern region; Ethiopia, 2021.

From a total of 12 universities in southern regional state of Ethiopia 8 of them were purposively selected for having nursing schools in regular, private and post-basic programs and systematic random sampling technique after proportional allocation to those university, using students identity number as a sampling frame were used to select study participants every K (K = 2) value. (Figure1).

2.2. Operational definitions

Clinical competency: Those who scored 50% and above of all competency domain assessment questions [7]. **Clinical incompetency:** those who scored below 50% of all competency domain assessment questions [15]. **Good staff and student interaction:** those who have 2/3 and above of good staff and student interaction characters [15]. **Satisfaction to clinical practice:** Students who scored above the mean score of all satisfaction assessment scales [25]. **Favorable attitude towards clinical practice:** Those who scored above the mean score of all attitude assessment scales [26].

2.3. Data collection tool and procedure

Structured questionnaire developed after the review of different literatures was used as a data collection tool [14–16,26]. Data collection instrument was first developed after intensive review of different literatures and then it was pretested and adapted into local context. The content validity of the tool was ensured by expert evaluation, in addition to using a questionnaire validated in another similar studies [15] and also its reliability was tested by using cronbach's alpha value, which revealed high reliability (0.85). The data were collected using self-administered structured questionnaires. The data collection instrument contains 7 parts: Socio-demographics related questions, which includes; sex, age, religion, ethnicity, residence, substance use and cumulative grade point average (CGPA) of students. Clinical competency was measured using five domains; domain 1, ethical practice (8 items), and domain 2, holistic approaches to care and the integration of knowledge (21 items), domain 3, interpersonal relationships (8 items), domain 4, organization and management of care (3 items) and domain 5, personal and professional development (2 items) and total of 42 items scored on 1 to 5 based on the students perception of their performance. If the student perceives that he/she cannot perform activities satisfactorily to the level required in clinical environment scores 1, if perform activities, but require supervision and assistance scores 2, if can perform activities without assistance scores 3, if can perform activities without assistance and adhering to evidence based practice scores 4 and if can perform activities without assistance and adhering to evidence based practice plus demonstrate initiative to special problem situations, and can lead others scores 5. The rest five parts of the measuring instrument (instructor related (14 items), environmental related (7 items), staff-student interaction (3 items), assessment related (6 items), student's attitude related (14 items), and student's satisfaction (16 items)) related questions were measured using items rated on a five -point Likert scale as 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Eight BSc nurses and two supervisors were employed to collect data by using self-administered questionnaire after three day training by the principal investigator.

Table 1
Socio demographic characteristics of the study participant among undergraduate nursing students in Universities in Southern Ethiopia, 2021 (n = 414).

Variables characteristics		Frequency	Percentage (%)
Sex	Male	204	49.3
	Female	210	50.7
Age in years	≤24	316	76.3
	25–30	60	14.5
	>30	38	9.2
Religion	Orthodox Christian	175	42.3
	Muslim	131	31.6
	Protestant	88	21.3
	Others	20	4.8
Marital status	Unmarried	370	89.4
	Married	44	10.6
Ethnicity	Guragie	169	40.8
	Oromo	122	29.5
	Amhara	100	24.2
	Others	23	5.6
Residence	Rural	175	42.3
	Urban	239	57.7
Substance use	No	363	87.7
	Yes	51	12.3
Program	Regular	202	48.8
	Private	108	25.1
	Post-basic	104	26.1
CGPA	<2.50	44	10.6
	2.50–2.99	68	16.4
	3.00–3.50	184	44.4
	>3.50	118	28.5

2.4. Data quality control

Data were collected by using pretested and structured questionnaire after experts' evaluation. Pre-test on 5% of the sample size was done at Addis Ababa Universities, Ethiopia and necessary correction was made before the actual data collection was proceeding. Data were entered in to Epi-data software was used for data entry and data were cleaned, coded and checked for completeness and accuracy before analysis. Three day training was given for all data collectors and supervisors for mutual consensus about data collection tool and procedure. The collected data were cross checked daily for completeness and consistency by the principal investigator.

2.5. Data analysis

After data were checked for completeness and consistency, it was entered in to EPI data version 3.1, coded and exported to SPSS version 25 for analyses. Data were analyzed for descriptive summery statistics and presented using text, frequency tables, graphs, percentage, mean and standard deviation.

Binary logistic regression analysis was computed, and all variables with p-value <0.05 in bi-variable logistic regression analysis were included in the multivariable logistic regression analysis. Association between variables was tested and expressed as an adjusted odds ratio (AOR) with 95% CI. Variables with a two-tailed *t*-test *P*-value of <0.05 were considered as statistically significant. In addition, variance inflation factor (VIF) and tolerance to check for multicollinarity and Hosmer and Lemeshow goodness of fit test to ensure for general model fitness was used.

3. Results

3.1. Socio-demographic characteristics

A total of 414 students were participated in this study giving a response rate of 97.8%. Out of 414 respondents almost half of respondents 210 (50.7%) were females and 204 (49.3%) were males. Regarding to age majority of the respondent 316 (76.3%) were $\leq$24 years. Regarding religions most of the participants 175 (42.3%) were orthodox Christians (Table 1). Less than half of participants 184 (44.4%) have cumulative grade point average (CGPA) ranging from 3.00 to 3.50 (Fig. 2).

3.2. Students and staffs related factors

Nearly half of the participants [202 (48.8%)] had poor interaction with clinical staffs and poor satisfaction with their clinical practice [203 (49%). From those study participants 169 (40.8%) of them had negative attitude towards clinical practice.

3.3. Clinical-instructor related factors

Among a total of 414 study subjects, 226 (54.6%) of them perceive their clinical instructors as poor and 244 (58.9%) of students perceived their clinical instructors way of assessment and their quality as poor.

3.4. Clinical learning environment related factor

Above half of the study participants [225 (54.3%)] perceived their clinical learning environment as non-conducive.

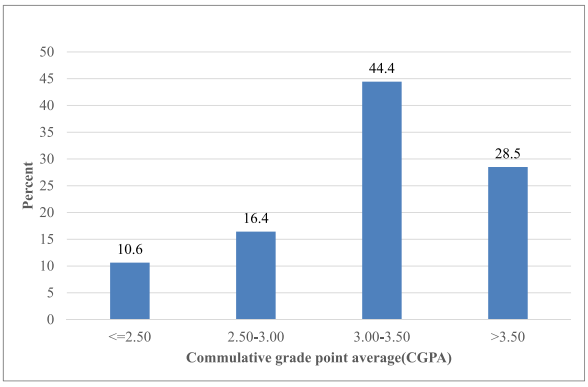

Fig. 2. Cumulative grade point average (CGPA) of undergraduate nursing students studying at universities in Sothern regional state of Ethiopia, 2021.

3.5. Magnitude of clinical competency

From those study participants, 248 (59.9%) of them has clinical competency [95% CI: (55.18%, 64.62%)].

3.6. Factors associated with clinical competency

Logistic regression analysis was computed to identify factors associated with clinical competency. In bivariate analysis, substance use, study program, staff-student interaction, clinical learning environment, instructor's quality, assessment quality, student's satisfaction toward the clinical practice and student's attitude were significantly associated with students' clinical competency at $p < 0.05$. However, in multivariate analysis, study program, staff-student interaction, environmental condition, student's satisfaction toward the clinical practice and student's attitude were significantly associated with clinical competency.

Final regression equation: Logit of clinical competency = 5.58*(study program) + 7.44*(student and staff interaction) + 4.10*(clinical environment) + 20.66*(satisfaction) + 2.49*(attitude) + 3.566.

Those students who studied in post-basic program had 5.6 times more clinical competency as compared to those studying in private program. Students having good interaction with staffs had 7 times more likely to had clinical competency as compared to those having poor interaction. Students with perceived conducive clinical environment were nearly 4 times more clinical competency than the opposite one. Satisfaction with the overall clinical practice increases the odds of students to had clinical competency by 20.7 times and those students having positive attitude towards clinical practice were almost 2.5 times more clinical competency than those students with negative attitude (Table 2).

4. Discussion

This was a study on clinical competency among undergraduate nursing students studying in universities of Southern regional state of Ethiopia. In this study the overall magnitude of clinical competency was 59.9% [95% CI: (55.18%, 64.62%)] and clinical incompetency was 40.1% [95% CI: (35.38%, 44.82%)]. The magnitude of clinical competency in this study was higher than studies conducted in Iran (50%) [12] in Dilla University, Ethiopia (39.3%) [14], Mettu University, Ethiopia (24.5%) [16], University of Gondar and Bahir Dar University (48.7.%) [3], universities in Northern Ethiopia (33.6%) [15]. The possible justification for this variation might be due to the fact that, others include all nursing students attending at least one clinical practice (second year and above), in contrast to the current study which includes only 4th year undergraduate nursing students, who were frequently exposed to clinical practice environment with better clinical experience and competency. In addition to these others were single centered studies, addressing only students studying in the regular program.

The magnitude of clinical competency in this study was lower than studies conducted Annals' University of Finland (67.7%) [11]. The possible justification for this variation might be due to the fact that Finland's study includes midwifes and also uses different measuring tool. Another possible justification might be due to the socio demographic variation among the participants.

In this study, students studying in post-basic program had 5.6 times more clinical competency as compared to those studying in private program, similar with a studies conducted in Hawassa, Ethiopia [21]. This might be due to; students studying in private program are usually recruited when they fail to score pass-mark for regular program and most of them have engaged in other areas of work, giving less emphasis for their clinical practice. In contrast to this, students studying in post-basic program were recruited from health care institutions to upgrade their professional level and easily adapt clinical learning environment with ability to achieve the required clinical competency [27]. Students having good interaction with clinical staffs were 7 times more clinical competency as

Table 2
Multivariate analysis of factors affecting clinical competency of nursing students studying in universities of Southern regional state of Ethiopia, 2021 (n = 414).

Explanatory Variable	Category	Competency NO	YES	COR (95% CI)	AOR (95% CI)	*P*-value
Substance use	Yes	27	24	1.81 (1.01, 3.27)	2.33 (0.67, 8.18)	0.185
	No	139	224	1.00	1.00	
Study program	Regular	75	127	3.25 (1.78, 5.94)	1.15 (0.41, 3.23)	0.790
	Private	75	33	12.5 (6.39, 24.47)	5.58 (1.75, 17.75)	**0.004**[a]
	Post basic	16	88	1.00	1.00	
Staff-student interaction	Good	26	186	1.00	1.00	**0.001**[a]
	Poor	140	62	16.15 (9.72, 26.84)	7.44 (3.24, 17.09)	
Clinical learning environment	Conducive	22	167	1.00	1.00	**0.001**[a]
	Not conducive	144	81	13.49 (8.01, 22.73)	4.10 (1.83, 9.23)	
Instructor quality	Good	19	169	1.00	1.00	0.202
	Poor	147	79	16.55 (9.57, 28.61)	1.79 (0.73, 4.38)	
Assessment quality	Good	16	154	1.00	1.00	0.326
	Poor	150	94	15.36 (8.64, 27.32)	1.63 (0.62, 4.28)	
Satisfaction	Satisfied	7	196	1.00	1.00	**0.001**[a]
	Not satisfied	159	52	85.62 (37.85, 193.68)	20.66 (7.60, 56.12)	
Attitude	Positive	38	207	1.00	1.00	**0.044**[a]
	Negative	128	41	17.01 (10.38, 27.85)	2.49 1.03, 6.02)	

[a] = *P*-value <0.05 (significantly associated factors).

compared to those having poor interaction with working staffs, which was consistent with studies in University of Gondar and Bahir Dar [3]. Working staffs have a responsibility to facilitate students learning during clinical practice by providing necessary information, guiding during nursing procedures, supporting in patient cares and integrating students with the clinical environment. To accomplish all those responsibilities students need to have good and professional relationship with clinical staffs that helps them to have clinical competency [28]. Also in this study, students with perceived conducive clinical environment were nearly 4 times more clinical competency as compared to those with perception of clinical environment as non-conducive for learning, consistent with study in Tanzania [4]. This is due to the fact that clinical environment with poor facilities, overcrowding, and distance from student's residency, hazardous and inadequate class rooms and libraries possess a great challenge for students during clinical practice and students practicing in those areas may have clinical incompetency than those studying in conducive environment [29]. In this study, students with good satisfaction with the overall clinical practice were 20.7 times more clinical competency than the counterpart and having positive attitude towards clinical practice increases the odds of clinical competency by 2.5 times as compared to those students with negative attitude. Students usually feel dissatisfied when they perceived that they don't achieve clinical learning objectives and required competency. Dissatisfaction with clinical practice may be related to less supportive environment, poor facilities and negative attitude towards their profession. Lack of motivation, seeking less attention for clinical practice, lack of reward for their best performance, discrimination, incongruence between theory and real practice and discouraging environment may leads to negative attitude for clinical practice and associated clinical incompetency [30].

5. Conclusion

In this study, the magnitude of clinical competency was found to be unsatisfactory (59.9%). Factors associated clinical competency was studying in post-basic program, perceived conducive clinical learning environment, good staff-student interaction, satisfaction and positive attitude towards clinical practice. These, policy makers, universities, teaching health institutions and instructors should work collaboratively focusing on private program studies, creating enabling clinical teaching environment, smooth relationship with clinical staffs and maintaining positive attitude of nursing students towards their profession.

5.1. Limitation of the study

The study was not supported by qualitative methods (the actual clinical practice may not be observed) and it may introduce desirability bias. It may also vulnerable for all drawbacks of cross sectional study design.

Consent for publication

Not applicable.

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Ethical considerations

Ethical clearance and support letter was obtained from Wolkite University ethical review committee with approval number RCS/127/46 and signed informed consent was obtained from each participants. To protect and respect the privacy of participants, we avoid personal identifiers; use coded data, keeping data in confidential place and using the data for research purpose only. COVID-19 preventions measures were applied throughout the data collection process and all methods were performed in accordance with the regulations and guidelines of Wolkite University.

Author contribution statement

Tamene Fetene Terefe and Haimanot Abebe Geletie: Conceived and designed the experiments; Analyzed and interpreted the data.

Fisha Alebel GebreEyesus, Tadesse Tsehay Tarekegn and Baye Tsegaye Amlak: Analyzed and interpreted the data; Wrote the paper.

Kassa Kindie, Omega Tolessa Geleta and Agerie Aynalem Mewahegn: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

Bogale Chekole Temere and Shegaw Tesfa Mengist: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

Masino Tessu, Alemayehu Wondie and Belayneh Mengist: Analyzed and interpreted the data; Wrote the paper.

Data availability statement

Data included in article/supp. material/referenced in article.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.heliyon.2023.e18677.

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