

Nurse–Physician Inter-Professional Collaboration and Associated Factors at Public Hospitals in Dessie City, Amhara, Northeastern Ethiopia, 2021

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Introduction: Nurse–physician collaboration is an integral part of quality improvement in health care. Collaboration enables individuals to work together to achieve defined and common health purposes. There is limited evidence related to nurse–physician inter-professional collaboration and its associated factors in Ethiopia, particularly in Dessie city public hospitals.

Objective: To assess nurse–physician inter-professional collaboration and associated factors at public hospitals in Dessie city, Ethiopia, 2021.

Methods: An institutional-based cross-sectional study was conducted among nurses and physicians at public hospitals in Dessie city. A self-administered questionnaire was used for data collection. Stratified simple random sampling techniques were used to select study participants proportional to the sample size allocation. The final sample size was 260 and allocated proportionally to Dessie Comprehensive Specialized Hospital and Boru Meda General Hospital. The data were entered and analyzed using EPI-data version 4.6 and SPSS version 26 software respectively. During analysis, p-values less than 0.25 in binary logistic regression were entered into multivariable logistic regression. Finally, p-values less than 0.05 in multi-variable logistic regression were considered statically significant.

Results: The mean score for inter-professional collaboration was $97.40 \pm 19.6SD$. In this study, inter-professional collaboration among nurses and physicians was 44.2%. This study showed that favorable attitude [AOR=3.205; CI: 1.781–5.766], respondents working in the gynecological department [AOR=0.210; CI: 0.052–0.849], satisfied organizational support [AOR=2.062; CI: 1.140–3.729] and urban residents [AOR=3.996; CI: 1.069–14.931] were factors associated with nurse–physician inter-professional collaboration.

Conclusion: In this study, nurse–physician inter-professional collaboration was low. Training on the importance of health teamwork, timely monitoring and evaluation of organizational support, and professional empowerment towards a favorable attitude of nurse–physician inter-professional collaboration shall be provided at hospital levels. Routine assessment and timely intervention of the gynecological department for nurse–physician inter-professional collaboration shall be done at hospital levels. Moreover, both quantitative and qualitative research shall be performed for future research.

Keywords: inter-professional, collaboration, nurse, physician, associated factors

Introduction

Inter-professional collaboration occurs when two or more professions work together to achieve common goals and it is often used as a means to solve a variety of problems and complex issues.^{1,2} Inter-professional collaboration is a process that involves communication and decision-making, enabling an influence by the synergy of grouped knowledge and skills.³

Inter-professional collaboration between nursing and physicians is described as working together, sharing decision-making around health and social issues, formulating and carrying out plans for patient care, and solving patients'

problems. This determines the overall health care and services.^{1,4} Health care system complexity demands policy changes in the health system. Health care professionals must deal with multi-disciplinary work to accomplish different programs.⁵

The rapidly growing health care system and in complexity requires the integration of various systems.¹ This broader sector needs collaboration between each department and individual to reduce the complexity of care by providing clear communication between workers.⁶ Inter-professional collaboration among health professionals generally occurs when multiple health workers from different professional backgrounds work together with patients, families, caregivers, and communities to deliver the highest quality of care.⁶ In health care, collaboration increases teamwork between health care professionals to deliver better care.^{2,6}

The World Health Organization (WHO) defines inter-professional collaboration practice (IPCP) as a collaborative practice in health care that occurs when multiple health workers from different professional backgrounds provide comprehensive care.⁷ Collaboration between physicians and nurses is vital for patient care and for building a good working environment.^{6,8,9} Collaboration between physicians and nurses' has many advantages in improving clinical outcomes and patient satisfaction. It also decreases the institutional cost, and quality of drugs, and improves behavioral interactions.⁶

Collaboration between physicians and nurses also provides satisfaction within the profession and increases their knowledge and skills. Collaboration between nurses and physicians helps health professionals resolve their problems.³ Generally, positive nurse–physician inter-professional collaboration is very important in creating safe, effective care, and a satisfying practice environment to provide quality patient care and decrease morbidity and mortality.¹⁰

Health professional collaboration is considered one of the healthcare goals because healthcare organizations need many interactions and collaborations between different healthcare professionals with varying levels of education and professional qualifications to provide effective care. It is necessary to ensure that health care teams are efficient and able to provide collaboration and joint decision-making between clients.^{8,10}

Materials and Methods

Study Area and Period

This study was conducted in Dessie town, northeastern Ethiopia. Dessie is a town with a distance of 400 km from Addis Ababa, Ethiopia, and 471 km from Bahir Dar, which is the capital city of the Amhara regional state. In Dessie town, there are governmental and private health institutions. In Dessie town, there were two public hospitals. In Dessie Comprehensive Specialized Hospital, there were 622 health care workers. Among these, 318 were nurses and 201 were GP (40 specialists).²² Another public hospital was Boru Meda General Hospital which had 103 nurses and 37 GPs.²³ The study period was from April 15 to June 15, 2021.

Study Design

An institution-based cross-sectional study was conducted among nurses and physicians working in public hospitals of Dessie city administration.

Population

Source population

The source populations were nurses and physicians working in public hospitals of Dessie city administration.

Study Population

The study populations were nurses and physicians working in public hospitals of Dessie city administration during the study period.

Inclusion and Exclusion Criteria

Inclusion Criteria

The study included all nurses and physicians who have been working in public hospitals in Dessie city administration in the clinical area for at least six months.

Exclusion Criteria

- The study excluded nurses and physicians who had been working in public hospitals of Dessie city administration but were currently on annual break, sick, and maternal leave during the study period.

Sample Size and Sampling Techniques

The sample size of the study was determined using a single population proportion formula to estimate the sample size for determining the level of nurse–physician inter-professional collaboration and associated factors at public hospitals in Dessie city administration. In this study, the following assumptions were made: 95% confidence level ($Z_{\alpha/2} = 1.96$) and absolute precision or margin of error to be 5% ($d = 0.05$). The study population proportion on assessments of inter-professional collaboration between nurses and physicians taken from a previous study done in Mekelle was 0.54.¹⁰

The total population was calculated as $n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2}$

- Where n = sample size
- P = proportion of the level of inter-professional collaboration between nurses and physicians taken from a study done in Mekelle which is 0.54,¹⁰
- CI : standard normal distribution curve value for the 95% confidence interval (1.96)
- d = the margin of error or accepted error.

The sample size was $n = \frac{(1.96)^2 0.54(1-0.54)}{(0.05)^2} = 382$.

As the total study population was less than 10,000, the sample size correction formula was used to obtain the actual sample size $n_f = \frac{n_0}{\left(1 + \frac{n_0}{N}\right)}$. Where, N = population size, n_0 = first calculated sample size then N_f was $\frac{382}{1 + \frac{382}{622}} = 236$. Adding 10%¹⁵ for the non-respondent rate was considered. So, the final sample size was $236 + 24 = 260$.

The sample size for nurses and physicians was calculated using the proportion formula: $n_i = \frac{N_i n}{N}$

- Where n_i : Sample size of n categories (Nurse and Physician final sample size)
- N_i : the total population of n_i categories (final sample size which was 260)
- n : total population n_i categories (Number of nurses and physicians in both hospitals which were 42L and 201 respectively)
- N : total population (total number of nurses and physicians in public hospitals of Dessie city administration which was 622)

The final sample size for each category of nurses and physicians was calculated. The number of nurses was $n = \frac{260 \times 421}{622} = 176$ and the number of physicians was $n = \frac{260 \times 201}{622} = 84$.

The number of nurses and physicians was 176 and 84 respectively.

In the study, the study populations were stratified into nurses and physicians (including all categories of general practitioners and specialists) and the sample was taken from each stratum proportionally. The final study population was selected by simple random sampling with the lottery method using a computer-generated random list. The sample frame consisted of all lists of nurses and physicians working in each ward of public hospitals. In Dessie, there are two public hospitals, with a proportional number of respondents taken from both hospitals, from which 201 (133 nurses and 68 physicians) from Dessie Comprehensive Specialized Hospital and 59 (43 nurses and 16 physicians) from Boru Meda General Hospital.

Variable

Dependent Variable

- Nurse–physician inter-professional collaboration.

Independent Variables

- Sociodemographic factors include age, sex, education, work experience, marital status, occupation status, religion, income, residence, and family size.

- Attitude toward inter-professional collaboration b/n nurse and physician (Shared education and teamwork, caring versus curing, nurse's autonomy and physician's dominance).
- Factors affecting collaboration between nurse and physician include the attitude of nurse and physician toward collaboration, work in area communication (angry, frustrated, feeling equal understood, feeling respected, satisfaction after the interaction, joyful talking, receiving correct information), and organizational related factor (organizational support for collaborations, professional growth of education and training, conflict resolution, monthly salary, and team conferences).

Data Collection Tools and Procedures

The data collection instrument was a self-administered questionnaire. The tool was adopted following the framework suggested by different evidence. A self-administered questionnaire was distributed to a representative sample of the study.

The tool consists of the different parts which developed from retrieving literature. The first part consists of socio-demographic factors such as age, sex, education, title of work, area of work, years of service, religion, and residence after searching relevant literature related to nurse–physician collaboration.^{10,18} Age of respondent and years of service was collected in continuous data and it was categorized based on reference from literature. The other sociodemographic factor variables were collected as categorical data. The nurse–physician collaboration level was assessed using the nurse–physician collaborative scale (NPCS) which was developed in Japan. Nurse–physician collaborative scale (NPCS) scale contains 27 items divided into three subscales: sharing patient information contains 9 items, 21 decision-making process contains 12 items and the relationship between nurse and physician contains 6 items.^{15,24} The nurse–physician collaboration (NPCS) item score from five Likert scales (1=Never, 2= rarely, 3= Sometimes, 4=usually, and 5=Always). NPCS overall score was calculated by adding each individual's scores out of the total. The NPC's overall score was calculated by summing all 27 items out of 135. The higher mean score indicates a higher level of nurse–physician collaboration. The nurse–physician collaboration (NPCS) means the score was 97.40. NPCS overall score above 97.40 was considered as frequent inter-professional collaboration and a score equal to and below 97.40 was considered as infrequent inter-professional collaboration. The outcome variable was inter-professional collaboration categorized as frequent inter-professional collaboration and infrequent inter-professional collaboration.^{10,18}

The attitude of the respondent was measured using the Jefferson scale of attitudes towards nurse–physician collaboration (JSAPNC). This tool was originally developed and modified by Hojat and Herman at Jefferson medical college in Pennsylvania.^{25,26} JSAPNC tool includes 15 items which are grouped in four subscales. The first subscales contain seven items that focus on Shared education and teamwork. The second subscales contain three items about caring as opposed to curing. The third group has three items about nurses' autonomy. The final group has two items about Physician's dominance. The Jefferson scale item score from four Likert scales (1=strongly disagree, 2= Disagree, 4=agree and 5=strongly agree). A higher score indicates a higher level of nurse–physician collaboration. The overall score will be calculated by adding each individual's score out of 60. The mean attitude score was calculated for each respondent after summarized of the overall score. JCAHO's mean score above 49.02 was considered as having a favorable/good attitude and a mean score equal to and below 49.02 was considered an unfavorable/poor attitude. The Cronbach alpha test for JCAHO ranges from 0.70 to 0.93.^{10,18}

The other tool used was to assess nurse–physician work area communication (good communication or poor communication) including factors like anger in the workplace, feeling respected, satisfaction after the interaction, joyful talking, receiving correct information scaled as always, some time, and none, and organizational related factor such as organizational support, professional growth of education and training, conflict resolution, monthly salary scaled in satisfied, unsatisfied, neutral taken from literature in Ethiopia.^{10,18}

Operational Definitions

Frequent inter-professional collaboration: - above higher mean score (>97.40) of overall nurse–physician collaboration result of nurse–physician collaborative scale (NPCS).

Infrequent inter-professional collaboration: -lower mean score (\leq 97.40) of overall nurse–physician collaboration result of nurse–physician collaborative scale (NPCS).¹⁹

Favorable attitude toward nurse–physician collaboration: -above the higher mean score of (>49.02) attitudes toward nurse–physician inter-professional collaboration.

Unfavorable attitude toward nurse–physician collaboration: -lower mean score (≤ 49.02) of attitudes toward nurse–physician inter-professional collaboration.¹⁰

Adequate nurse–physician communication: -above the higher mean score of nurse–physician communication (≤ 13.29).

Inadequate nurse–physician communication: -below the higher mean score of nurse–physician communication (>13.29).

Satisfied organizational factor: -above the higher mean score of the overall organizational-related questioner (>7.92).

Un-satisfied organizational factor: -below the higher mean score of the overall organizational-related questionnaire (≤ 7.92).

Data Analysis Procedure

The data were first checked for completeness and consistency. The collected data was cleaned and questionnaires with missing variables were managed. The questionnaires were entered using Epi Data version 4.6. The questionnaires were exported and analyzed using the statistical package for social sciences (SPSS) statistical software package version 26. Analysis of data started with a description of data using mean, standard deviation, and frequencies for the variables. Study results have been presented using tables and charts.

Binary logistic regression analysis was performed to identify independent variables that are predictors of inter-professional collaboration between nurses and physicians. In bi-variable logistic regression analysis, all candidate variables p values less than 0.25 were entered into multivariable logistic regression analysis.

In multivariable logistic regression, all candidate variable p-value less than 0.25 were entered and p-values less than 0.05 were reported as an associated factor for inter-professional collaboration between nurses and physicians. Associated factor interpreted in Odds ratio in 95% confidence interval. Model fitness was checked by the Hosmer-Lemeshow test of goodness of fit and the model was fitted when the p-value >0.05 . Multicollinearity was checked by variance inflation factor at a cut point of 10. Variance inflation factor less than 10 was considered as an absence of multicollinearity and the variable was included in the analysis.

Data Quality Control

Data quality control and cleaning commenced in the field by the researcher ensuring that all the information on the questionnaires was properly collected, recorded, and checked for completeness of data. Four health professionals were selected for data collectors and they were trained for two days, which focused on data collection techniques, ethical issues, rights of the participants, reading through all the questions, and understanding them. The training also includes ways of decreasing under-reporting and maintaining confidentiality. The final version of the questionnaire was translated into the local language of the respondents (Amharic language) and was used for the data collection. Two weeks before the actual data collection, the questionnaire was pre-tested at South Wollo zone (Haik Hospital) selected woreda which is adjacent to the study area, on 5% of the total sample size facilities. It assesses whether the questionnaire and its items are easily understood by study participants, and to make any necessary changes before the main study began.

Result

Socio-Demographic Characteristics of the Study Participants

The response rate of the study was 100% and 260 health professionals among them 176 (67.7%) nurses and 84 (34.3%) physicians participated in the study. Of the total respondents, 163 (62.7%) were male. Of the total respondents, 244 (93.8%) and 118 (45.4%) were urban respondents and had less than five years of experience respectively. Out of the respondents, 140 (53.8%) and 77 (91.7%) had a first-degree educational level for nurses and physicians (general practitioners) respectively (Table 1).

Table 1 Sociodemographic Characteristics of Respondents at Public Hospitals in Dessie City, Ethiopia, 2021 (N=260)

Variables	Category	Number of Nurses (%)	Number of Physicians (%)	Total Number (%)
Age	<30	83(47.2)	29(34.5)	112(43.1)
	31–35	23(13.1)	21(25)	44(16.9)
	36–40	31(17.6)	19(22.6)	50(19.2)
	>40	39(22.2)	15(17.9)	54(20.8)
Sex	Female	84(47.7)	13(15.5)	97(37.3)
	Male	92(52.3)	71(84.5)	163(62.7)
Marital status	Single	44(25)	19(22.6)	63(24.2)
	Married	132(75)	65(77.4)	197(75.8)
Length of service	<5	72(40.9)	46(54.8)	118(45.4)
	5–10	55(31.3)	18(21.4)	73(28.1)
	11–15	23(13.1)	8(9.5)	31(11.9)
	>15	26(14.8)	12(14.3)	38(14.6)
Educational status	Diploma nurse	30(17)		30(11.5)
	BSc nurse	140(79.5)		140(53.8)
	MSc nurse	6(3.4)		6(2.3)
	GP		77(91.7)	77(29.6)
	Specialist		7(8.3)	7(2.7)
Area of work	Medical	21(11.9)	34(40.5)	55(21.2)
	Surgical	43(24.4)	29(34.5)	72(27.7)
	Gynecology	9(5.1)	6(7.1)	15(5.8)
	Emergency	40(22.7)	7(8.3)	47(18.1)
	OPD	35(19.9)	3(3.6)	38(14.6)
	Pediatrics	11(6.3)	2(2.4)	13(5)
	Operation room	17(9.7)	3(3.6)	20(7.7)
Religion	Orthodox	111(63.1)	55(65.5)	166(63.8)
	Muslim	56(31.8)	23(27.4)	79(30.4)
	Protestant	9(5.1)	6(7.4)	15(5.8)
	Other			
Residence	Rural	16(9.1)	0	16(6.2)
	Urban	160(90.9)	84(100)	244(93.8)

Attitude Towards Nurse–Physician Inter-Professional Collaboration

The mean score of attitude towards nurse–physician inter-professional collaboration was $49.02 \pm 5.87SD$. The mean score for the subscale was higher for shared education and teamwork ($23.23 \pm 3.18SD$). The mean score for other subscales like caring vs curing, nurse autonomy, and physician dominance were $10.22 \pm 1.59SD$, $10.22 \pm 1.59SD$, and $5.33 \pm 1.85SD$ respectively.

Of the total respondents, 136 (52.3%) had a favorable attitude toward nurse–physician inter-professional collaboration. The nurses' attitude toward nurse–physician inter-professional collaboration was 93 (52.8%) when compared to physicians 43 (51.2%). Regarding shared education and teamwork, fifty-one physicians (60.7%) have favorable shared education and teamwork (Table 2.)

Communication and Organization-Related Factors Among the Study Participants

The nurse–physician communication showed that 133 (51.2%) of the respondents had good communication between nurse and physician. Regarding organization support, 133 (51.2%) of the respondents had satisfied with organizational support for nurse–physician inter-professional collaboration (Table 3).

Table 2 Attitude Toward Nurse–Physician Inter-Professional Collaboration at Public Hospitals in Dessie City, Ethiopia, 2021 (N=260)

Variables	Category	Number of Nurses (%)	Number of Physicians (%)	Total Number (%)
Shared education and teamwork	Unfavorable	75(65.2)	57(39.3)	132(50.8)
	Favorable	40(34.8)	88(60.7)	128(49.2)
Caring vs Curing	Unfavorable	67(58.3)	63(43.4)	130(50)
	Favorable	48(41.7)	82(56.6)	130(50)
Nurse autonomy	Unfavorable	72(62.6)	67(46.2)	139(53.5)
	Favorable	43(37.4)	78(53.8)	121(46.5)
Physician dominance	Unfavorable	75(65.2)	62(42.8)	137(52.7)
	Favorable	40(34.8)	83(57.2)	123(47.3)
Overall attitude	Unfavorable	83(47.2)	41(48.8)	124(47.7)
	Favorable	93(52.8)	43(51.2)	136(52.3)

Table 3 Communication and Organization-Related Factors Among Nurses and Physicians at Public Hospitals in Dessie City, Ethiopia, 2021 (N=260)

Variables	Category	Number of Nurses (%)	Number of Physicians (%)	Total Number (%)
Nurse–physician communication	Poor	95(54)	32(38.1)	127(48.8)
	Good	81(46)	52(61.9)	133(51.2)
Organizational factor	Satisfied	91(51.7)	42(50)	133(51.2)
	Not satisfied	85(48.3)	42(50)	127(48.8)

Nurse–Physician Inter-Professional Collaboration

The mean score for inter-professional collaboration was $97.40 \pm 19.6SD$. Out of the total respondents, 114.9 (44.2%) of them had frequent inter-professional collaboration. This study showed that nurses had more frequent nurse–physician inter-professional collaboration (46.6%) when compared to physicians (39.9%) (Figure 1).

Factors Affecting Nurse–Physician Inter-Professional Collaboration

In bi-variable logistic regression, age of respondent, length of service, area of work, religion, residence, attitude toward inter-professional collaboration, and organization factor were factors with a p-value less than 0.25. These variable that satisfied bi-variable logistic regression was selected for multivariable logistic regression analysis.

In multivariable logistic regression, respondent who work in gynecological department [AOR=0.210; CI: 0.052–0.849], favorable attitude toward nurse–physician inter-professional collaboration [AOR=3.205; CI: 1.781–5.766], satisfied organization support [AOR=2.062; CI: 1.140–3.729] and urban residents [AOR=3.996; CI: 1.069–14.931] were factors associated with nurse–physician inter-professional collaboration (Table 4).

Discussion

Nurse–physician inter-professional collaboration is important to improve the quality of health care. Nurse–physician inter-professional collaboration is affected by different determinants. So, this study explored nurse–physician inter-professional collaboration and associated factors at public hospitals in Dessie city administration, Ethiopia.

In this study, nurse and physician inter-professional collaborations were 44.2%. This study was supported by a study done in Addis Ababa.¹⁹ But this finding is lower than the study done in Mekele¹⁰ and Jimma.¹⁸ The possible reason for this difference might be health professional training related to collaboration, manager conflict management skills and health professional communication skills, and teamwork.²⁷ There was a discrepancy with a study done in the United States, which reported that 72% of nurses were collaborating between nurses and physicians.¹⁶ The discrepancy may be a result of the difference in the study setting and sociodemographic factors.

The study also showed that nurses had more frequent collaboration compared to physicians. The possible reason might be the difference between the two professionals in terms of their academic ability, ability to make a decision, interpersonal skills, and being team players.²⁸

Attitude toward nurse–physician inter-professional collaboration is higher among nurses. This is supported by a study done in another study which concluded that nurses had positive attitude toward nurse–physician inter-professional collaboration when compared to physicians.^{5,18,20,34} Additionally, a study was done in Palestine and Nigeria that stated

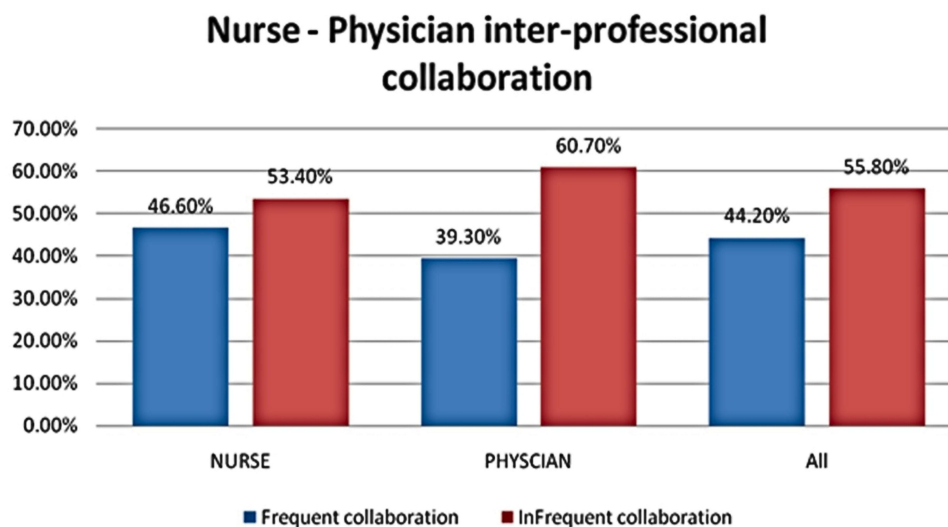


Figure 1 A graph showing nurse–physician inter-professional collaboration at public hospitals in Dessie city, Ethiopia, 2021 (N=260).

Table 4 Bi-Variable and Multi-Variable Logistic Regression to Identify Factors Associated with Nurse–Physician Inter-Professional Collaboration at Public Hospitals in Dessie City, Ethiopia, 2021 (N=260)

Variables	Category	Nurse–Physician Collaboration		COR with 95% CI	AOR with 95% CI	P-value
		Infrequent	Frequent			
Age of respondents	<30	58(50.4)	54(37.2)	1	1	
	31–35	16(13.9)	28(19.3)	1.88(0.91–3.85)	1.178(0.474–2.927)	0.724
	36–40	24(20.9)	26(17.9)	1.16(0.59–2.26)	0.709(0.218–2.304)	0.567
	>40	17(14.8)	37(25.5)	2.33(1.18–4.60)	1.845(0.371–9.184)	0.454
Length of service	<5	60(52.2)	58(40)	1	1	
	5–10	29(25.2)	44(30.3)	1.57(0.86–2.83)	1.818(0.713–4.632)	0.210
	11–15	15(13)	16(11)	1.10(0.50–2.43)	2.284(0.553–9.428)	0.253
	>15	11(9.6)	27(18.6)	2.53(1.15–5.58)	1.531(0.257–9.139)	0.640
Area of work	Medical	18(15.7)	37(25.5)	1	1	
	Surgical	35(30.4)	37(25.5)	0.51(0.24–1.06)	0.654(0.292–1.464)	0.301
	Gynecology	11(9.6)	4(2.8)	0.17(0.04–0.63)	0.210(0.052–0.849)	0.029
	Emergency	23(20)	24(16.6)	0.50(0.22–1.13)	0.650(0.269–1.571)	0.339
	OPD	14(12.2)	24(16.6)	0.83(0.35–1.98)	0.745(0.285–1.948)	0.549
	Pediatrics	9(7.8)	4(2.8)	0.21(0.05–0.79)	0.237(0.055–1.015)	0.052
	Operation	5(4.3)	15(10.3)	1.45(0.45–4.64)	1.369(0.340–5.504)	0.659
Religion	Orthodox	73(63.5)	93(64.1)	1	1	
	Muslim	38(33)	41(28.3)	0.84(0.49–1.44)	0.807(0.432–1.508)	0.501
	Protestant	4(3.5)	11(7.6)	2.15(0.66–7.05)	2.091(0.548–7.977)	0.280
Residence	Rural	11(9.6)	5(3.4)	1	1	
	Urban	104(90.4)	140(96.6)	2.96(0.99–8.78)	3.996(1.069–14.931)	0.039
Attitude	Favorable	74(64.3)	50(34.5)	1	1	
	Unfavorable	41(35.7)	95(65.5)	3.42(2.05–5.72)	3.205(1.781–5.766)	0.00
Organizational related factors	Not Satisfied	71(61.7)	62(42.8)	1	1	
	Satisfied	44(38.3)	83(57.2)	2.16(1.31–3.56)	2.062(1.140–3.729)	0.017

nurses expressed a more positive attitude toward collaboration by the mentioned nurse were more involved and partners in inpatient care.^{11,21} This might be the integration of health training programs related to collaboration in the nurse curriculum.²⁸ Another study, done in a different country showed that physicians had a more positive attitude toward collaboration than nurses.^{3,12} The discrepancy might be a difference in the study area and study design.

Attitude was a significant factor affecting inter-professional collaboration among nurses and physicians. Those respondents who had a favorable attitude toward collaboration had 3 times more frequent nurse–physician inter-professional collaboration. This study was supported by a study done in Mekelle,¹⁰ Jimma,¹⁸ and Turkey.³⁴ The pleasurable reason might be due to hierarchical differences, professional dominant authority, and low participation in the decision-making of nurses and physicians.^{21,29,30}

Organization support was statistically significantly associated with satisfied inter-professional collaboration. Satisfied organization support had 2 times more frequent nurse–physician inter-professional collaboration when compared to unsatisfied organization support. This is in line with studies done in Mekele¹⁰ and Kenya.¹³ This might be due to a supportive working environment, salary, continuous professional development, and the existence of a conflict management system that is required to ensure professionals' adequate collaboration.^{28,31}

Nurse–physician inter-professional collaboration factors were significantly influenced by residency and respondents who reside in urban had 4 times more likely to have frequent nurse–physician inter-professional collaboration. This could be related to urban residents having more opportunities to adapt collaboration behavior and teamwork than physicians.³²

The working department was found to be another factor associated with nurse–physician inter-professional collaboration. Those respondents who work in the gynecological department had less frequent inter-professional collaboration when compared to other departments. This is supported by a study done in India.¹⁷ The possible reason for the difference might be a variation in the professional title, and individual competencies.^{28,33} Additionally, the workplace was one of the influential factors in nurse–physician inter-professional collaboration.¹⁷ But the working department is not mentioned as a significant factor for nurse–physician inter-professional collaboration in a study done in Jimma and Addis Ababa.¹⁹

Conclusion

In this study, nurse–physician inter-professional collaboration was low. Of the total respondents, nurses had more frequent inter-professional collaboration when compared to physicians. In addition, attitudes toward nurse–physician inter-professional collaboration were higher among nurses when compared to physicians.

Unsatisfied satisfied organization support, favorable attitude toward inter-professional collaboration, rural residents, and working in the gynecology department were associated factors for nurse–physician inter-professional collaboration.

Training on the importance of health teamwork, timely monitoring and evaluation of organizational support, and professional empowerment towards the attitude of nurse–physician inter-professional collaboration shall be provided at hospital levels. Routine assessment and timely intervention of different departments for nurse–physician inter-professional collaboration shall be done at hospital levels. Moreover, both quantitative and qualitative research shall be performed for future research.

Abbreviations

AOR, adjusted odd ratio; CI, confidence interval; COR, crude odd ratio; GPs, general practitioners; IPCP, inter-professional collaboration practice; JSAPNC, Jefferson scale of attitudes towards nurse–physician collaboration; IRB, Institution Review Board; NPCS, nurse–physician collaborative; SPSS 26, Statistical Package for Social Science 26; WHO, World Health Organization.

Data Sharing Statement

The data used to support the findings of this study is available upon request from the corresponding author.

Ethical Approval and Consent to Participate

Ethical approval was obtained from the Ethical Review Committee of Tropical College of Medicine with approval number NURS3420/13. Permission letter was received from Dessie Comprehensive Specialized Hospital and Boru Meda General Hospital. The purpose and importance of the study were explained to each study participant. The confidentiality and privacy of participants were secured by avoiding any personal identifier. Written consent was obtained from each participant before study commencement, and this study was conducted as per the Declaration of Helsinki. Participants were informed of their full right to withdraw from the study at any time they wish. The study did not have any physical harm, social discrimination, psychological trauma, and economic loss to the study participants.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

All authors declare that they have no conflicts of interest in this work.

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