







# Knowledge and Attitudes of Graduating Medical, Pharmacy, and Nursing Students Toward Geriatric Care at the College of Medicine and Health Sciences, University of Gondar, North West Ethiopia

Faisel Dula Sema <sup>1</sup>, Abdisa Gemedi Jara<sup>1</sup>, Admasu Teshome Demessie<sup>2</sup>, Tsegagabriel Shawel Lemma<sup>2</sup>, Saron Naji Gebremariam <sup>1</sup>, Gizework Alemnew Mekonnen <sup>1</sup>, Wudneh Simegn <sup>3</sup>, Asmamaw Emagn Kasahun <sup>4</sup>, Masho Tigabe Tekle <sup>1</sup>

<sup>1</sup>Department of Clinical Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; <sup>2</sup>Schools of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; <sup>3</sup>Department of Social and Administrative Pharmacy, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia; <sup>4</sup>Department of Pharmaceutics, School of Pharmacy, College of Medicine and Health Sciences, University of Gondar, Gondar, Ethiopia

Correspondence: Faisel Dula Sema, Email [faiselye1203@gmail.com](mailto:faiselye1203@gmail.com)

**Background:** The education and training of health professions students in geriatric care is critical to their future clinical practice. However, the knowledge and attitude of health science students toward geriatric care are barely studied in Ethiopia.

**Objective:** This study aimed to assess the knowledge and attitude of graduating medical, pharmacy, and nursing (MPN) students towards geriatric care at the College of Medicine and Health Sciences, University of Gondar, North West Ethiopia.

**Methods:** A cross-sectional study was conducted among 301 graduating MPN students using stratified random sampling from June 30, 2022, to July 30, 2022. The data was collected by using previously validated self-administered structured questionnaires and analyzed using SPSS version 26. Both descriptive and inferential statistics were done. A statistical significance was declared at a p-value < 0.05.

**Results:** The majority of graduating MPN students had either neutral (70.76%) or positive (16.28%) attitudes towards older people; however, a greater amount (88%) of them had poor knowledge of geriatric care. The knowledge of female students was significantly less favorable than the knowledge of male students (p-value < 0.001). The knowledge and attitudes of pharmacy and nursing students were significantly lower than medical students (p-value < 0.001). The attitude mean rank score of students aged ≤25 years was significantly lower than students aged >25 years (p-value < 0.001).

**Conclusion:** The majority of graduating MPN students had poor knowledge despite having either a neutral or positive attitude toward geriatric care. Female students had lower knowledge scores than male students. Similarly, pharmacy and nursing students had lower knowledge and attitude scores than medical students, and the attitude score of students aged ≤ 25 years was lower than students aged >25 years. Their respective departments should implement a strategy to improve the knowledge of MNP students.

**Keywords:** knowledge, attitude, geriatric care, medical, pharmacy, nursing students

## Background

Aging results from the additive effect of molecular and cellular irreversible damage over time, which results in a higher risk of geriatric syndrome and the accumulation of multiple long-term conditions that make them prone to adverse clinical outcomes. In 2019, there were 703 million people aged 65 years and over worldwide, which is expected to increase by two-fold to 1.5 billion in 2050.<sup>1</sup> The World Health Organization (WHO) estimates that two-thirds of the world's population over 65 years will live in low-and middle-income countries in 2050.<sup>2</sup>

Currently, the world has faced a problem of ensuring geriatrics' healthcare needs. This can significantly diminish the positive impact of older individuals' contributions to society.<sup>2</sup> The WHO warns that health systems around the world are falling short of meeting the needs of older patients.<sup>3</sup>

The increase in the number and demand for geriatric care need adequately trained medical professionals. The proper education and training of health professions students with geriatrics-focused courses helps to prepare them for managing geriatric syndromes in their future clinical practice and improves their knowledge of and attitudes towards older people.<sup>4,5</sup> A study done in Malaysia showed that the majority of pharmacy students had good knowledge (78%) regarding geriatric care and positive attitudes (78%) towards the inclusion of geriatric care in their teaching.<sup>5</sup> Similarly, a study done in India indicated that the majority of undergraduate nurse students had good knowledge (76.4%) and attitudes (64.6%) toward geriatric care.<sup>6</sup> Another study conducted in Zanzibar showed that despite the majority (67.9%) of the students having a positive attitude, only about a quarter (17.6%) of them had a good knowledge of geriatric care.<sup>7</sup>

In Ethiopia, despite the proportion of the older age population showing a marked incline,<sup>8</sup> access to social and healthcare services for older patients is limited.<sup>9</sup> Moreover, because there is a lack of trained personnel, well-organized geriatric care units, and training institutions in the country, the issue of geriatric care is not addressed adequately.<sup>10</sup> Studies showed that less than half of healthcare professionals had good knowledge and attitudes towards geriatric care;<sup>10,11</sup> however, there has been no study of such knowledge and attitudes among health professions students in Ethiopia. Therefore, this study aimed to assess the knowledge and attitudes of graduating medical, pharmacy, and nursing (MPN) students towards geriatric care at the College of Medicine and Health Sciences (CMHS), University of Gondar, northwest Ethiopia. Being the first study in Ethiopia, it may help to attract the attention of all interested stakeholders toward the promotion of geriatric care through multifaceted strategies.

## Methods and Materials

### Study Design, Study Area, and Period

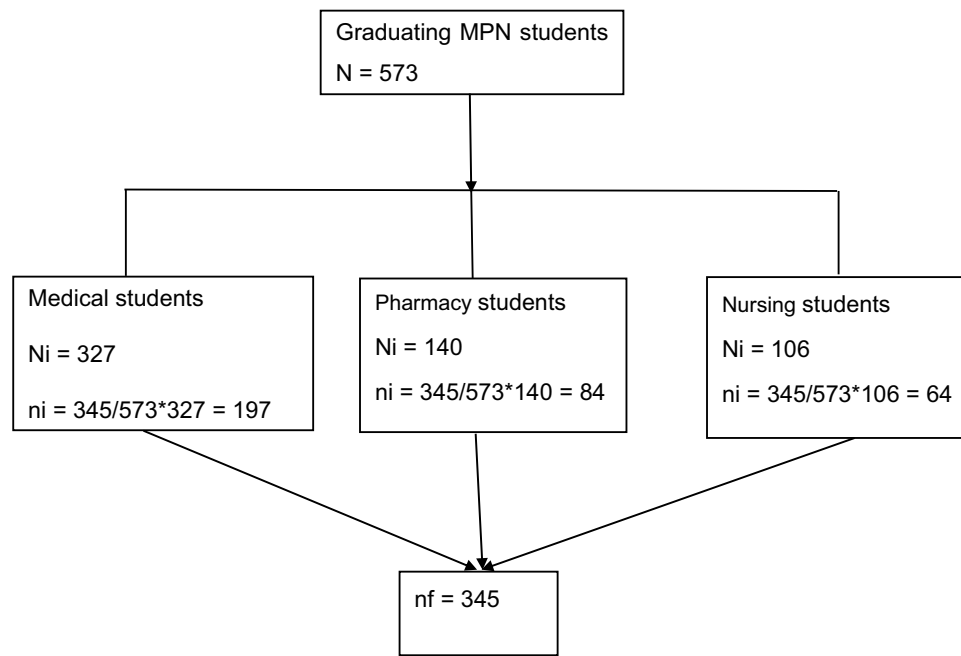
A cross-sectional study was conducted at the CMHS, University of Gondar from June 30 to July 30, 2022. The University of Gondar is located in the central Gondar administration zone, Amhara National Regional State, 750 kilometers from Addis Ababa (the capital city of Ethiopia) in North West Ethiopia. It was founded in 1954 as a Public Health College and nowadays evolved into one of the top educational institutions in Ethiopia. Currently, the university has 11 undergraduate degree programs and more than 34 postgraduate programs. Medicine, pharmacy, and nursing are among the main programs that had graduating students in the 2021/2022 academic year.

### Population and Eligibility Criteria

The source population was graduating MPN students at the CMHS, University of Gondar. The study population was graduating MPN students at the CMHS, University of Gondar in the 2021/2022 academic year. Students who dropped any count of courses, who did not consent to participate, who did not fully complete the questionnaire, and who were absent during the data collection period due to illnesses or other causes were excluded from the study.

### Sample Size Determination and Sampling Procedure

The total sample size was determined using a single population proportion formula as follows:  $n = z^2pq/d^2$  Where,  $n$ -desired sample size;  $p$  = proportion, since the estimate proportion is unknown in Ethiopia,  $p = 50\% = 0.5$  was taken;  $q = 1-p = 0.5$ ;  $Z$ -Standard score corresponding to-standard normal deviate 1.96 at 95% confidence interval (CI);  $d$  = the acceptable margin of error 0.05 at 95% CI;  $n = (1.96)^2 * 0.5 * 0.5 / (0.05)^2 = 384$ . Since the population was <10,000 (573), a reduction formula was applied as follows:  $nf = n / (1 + n/N) = 384 / (1 + 384/573) = 230$ . Because a lower response rate was reported in a previous study,<sup>5</sup> we added half of the calculated sample size  $nf = 230 * 0.5 + 230 = 115 + 230 = 345$  (Figure 1). Finally, a lottery method was applied to select the required samples from each department.



**Figure 1** Sampling procedure employed for graduating MPN students in the 2021/2022 academic year. In the 2021/2022 academic year, there were 327 medical, 140 pharmacy, and 106 nursing graduating students. A proportional sample size was taken from each department using the following formula:  $ni = nf/N * Ni$ . Where  $nf$  is the total sample size required for the study;  $ni$  is the required sample size from each respective department;  $N$  is the total graduating MPN students in the 2021/2022 academic year;  $Ni$  is the total number of graduating students in each department in 2021/2022 academic year.

**Abbreviations:** MPN, Medical, Pharmacy and Nursing; UoGCSH, University of Gondar Comprehensive Specialized Hospital.

## Study Variables, Data Collection Tool, and Quality Control

The dependent variables were the Knowledge and Attitudes of MPN graduating students. The independent variables were Socio-demographic factors including age, marital status, religion, gender, work experience, training experience, close connection to grandparents, living grandparents, family residency, and department.

The data was collected by two pharmacists using a validated tool adapted from previously published studies. The questionnaire contained 10 demographic, 28 knowledge, and 31 attitude questions about geriatric care. The knowledge questions were prepared based on a validated 28-item Geriatric Knowledge Assessment Scale (GKAS) in the form of multiple-choice questions.<sup>5,12</sup> The GKAS Kuder–Richardson reliability coefficient was 0.61.<sup>12</sup> The attitudes of MPN students were assessed by 31 Likert-scale questions prepared based on the Older People in Acute Care Survey (OPACS), the University of California at Los Angeles Geriatric Attitudes (UCLA-GA) scale, and previous literature.<sup>5,7,13,14</sup> The reliability of the OPACS-US was (Cronbach's  $\alpha = 0.93$ ).<sup>15</sup> The UCLA-GA scale has high reliability (Cronbach's  $\alpha = 0.76$ ) and known-groups and construct validity.<sup>16</sup> From the total of 28 multiple choice knowledge questions, Bloom's cut-off points for categorizing knowledge levels were used: good knowledge  $\geq 23$  questions correct (80%), moderate knowledge 17–22 questions correct (60–79%), and poor knowledge  $< 17$  questions correct ( $< 60\%$ ). The same cut-offs were used to categorize students' attitudes as positive, neutral, and negative respectively, assessed using 31 Likert-scale questions, where scores ranged from strongly disagree (1 point) to strongly agree (5 points), giving a minimum possible score of 31 and a maximum of 155.<sup>17</sup> The level of attitude was considered positive if they scored  $\geq 124$  (80%), neutral if they scored 93–123 (60–79%), and negative if they scored  $< 93$  ( $< 60\%$ ) of the maximum possible total score.

A pre-test was done on 5% (12 medical, 12 pharmacy, and 11 nursing students) of the study participants. A slight modification was made based on the pretest on variables related to the socio-demographic characteristics of the participants. Data for the main study was not collected on participants who were involved in the pretest. The data collected for the pretest was also not included in the final analysis. The data collection was supervised by the principal investigator daily. The reliability of the data collection tool was assessed by Cronbach's alpha coefficient. The Cronbach's alpha coefficient of the knowledge, and the attitude was 0.609 and 0.899, respectively.

## Data Processing and Analysis

The data was entered, processed, and analyzed using the Statistical Package for Social Science (SPSS) version 26. The knowledge questions answers were sum-up, high score indicates good knowledge from a range of 0–28. Likewise, the participant's answers to the attitude Likert scale (1 to 5) were summed after reverse coding of negative questions and high scores indicated positive attitudes from a possible range of 31–155. Descriptive statistics such as mean with standard deviation (SD), median with interquartile range (IQR), frequency, and proportion were used for data analysis. Because the data was not normally distributed, nonparametric tests like Mann–Whitney and Kruskal–Wallis tests were used to compare the knowledge and attitude of the students based on their department and other sociodemographic variables. The normality of the data was checked by the Kolmogorov–Smirnov test. A p-value less than 0.05 was considered a statistically significant difference among groups.

## Operational Definitions

Knowledge: the facts and information that an individual learns over time.

Attitude: a state of mind of a person towards someone or something.

Geriatric refers to people aged 65 years and above.<sup>18</sup>

Geriatric care deals with the prevention, diagnosis, and treatment of diseases among older people.<sup>18</sup>

Graduating MPN students: MPN health science students who were completing their studies in the academic year 2021/2022.

## Results

### Demographic Characteristics of MPN Students

From 345 study participants, 301 completed all questions with a response rate of 87.2%. The majority (51.8%) of the participants were males. The age of around 60% (62.80%) of participants was > 25 years. The marital status of about 70% (70.1%) of the participants was single. More than half (57.48) of the respondents were medical students. About two-thirds (66.8%) of them came from urban areas, and 61.5% had living grandparents. Almost 50% of the participants responded that they had a close relationship with their grandparents. Only about one-third (32.9%) and less than ten percent (8.3%) of respondents had experience and training regarding geriatric care, respectively (Table 1).

**Table 1** Demographic Characteristics of Graduating MPN Students

Characteristics		Frequency (%)
Age	> =25	189 (62.79)
	< 25	112 (37.21)
Gender	Male	156 (51.8%)
	Female	145 (48.2%)
Marital status	Single	211 (70.1)
	In relationship	66 (21.9)
	Married	23 (7.6)
	Divorced	1 (0.3)
Department	Medicine	173 (57.48)
	Pharmacy	78 (25.91)
	Nursing	50 (16.61)

(Continued)

**Table 1** (Continued).

Characteristics		Frequency (%)
Religion	Orthodox	239 (79.4)
	Muslim	35 (11.6)
	Protestant	25 (8.3)
	Catholic	1 (0.3)
	Adventist	1 (0.3)
Family residency	Urban	201 (66.8)
	Rural	100 (33.2)
Living grand parents	Yes	185 (61.5%)
	No	116 (38.5%)
Close and connected to grand parents	Yes	148 (49.2%)
	No	153 (50.8%)
Geriatric care past experience	Yes	99 (32.9%)
	No	202 (67.1%)
Geriatric care training experience	Yes	25 (8.3%)
	No	276 (91.7%)

**Abbreviation:** MPN, Medicine Pharmacy Nursing.

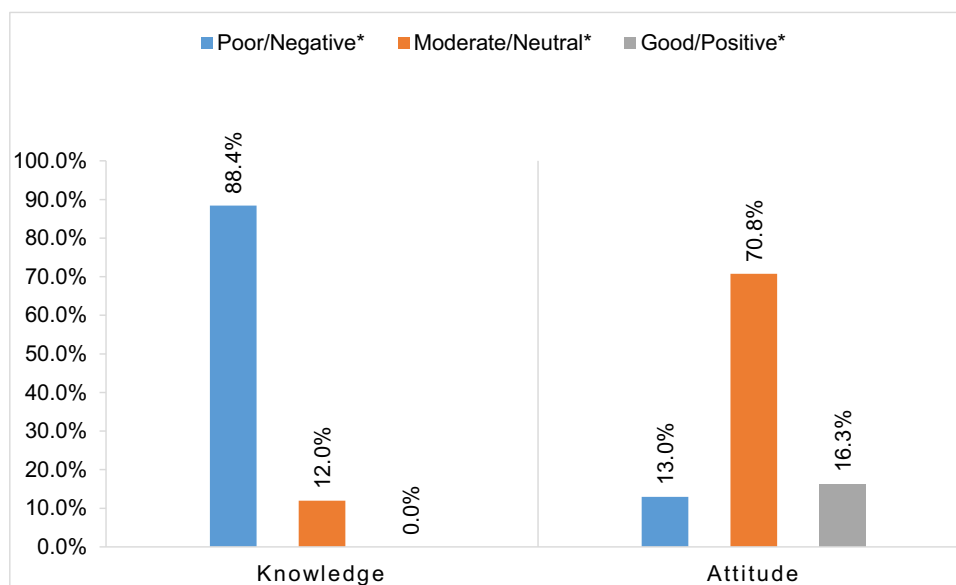
## The Knowledge and Attitude of Graduating MPN Students

The median (interquartile range (IQR)) knowledge and attitude score of the participants was 11<sup>6</sup> and 116,<sup>16</sup> respectively (Table 2). The majority of graduating MPN students had either a neutral (70.76%) or positive (16.28%) attitude toward geriatric care. By contrast, a greater magnitude (88%) of them had poor knowledge of geriatric care (Figure 2). Only, 7 of the 28 questions were correctly responded to by more than 50% of the students (Supplementary file 1). More than two-thirds (69.5%) of the participants agreed (48.2%) and strongly agreed (21.3%) with the importance of taking a course regarding geriatric care. Similarly, around two-thirds (65.1%) of them reported that they want to work with older people (Supplementary file 2).

**Table 2** The Mean and Median Knowledge and Attitude Score of Graduating MPN Students

	Category	Mean	Standard Deviation	Median	IQR	Range
Knowledge	Medicine	12.24	4.07	12.00	7.00	(3, 21)
	Pharmacy	10.94	3.46	11.00	5.00	(3, 19)
	Nursing	9.16	2.84	9.00	3.00	(2, 15)
	Overall Knowledge	11.39	3.89	11	6	(2, 21)
Attitude	Medicine	117.25	15.05	120.00	13.00	(66, 147)
	Pharmacy	104.85	19.72	107.00	29.25	(51, 151)
	Nursing	110.88	17.23	116.00	15.25	(63, 146)
	Overall Attitude	112.98	17.51	116.00	17.00	(51, 151)

**Abbreviations:** IQR, interquartile range; MPN, Medicine Pharmacy Nursing.



**Figure 2** The level of knowledge and attitude of graduating MPN students at the University of Gondar, 2022. \*Attitude.

## Comparisons of Graduating MPN Students' Knowledge and Attitude Based on Their Department and Socio-Demographic Characteristics

The knowledge mean rank score (128.89) of female students was significantly lower than the knowledge mean rank score (171.55) of male students ( $p$ -value < 0.001). The knowledge mean rank score of pharmacy (144.28) and nursing (102.60) students was significantly lower than the mean rank score of medical (168.02) students ( $p$ -value < 0.001). Similarly, the attitude mean rank score of pharmacy (108.64) and nursing (146.64) students was significantly lower than the attitude mean rank score of medical (171.36) students ( $p$ -value < 0.001). The attitude mean rank score of students aged  $\leq 25$  years (mean rank score = 38.89) was significantly lower than students aged  $> 25$  years (mean rank score = 172.02) ( $p$ -value = < 0.001) (Tables 3 and 4).

**Table 3** Comparison of the Overall Knowledge of Graduating MPN Students Based on Their Socio-Demographic Characteristics

Variables	Category	Frequency (%)	Knowledge (Mean Rank Score)	Mann Whitney / Kurkulias Test (Chi-Square)	P-value	Z-Score/df
Sex	Male	156	171.55	8104.00	< 0.001	-4.262
	Female	145	128.89			
Age	$\leq 25$	191	155.29	9686.00	0.252	-1.130
	$> 25$	110	143.55			
Marital status	Unmarried	278	152.69	2728.50	0.090	-1.172
	Married	23	130.63			
Department	Medicine	173	168.02	22.679	< 0.001	2
	Pharmacy	78	144.28			
	Nursing	50	102.60			
Religion	Christianity	266	150.78	4597.50	0.927	-0.119
	Muslim	35	152.64			

(Continued)

**Table 3** (Continued).

Variables	Category	Frequency (%)	Knowledge (Mean Rank Score)	Mann Whitney / Kurkulias Test (Chi-Square)	P-value	Z-Score/df
Family residence	Urban	200	149.73	9845.00	0.801	-0.220
	Rural	100	152.05			
Close and connected with grand parents	Yes	148	151.89	11,191.00	0.445	-0.174
	No	153	150.14			
Past experience of geriatric care	Yes	99	146.06	9509.50	0.502	-0.692
	No	202	153.42			
Living with grand parent	Yes	185	152.93	10,373.50	0.611	-0.487
	No	116	147.93			
Training experience regarding geriatric care	Yes	25	134.30	3032.50	0.372	-0.951
	No	274	151.43			

**Table 4** Comparison of the Overall Attitude of Graduating MPN Students Based on Their Socio-Demographic Characteristics

Variables	Category	Frequency (%)	Attitude (Mean Rank Score)	Mann Whitney / Kurkulias Test	P-value	Z-Score
Sex	Male	156	148.25	10,881.50	0.591	-0.569
	Female	145	153.96			
Age	≤25	191	138.89	8192.50	< 0.001	-3.186
	>25	110	172.02			
Marital status	Married	23	136.80	2870.50	0.405	-0.815
	Unmarried	278	152.17			
Department	Medicine	173	171.36	28.169	< 0.001	2
	Pharmacy	78	108.64			
	Nursing	50	146.64			
Religion	Christianity	266	154.34	3766.50	0.066	-1.839
	Muslim	35	125.61			
Family residence	Urban	200	146.30	9160.50	0.209	-1.187
	Rural	100	158.89			
Close and connected with grand parents	Yes	148	150.67	11,273.50	0.957	-0.064
	No	153	151.32			
Past experience of geriatric care	Yes	99	139.65	8875.00	0.136	-1.587
	No	202	156.56			
Living with grand parent	Yes	185	153.34	10,297.00	0.578	-0.590
	No	116	147.27			
Training experience regarding geriatric care	Yes	25	132.70	2992.50	0.269	-1.047
	No	274	151			

## Discussion

In this study, most (88%) of MPN students had poor knowledge of geriatric care. Similar trends were observed in previous studies in Zanzibar (82.4%),<sup>7</sup> and Malaysia (80.4%). On the contrary, the study conducted in Nigeria reported that the majority had either fair (39.3%) or good (60%) knowledge,<sup>19</sup> and in India about three-quarters (76.4%) had good knowledge.<sup>6</sup> In this study, only 7 of the 28 questions were correctly responded to by more than 50% of the students. However, a study in India showed, more than 80% of the participants gave the correct answer for the majority of the questions.<sup>6</sup> The differences between studies may be due to differences in the content and depth of geriatric care teaching (both theoretical and clinical) in their curricula. There may also be differences in the cut-off the cutoff points used among the studies to define the level of knowledge, and the slight difference among the population of the studies. Now we must use our findings in tandem with those of other studies to assess the adequacy of the current curriculum and its implementation plan to prepare the students for providing quality geriatric care.

The majority of graduating MPN students had either a neutral (70.76%) or positive (16.28%) attitude toward geriatric care. However, the majority of participants had a positive attitude in studies done in Zanzibar (67.9%),<sup>7</sup> Ghana (82.2%),<sup>13</sup> Malaysia (80%),<sup>5</sup> and India (64.6%).<sup>6</sup> On the contrary, the study conducted in Chile also showed that the majority (61.2%) of undergraduate students generally perceived themselves with a low-level positive attitude.<sup>20</sup> The difference may be due to a variation in the study setting, study population, the question used to assess attitude, and a cut-off point. The study participants in this study may not had adequate exposure to geriatric care due to the absence of a separate geriatric care center in this study setting. So pre-job training and increasing their exposure to older people's care may help to improve the majority of students' attitudes from negative and neutral to positive.

In this study, more than two-thirds (69.5%) of MNP graduating students agreed or strongly agreed on the importance of taking a course in geriatric care, which aligns with findings from Malaysia (89.2%).<sup>5</sup> In this study, about two-thirds (65.1%) of MNP students also reported that they want to work with older people. However, willingness to work with older people was lower in the study report from China (38.1%)<sup>21</sup> and Sri Lanka (5.1%).<sup>22</sup> Despite the difference that may be explained by variations in curricular issues, the cutoff points used among the studies, and differences in the study population, the difference in cultural and religious norms, values, and practices may influence the attitude of the participants.<sup>23–26</sup> So preparing the students with consideration of differences in socio-cultural background may better increase their attitude toward geriatric care.

In the current study, the knowledge mean rank score of pharmacy (144.28) and nursing (102.60) students were significantly lower than the knowledge mean rank score of medical (168.02) students ( $p$ -value < 0.001). Likewise, the attitude mean rank score of pharmacy (108.64) and nursing (146.64) students is lower than the attitude mean rank score of medical (171.36) students ( $p$ -value < 0.001). Similarly, a study in Saudi Arabia<sup>14</sup> and Ghana<sup>13</sup> indicated that medical students had a more positive attitude toward geriatric care. This may be because medical students have a longer duration of study with a greater exposure time to older people's care during their internship period. As working with geriatrics increases the knowledge regarding old adult care will also be improved.<sup>11,27,28</sup> So, giving students a longer contact time with geriatric care may help to improve both their knowledge and attitude.

In this study, the knowledge mean rank score (128.89) of female students was significantly lower than the knowledge mean rank score (171.55) of male students ( $p$ -value < 0.001). Since this may be a reflection of the overall knowledge difference between male and female students, investigating the potential causes is crucial. However, as far as our literature review encompasses we did not encounter either positive or negative support for this finding.

In the present study, the attitude mean rank score of students aged  $\leq 25$  years was significantly lower than students aged  $>25$  years with a  $p$ -value < 0.001. This finding is supported by the study done in Chile, which reported that older students had a better attitude towards geriatric care.<sup>20</sup> Significant differences in attitude scores by age group were also observed in a Nigerian study.<sup>19</sup> Older students may have more experience which makes them motivated toward a caring attitude endorsed by their social environment and education.



## Limitations of the Study

Although this study is the first to assess the graduating MPN students' knowledge and attitude toward geriatric care in Ethiopia, this study is not without any limitations. First, since the study was done only on graduating undergraduate MPN students, it limits its generalizability to other health science students. Second, the quantitative nature of the study may impose a potential bias. The reliability coefficient of 0.609 may not be adequate since a reliability coefficient higher than 0.70 is expected in the social sciences. However, the GKAS reliability coefficient of 0.609 can be acceptable because knowledge scales a range of knowledge areas. Moreover, being a single-center study, it may also be difficult to extrapolate the findings to other institutions.

## Conclusion and Recommendation

In conclusion, the majority of MPN graduating students had poor knowledge and either neutral or positive attitudes toward geriatric care. Pharmacy and nursing students had a statistically significant lower knowledge and attitude than medical students towards geriatric care. Similarly, female students had a significantly lower knowledge score than male students, and students aged  $\leq 25$  years had a statistically significant lower attitude score than students aged  $>25$  years. The schools of medicine, pharmacy, and nursing should implement a strategy to improve the knowledge of MPN students. Emphasizing the topic of geriatric care both in theoretical and practical aspects may help to improve the knowledge and attitude of MPN students. Moreover, providing special training for final-year MPN students may increase the knowledge and attitude of the students toward geriatric care. Interested researchers could conduct a multicenter study at the national level to attract the attention of policymakers.

## Data Sharing Statement

The authors confirm that data used to support the findings of this study will be available from the corresponding author upon request.

## Ethics Approval and Consent to Participate

Ethical clearance was obtained from the ethical committee of the University of Gondar College of Medicine and Health Sciences School of Pharmacy. This study was conducted in accordance with the Declaration of Helsinki, and following all methods in accordance with the relevant guidelines and regulations. In addition, after an explanation of the objective of the study, informed consent was obtained from all participants. Furthermore, all participants were given assurance that they could withdraw consent and discontinue participation without any form of prejudice. Confidentiality of information and privacy of participants was assured for all the information provided.

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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.

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## Disclosure

The authors declare that they have no competing interests.

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