AFRICAN JOURNAL OF HEALTH SCIENCES AND MEDICINE
AJHSM (2023)02:01
http://www.du.edu.et/duj

RESEARCH ARTICLE

Work-related Musculoskeletal Disorder Symptoms among Computer User Workers of Ethiopian Roads Authority in Addis Ababa, Ethiopia

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Received: 30 December 2022

DOI:10.20372/ajhsm.v02i01.01

Accepted: 29 May 2023

Published: 21 June 2023

Suggested Citation: Negassa B.G. and Tesfaye A.A., Work-related Musculoskeletal Disorder Symptoms among Computer User Workers of Ethiopian Roads Authority in Addis Ababa, Ethiopia. Afri. J. Heal. Sci. Med; 2023, 02(01).

Abstract

Background: Computer related health problems and ergonomic disorders are resulted from prolonged computer usage in a maladaptive manner. At least 10 million new cases of computer related human health risks occur each year; posing in reduced life quality and work productivity. This study aims to describe the prevalence of work-related musculoskeletal disorder symptoms among computer user workers of Ethiopian Roads Authority.

Methods: Two hundred thirty three workers were requested for the study from all ten districts of Ethiopian Roads Authority from January 2018 to February 2018. A cross-sectional study was conducted using self-administered questionnaires to collect socio-demographic data, symptoms of musculoskeletal disorders, information regarding ergonomic and computer work station conditions. Chi-square test was used to determine the association between the variables. The odds ratio was calculated using binary logistic regressions. The significance level was considered as $P < 0.05$.

Result: A total of 233 workers were included in this study from Ethiopian Roads Authority; 61% of the respondents were males, whereas; 39% were females. The 12-months prevalence of work related musculoskeletal disorder symptoms among computer users in this study population was 71.2%. The most frequently self-reported symptoms were back pain (46.4%), headache (39.9%), neck pain (31.3%), and wrist pain (12%) among Ethiopian Roads Authority workers ($p < 0.05$). Computing hours per day was significantly associated with the presence of musculoskeletal disorder symptoms.

Conclusion: Ethiopian Roads Authority computer user workers had a high prevalence of work-related musculoskeletal disorders. Daily computer using hours was the most single statistically significant risk factor in this study. There is a need to increase the corrective measures that to be implemented to reduce the impact of computer related symptoms of musculoskeletal disorders.

Keywords: Mmusculoskeletal symptoms, Computer user workers, Ergonomic training, Ethiopian Roads Authority, Work-related musculoskeletal disorders

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Background

In today's age, computer has become a common item; its usage become an integral part of daily life [1]. Appreciably, computers have been changing the working environment, simplifying and speeding up numerous tasks across many work areas. It has increased the work efficiency and communications and has opened access to information like never before [2]. It makes the lifestyle of users too much relaxed. Huge numbers of people use computers excessively and intensively starting from official work to playing video games [3].

Continuous use of computers for long hours [4] in maladaptive manner found to have severe problems; even for few hours per day usage [5], causes various health illness. Scholars [6] have identified health risks developed from usage of computer for three hours per day such as Occupational Overuse Syndrome (OOS), Computer Vision Syndrome (CVS), Musculoskeletal Symptoms (MSSs): low back pain, neck pain, wrist pain; headaches and psychosocial stress. These risks are directly related to prolonged sitting in front of computer screens with poor ergonomic practices [7,8].

Mashige *et al.* [9] and Ranganatha S C *et al.* [10] have listed posture-related symptoms as neck pain, shoulder pain, back pain, wrist pain, knee pain which are collectively named as musculoskeletal symptoms (MSSs).

Work-related musculoskeletal symptoms, MSSs can occur due to improper working conditions and poor work habits. It might be associated with maladapted monotonous use of computers that attributed to poor ergonomic practices [11]. Muscular Skeletal Symptoms, MSS can cause Muscular Skeletal Disorders, MSDs. The MSDs are considered as one of the contemporary health issues. It comprises two percent of global disease burden and the second highest volume of years lived with disability [1,12]; existed in 22% of patients [13]. Part of MSDs categorized under musculoskeletal symptoms includes: headache, neck and back pain, and shoulder, wrist, and finger discomfort [13,14]. These symptoms are well associated with improper placement of computer screen which lead to muscles sprain; affecting head and neck postures when working at a computer [15,16].

Most evidences show that, work-related musculoskeletal disorders have been called the foremost occupational hazard of the 21^{st} century [17]. The studies have identified that 64% to 90% of computer users have health problems [18]. Study of 2014 in US shown that, on average, (45 to 70) million people spend an hour staring into a computer screen. But, recently about 143 million of workers use a computer daily [19] in U.S.A alone and 90% of whom who use three to four hours per day developed computer related illnesses [20]. Global records also estimated that nearly 60 million people suffer [6] and other study estimates that at least 10 million new cases of computer-related human health risks were reported each year [21].

Work-related musculoskeletal disorders (WMSDs) lead to economic costs and affect organizational effectiveness and efficiency. Excessive use of technology [22]; duration of occupation [23]; lack of ergonomic training for workers to implement safe practices at their work place [24] have led to increase prevalence of WMSDs. Since MSSs places an unusual strain on workers physical well-being, it decreases the quality of life [25], reduces employees' effectiveness, and significantly causes a resultant loss of productivity [26].

So, MSDs can be considered as a significant rising non-communicable disease having the capacity of global public health threat unless serious attention is paid to it [27]. It has affected most computer users from various occupations that attract attentions of researchers from both developed and developing world.

Many studies have been conducted to address

questions concerning safety and health for computer users. Most of these studies reported prevalence of WMSDs ranged from 40-73.3% [13,28-31]. However, they were centered in Western and Middle East regions focusing on assessing knowledge, practice and magnitude of eye related problems of computer usage targeted on university communities as their study population [32-41]. But, every individual using computer for longer time without rest at their office or home can develop work-related MSSs or WMSDs [28-31].

To the author's best knowledge, there is limited study focusing on workers using computers in African region including Ethiopia. Few studies were conducted in limited states or districts: Debre Tabor and Gonder in Ethiopia [42,43]; Abuja in Nigeria [44] assessed the prevalence of CVS among computer users. Academic and financial institutions were the subject of a few studies conducted in Ethiopia [42,43,45] to assess computer-related health issues. These studies do not go far enough to investigate the existence of computer-related health risks and predictor variables across various groups of computer users.

As a result, computer users in other broad representative federal organizations, such as the Ethiopian Roads Authority, which employs a large number of people with varying levels of computer usage, should be included in such studies. Furthermore, no single study has attempted to determine the magnitude of MSDS and its related factors among Ethiopian computer users. Posture related symptoms which are also a growing, but neglected health risks among computer users was excluded. Also evidences show that work-related MSSs lead to complicated MSDs. Therefore, the aim of this study was to determine the prevalence of work related symptoms of MSDs and their associated factors among Ethiopian Roads Authority computer users.

Methods and Materials

Study Design and Period

A cross-sectional study design was used from January 2018 to February 2018.

Study Area

The study was conducted in Addis Ababa, the capital city of Ethiopia. The government institution at which this study conducted was Ethiopian Roads Authority, which consist about 34 departments (work units) with a total of 2928 workers as ERA's census of April, 2017 [47].

Source and Study Population

All computer users who worked in Ethiopian Roads Authority were the source population, whereas all workers who were using computer in their day-to-day working activities for at least twelve months were taken as study population. Any type of duties carried out by employees was considered.

Eligibility Criteria

The research included all ERA computer users, with the exception of those who had used a computer for fewer than twelve months. ERA employees who had a history of known musculoskeletal disorders prior to starting computer use were also ineligible.

Sample Size Determination

The sample size (n) was first estimated using the single population proportion formula with the following assumptions: a margin of error (D) of 5%, a proportion (P) of health risk in frequent computer users 73.3 percent [21], and a confidence interval of 95 percent; $Z_{\alpha/2}$=1.96

$$\mathrm{n} = \frac{(Z_{\alpha/2})^2 p(1-p)}{D^2}$$

$$\mathrm{n} = \frac{(1.96)^2(0.73)(1-0.73)}{(0.05)^2} = 301$$

$$\mathrm{n}_f = \frac{n}{1+\frac{n}{N}} = \frac{301}{1+\frac{301}{2928}} = 272$$

Sampling Procedure

A pre-determined sample size was allocated to 34 work units of ERA offices. A random sampling technique was used to select participants. Then, from each selected office, study subjects were selected proportionally to their size by random sampling technique.

Operational Definition

Musculoskeletal Disorders, MSDs: will be considered if the respondents have experienced a variety of symptoms such as discomfort in the neck, pain in the shoulders, elbows, hands, fingers, hips and knees as a result of repetitive movements, doing work in awkward postures and static postures while prolonged seating at works [28].

Computer user workers: employees those using computer for their day-to-day life activities to perform different tasks [42] at least for twelve months and who were staff at ERA.

Ergonomically nonadjustable chairs: Non-ergonomic chairs usually have a fixed and non-adjustable backrest, which means you can't adjust it to suit your needs [23].

Data Collection

Self-administered questionnaires were used to collect socio-demographic data, symptoms of MSDs, information regarding ergonomics and lightening, and potential risk factors (computer work station conditions or workplace/environment) of workers on safety measures of MSDs. The questionnaires were initially prepared in English language and translated into Amharic language for obtaining information about socio-demographic characteristic and factors for MSDs and then translated back into English language for data entry and analysis. The purpose and objectives of the study was briefed for participants before taking consent from them. The pre-designed questionnaires were distributed to each work units among the study population; completeness of the questionnaires was checked and/then collected back.

Data Analysis

Data was entered to Excel spread sheet and imported to predictive analytics software 20 version software for statistical analysis (IBM SPSS Statistics 20). The prevalence of computer related disorders was expressed as percentage. Chi-square test was used to determine the association between the variables. The odds ratio (OR) was determined using logistic regressions. The significance level was considered as $P < 0.05$.

Ethical Approval

The study was approved by the Ethics committee of the Ethiopian Roads Authority and therefore been performed in accordance with the ethical standards.

Results

Socio-demographic Characteristics

A total of 233 computer user ERA workers who met the criteria were included in the study with a response rate of 85.7%. This is due to incorrect response of 39 participants. Male participants were 142 (61%) and 91 (39%) of them were females. Majority (40.4%) of the study population belonged to between 21-30 years of age categories followed by 31-40 years (33.3%) age groups. Most of the respondents (141, 60.5%) were BA/BSc holders; about (33, 14.2%) of them were MA/MSc holders, and the rest (59, 25.3%) were college diploma. The majority (42.5%) of respondents were engineers.

Just about 6 out of 10 (59.7%) of the respondents reported having worked between one (1) year to five (5) years; about 24% of them worked between six to ten years, and the rest (16.3%) were worked above ten years. Nearly three-fourth (74.7%) of the participants were using computer for more than 6 hours a day; that is in the range of working hours. Hence, this is in agreement with the normal office hours in Ethiopia. About 14.2% were using computer for 3 to 5 hours a day and the rest 11.2% were using for less than 2 hours a day.

Table 1 Socio-demographic Characteristics of Computer User Workers of ERA in Addis Ababa, 2018

Variables		**All(N=233)**	**Does MSD Symptoms Exist?**	
			Yes	No
Gender				
	Male	142(61%)	101(71.1%)	41(28.9%)
	Female	91(39%)	65(71.4%)	26(28.6%)
Age				
	21-30 years	96(41.2%)	66(39.8%)	30(44.8%)
	31-40 years	77(33.3%)	60(36.1%)	17(25.4%)
	41-50 years	40(17.2%)	25(15.1%)	15(22.4%)
	51-60 years	20(8.6%)	15(9.0%)	5(7.5%)
Education level				
	Diploma	59(25.3%)	37(22.3%)	22(32.8%)
	BA/BSc degree	141(60.5%)	105(63.3%)	36(53.7%)
	MA/MSc degree	33(14.2%)	24(14.5%)	9(13.4%)
Occupation type				
	Engineer	99(42.5%)	78(47.0%)	21(31.3%)
	Finance officer	38(16.3%)	23(13.9%)	15(22.4%)
	Human resource officer	35(15.0%)	26(15.7%)	9(13.4%)
	Office manager/secretary	38(16.3%)	29(17.5%)	9(13.4%)
	Others	23(9.9%)	10(6.0%)	13(19.4%)
Service year on current job				
	1-5 years	139(59.7%)	103(62.0%)	36(53.7%)
	6-10 years	56(24.0%)	36(21.7%)	20(29.9%)
	11-15 years	16(6.9%)	13(7.8%)	3(4.5%)
	Above 15 years	22(9.4%)	14(8.4%)	8(11.9%)
Ergonomic training				
	Yes	29(12.4%)	17(10.2%)	12(17.9%)
	No	204(87.6%)	149(89.8%)	55(82.1%)
Daily computer usage time				
	More than 6 hours	174 (74.7%)	141 (84.9%)	33(49.3%)
	3 to 5 hours	33(14.2%)	19(11.4%)	14(20.9%)
	1 to 2 hours	26(11.2%)	6(3.6%)	20(29.9%)
Adjusting screen				
	Yes	203(87.1%)	151(91.0%)	52(77.6%)
	No	30(12.9%)	15(9.0%)	15(22.4%)

Prevalence of MSD Symptoms

A total of 166 workers reported a history of one or more symptoms of MSD. Consequently, the 12-month prevalence of MSD in the study population was found to be 71.2% (166/233). The most commonly reported work-related musculoskeletal disorder (WMSD) complaint was back pain (46.4%); followed by headache (39.9%), neck pain (31.3%) and Wrist pain (12%) among musculoskeletal symptoms, MSSs (Figure 1). The prevalence of symptoms ranged from the least frequently reported (4.3%) for shoulder pain to (46.4%) for back pain among ERA workers. Almost there was no difference in cumulative prevalence of WMSD symptoms among male (71.1%) and female (71.4%) workers ($p > 0.05$).

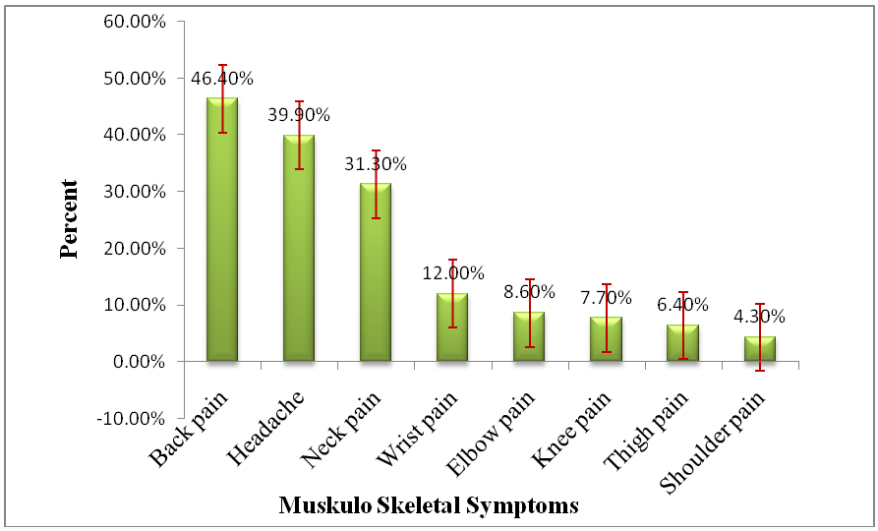

Figure 1 Musculoskeletal Symptoms of Computer User Workers in ERA

Table 2 One Year Prevalence of MSD Symptoms among Computer User Workers of Ethiopian Roads Authority, 2018

Symptoms	All prevalence %	Male prevalence %	Female prevalence %	*p-value*
Does MSSs or MSDs exist?				
Yes	166(71.2%)	101(71.1%)	65(71.4%)	.54
No	67(28.8%)	41(28.9%)	26(28.6%)	
Musculoskeletal symptoms reported				
Headache	93(39.9%)	60(42.3%)	33(36.3%)	.41
Neck pain	73(31.3%)	49(34.5%)	24(26.4%)	.20
Elbow pain	20(8.6%)	12(8.5%)	8(8.8%)	.55
Wrist pain	28(12.0%)	10(7.0%)	18(19.8%)	.004*
Shoulder pain	10(4.3%)	8(5.6%)	2(2.2%)	.33
Back pain	108(46.4%)	70(49.3%)	38(41.8%)	.29
Thigh pain	15(6.4%)	13(9.2%)	2(2.2%)	.051
Knee pain	18(7.7%)	12(8.5%)	6(6.6%)	.63

Workstation environs and Ergonomics related Problems Triggers MSSs

The ergonomic hazards were part of the assessment conducted during the survey. Almost more than half of the respondents 120 (51.5%) were used ergonomically nonadjustable chairs. More than half (54.1%) of the participants usually used desktop computers. Nearly half of them 114 (48.9%) were reported inadequate free space near to their computer work station.

About 12.9% of respondents reported that they were not adjusting their computer screen. On the other hand, 87.6% of the participants did not attend any ergonomic training related to computer usage (Table 1 and 2).

Table 3 Working Station Environs and Percentage of MSSs among Computer Users in Ethiopian Roads Authority (n = 233), 2018

Variables (working station environment)										
Symptoms of	Computer type used				Using adjustable chair			Free space availability		
MSD	Dt	Dt & Lt	Lt	P-value	Yes	No	P-value	Yes	No	P-value
Headache	34.9	47.7	38.1	.17	42.5	37.5	.43	47.9	31.6	.01*
Neck pain	30.2	31.4	38.1	.78	31.0	69.0	1.0	31.1	68.9	.52
Elbow pain	4.8	11.6	19.0	.04	8.0	92.0	.81	7.6	92.4	.36
Wrist pain	8.1	15.1	9.5	.31	11.5	88.5	.84	14.3	85.7	.18
Shoulder pain	2.4	8.1	0.0	.10	7.1	92.9	.054	5.9	94.1	.33
Back pain	46.0	48.8	38.1	.68	47.8	52.2	.69	47.9	52.1	.69
Thigh pain	4.8	9.3	4.8	.48	5.3	94.7	.59	5.9	94.1	.79
Knee pain	9.5	5.8	4.8	.61	7.1	92.9	.80	8.4	91.6	.81

Dt=Desktop; Lt=Laptop

Factors Associated with MSDs Symptoms

Job category, ergonomic training, computing hours per day and adjusting computer screening were candidate variable with the occurrence of MSSs ($p < 0.25$). However, among all candidate variables only patterns of computer usage per day was significantly associated with occurrence of MSDs ($p < 0.05$).

Results of the Logistic Regression Analysis

From binary logistic regression analysis: computing hours per day was significantly associated with the presence of MSD symptoms. When compared to workers who use the computer for more than 6 hours a day, using the computer for 1 to 2 hours a day substantially reduced the incidence of MSD symptoms by 16.4 times (AOR=16.401; 95% CI: 5.371-50.086).

Table 4 Factors Associated with MSD Symptoms among Computer User ERA Workers (n=233), 2018

Variables		COR (95% CI)	AOR (95% CI)	*P-value*
Job category				
	Engineer®			
	Finance and accountant	2.42 (1.08-5.44)*	2.16 (0.90-5.21)	0.085
	Human resource officer	1.29 (0.52-3.16)	1.10 (0.39-3.07)	0.861
	Office manager/secretary	1.15 (0.47-2.81)	0.47 (0.16-1.38)	0.168
	Others	4.83 (1.86-12.55)*	2.89 (0.34-24.94)	0.334
Ergonomic training				
	Yes®			
	No	0.52 (0.24-1.17)	0.84 (0.31-2.26)	0.730
Computer usage per day				
	More than 6 hours®			
	3 to 5 hours	3.15 (1.43-6.92)*	3.814 (1.65-8.84)	0.002
	1 to 2 hours	14.24 (5.30-38.25)*	16.40 (5.37-50.09)	0.000
Adjusting computer screen				
	Yes®			
	No	2.90 (1.33-6.35)*	0.98 (0.15-6.23)	0.983

Note: ® = Reference; *= indicates candidate variables for multivariable

Discussion

In the present study 71.2% of ERA workers had one or more than one symptoms of MSDs, which is very high computer related health risk. This finding is higher than studies reported prevalence of MSD symptoms ranged from 40-70% [22,24,33-35,42-45].

The higher prevalence observed in this study is possibly due to the higher sample size in reference with similar studies reviewed. Then again, most respondents in this study were engineers, who were experienced on daily usage of computers for long period of time as evidenced by Logaraj *et al.* [34]. Hence, these inconsistencies might be a possible justification for the determined higher prevalence in present study.

The main work-related musculoskeletal disorder symptoms of this study were back pain (46.4%), headache (39.9%), neck pain (31.3%) and wrist pain (12%) among ERA workers. This is aligned with a study done by other scholars [34,40].

In gender wise, almost there was no difference in general prevalence of MSD symptoms among male (71.1%) and female (71.4%) workers ($p > 0.05$). But, in particular wrist ($p=0.004$) pain were observed symptoms of MSDs associated to gender ($p < 0.05$) and more prevalent among female participants which is similar to Pandey *et al.* [12].

The possible justification might be due to the proportion of female in job categories. Out of 91 (39%) female participants in current study, the majorities were office secretaries 38 (41.8%) who have higher chance to develop wrist/finger pain since their job is related to comprehensive usage of computers. Strengthening this fact, Dessie et al found that secretaries were significantly impacted by MSDs compared to other workers [42].

Out of all, 233, respondents met the criteria and participated in this study, the majority 96 (40.4%) of them belonged to age category of 21-30 years old followed by age groups between 31-40 years 77 (33.3%). No significant association was found between the ages of workers with MSDs development in present study. Nevertheless, it might be revealed that most computer based work was dominated by younger generation. This is in line with other study conducted by Abudawood *et al.* in King Abdulaziz University, Jeddah, Saudi Arabia [40]. The current finding disagree with the study by Alemayehu *et al.* [45] who reported that older aged were at higher risk of developing computer related health problems within their study population.

Daily computer using time was the most statistically significant risk factor in this study. Workers who used computers for 3 to 5 hrs per day (AOR: 3.8; 95% CI=1.6-8.8, p=0.002) were 3.8 times less likely to develop MSD symptoms as compared to those who used computers more than 6 hours per day. On the other hand, computer user workers using for 1 to 2 hours per day (AOR: 16.4; 95% CI=5.37-50.08, p=0.000) were 16.2 times less likely to develop symptoms of MSDs comparing to those who used more than 2 hours per day. This finding is in agreement with numbers of the previous findings [22,23,36,38].

Moreover, Noreen *et al.* [22] and Logaraj *et al.* [34] reported that users who spent continuously without rest more than four hours were significantly at higher risk of developing computer related health problems than who spent less than four hours. Other similar studies also shown that the longer the time spent on computer, the more prevalent and extent are risks of MSDs symptoms appreciably [4,24]. Additionally, Logaraj *et al.* [34] observed that the longer the duration, the longer the complaint last even after work. Hence, either reducing daily exposure time spent on computer or taking mini breaks [23] are important to prevent and control MSDs.

Neck pain was more prevalent among laptop users (40%) (table 3), this might be resulted from view distance which was revealed by scholars in previous studies [33,46]. Users who viewed computers at a distance of less than arm and forearm length (> 50 cm), resulted in more symptoms significantly [46]. Shantakumari *et al.* [33] added that the prevalence of headache decreased in students who viewed the screen at a distance more than 50 cm.

A well-designed chair may favorably affect the posture, circulation and the extent of strain on the spine. The chair should allow the feet firmly on the floor or a footrest should be used to support the feet. Most chairs used by computer users in properly designed computer facilities and institutions have adjustments to make them comfortable to sit on and therefore preventing back pains [23]. However, almost 5 out of 10 (51.5%) of ERA workers were sitting on non-adjustable chair in present study. This revealed that only 48.5% of the workers used adjustable chair which was inconsistent with Logaraj *et al.* [34] who reported that 61.5% of respondents in their study used chairs with adjustable backrest while working on their computer.

Despite it was non-significant in this study, sitting on inappropriate chair in front of computer screen cause muscle stiffness, headache, and back pain as muscles and tendons become inflamed due to prolonged sitting [12]. Strengthening this, evidence explaining that musculoskeletal symptoms are well related to improper seating posture and placement of the screen [16]. Additionally, just 48.9% of the respondents were complaining about free space availability near to their working station.

Although, this is not significant in present study, it may be one factor that triggers for 46.4% back; 39.9% headache; 31.3% neck; 12% wrist, 8.6% elbow; 7.7% knee, 6.4% thigh and 43% shoulder pains among study participants. That's why, American Optometric Association recommend that proper ergonomic design and adjustment

of computer in an adequate workstation can increase productivity and workers comfort by decreasing the demands of the task [15].

Limitation of study

The major limitation to this study was that, only self-reported symptoms were considered excluding ergonomic examinations using cross-sectional study design. Besides to this, other ergonomic parameters such as workstation furniture and viewing distance of computer screen might be associated with MSSs were not taken into consideration.

Conclusion

Ethiopian Roads Authority computer user workers had a high prevalence of work-related musculoskeletal disorder symptoms. Computing hours per day was significantly associated with the presence of musculoskeletal disorder symptoms. Multi-programmed approaches; decreasing the number of hours per day at the computer screen, increasing frequent rest (mini breaks) with motivation for exercises (to stand, stretch, and move around) at workplace and proper positioning is needed to prevent Work-related Musculoskeletal Disorder Symptoms (WMSDSs). Ergonomic interventions should be considered to prevent the computer related health problems.

Assertions

Abbreviations

CVS	Computer Vision Syndrome
CI	Confidence Interval
ERA	Ethiopian Roads Authority
MSSs	Muscular Skeletal Symptoms
MSDs	Musculoskeletal Disorders
WMSDs	Work-related Musculoskeletal Disorders
OOS	Occupational Overuse Syndrome
SPSS	Statistical Package for Social Sciences

Acknowledgments

The author would like to express his gratitude to ERA's principals and employees for their willingness to participate in this research. Thank you to Mrs. Birhan Hagos, Mr. Dawit Solomon, and Amha Hailu for their assistance in revising the questionnaire.

Consent for publication - Not applicable

Availability of data and materials

The datasets underlying the study are available from the corresponding author up on request.

Competing interests

The author declares that there is no competing interest.

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AFRICAN JOURNAL OF HEALTH SCIENCES AND MEDICINE
AJHSM (2023)02:01
http://www.du.edu.et/duj

RESEARCH ARTICLE

Magnitude and associated factors of Utero-vaginal Prolapse among women's visiting gynecology ward from 2016-2019 at Dilla Referral Hospital, southern Ethiopia

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Received: 02 October 2022

Accepted: 02 June 2023

Published: 29 June 2023

DOI:10.20372/ajhsm.v02i01.02

Suggested Citation: Alehegn K., Kassaw C., Mareg M., and Sisay D., Magnitude and associated factors of Utero -vaginal Prolapse among women's visiting gynecology ward from 2016-2019 at Dilla referral hospital, southern Ethiopia. Afri. J. Heal. Sci. Med; 2023, 02(01).

Abstract

Background: Utero-vaginal prolapse (UVP) is the herniation of the uterus and all vaginal segments wall. It is a major women's health concern throughout the world. Globally, 2-20% of all women are affected by utero-vaginal prolapse. The prevalence of utero-vaginal prolapse in Ethiopia is 18.55% among all gynecological operations. Despite the fact, there is no enough study conducted in southern Ethiopia, therefore, this study aimed to assess the prevalence and associated factors of utero-vaginal prolapse among patients admitted at gynecological ward in Dilla University Referral Hospital, Dilla town, southern Ethiopia, 2020.

Methods: This study was an institutional-based retrospective cross-sectional conducted in Dilla University Referral Hospital from records. We included 257 gynecologic ward admitted patients chart which were selected, using systematic sampling from 1864 charts from September 2016 to June 2019. The study was conducted from December 2019 to September 2020 at Dilla University referral Hospital (DURH). We used SPSS version 22 for data entry and analysis. A bi-variable and multi-variable logistic regression (95% CI, $p<0.05$) were conducted to identify the factors associated with Utero-vaginal prolapse. Descriptive statistics, such as frequency, percentage, and tables were used to display the result.

Result: This study found that 27 (10.5%) of the participants had utero-vaginal prolapse. The predictor variables for utero-vaginal prolapse were absence of perianal tear [AOR= 0.016; 95% CI (0.001, 0.506)], absence of chronic constipation [AOR= 0.015; 95% CI (0.001, 0.528)], absence of chronic cough [AOR= 0.020; 95% CI (0.001, 0.749)], and having no family history of UVP [AOR= 0.031; 95% CI (0.004, 0.230)] decreased the risk of UVP.

Conclusion: This study identified that one-fourth of the participants had Utero-vaginal prolapse. This study also identified modifiable factors related with the outcome variable. Therefore, giving special attention, creating awareness, and working on those risk factors is crucial for the prevention and management of utero-vaginal prolapse.

Keywords: Gynecology ward, South Ethiopia, Utero-vaginal prolapse, Women

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Background

Utero-vaginal prolapse (UVP) is the herniation of the uterus and vaginal segments such as the anterior wall, the posterior wall, or the apex of the vagina into or beyond the vagina, which is held inside the pelvic cavity by various ligaments, muscles, and connective tissues which are collectively known as the pelvic floor [1]. The common complaints are pelvic pressure, discomfort, visible bulging, and sexual impairment. And clinically graded based on the quality of life affected, the severity and stage of prolapse [2–6].

The common cause of UVP was the early age of the marriage, culture related to caste/ethnicity, less access to health services due to poor economic condition, delivery at a young age, lack of spacing between pregnancies. Other causes were older age, Family history, menopause, higher parity, vaginal delivery, and prolonged labor [7–10].

It affects women's sexual, gynecological, psychological, and mental wellbeing, and quality of life; results in social stigma and discrimination in low and middle-level countries, which the culture is discouraging, secret, feel of shame to clarify Franky the condition at the public [11–13].

Globally, 2-20% of all women are affected by utero-vaginal prolapse and estimated that the prevalence of any degree of uterine prolapse among women age 20-59 was 5%. The incidence of utero-vaginal prolapse was 14.2% in the UK, 17% in Australia, 8.5% in France, 27% in Turkey, and 10% in India [14–18]

The mean prevalence of pelvic organ prolapses among low and middle-income countries was 19.7%. In Ethiopia, 19.9 % in Gondar, and 17.2% in Gandhi memorial hospital [7,12]. Despite its magnitude and effects, there is no enough study conducted in southern Ethiopia. Therefore, this study aimed to assess the magnitude and its determinants among women attended a gynecological treatment service [19].

Study Objective

General Objective

To assess the prevalence and its associated factors of utero-vaginal prolapse among gynecological patients in DURH, Dilla town, Gedeo zone, south Ethiopia, 2020.

Specific objectives

To assess the prevalence of utero-vaginal prolapse among gynecological patients in DURH, Dilla town, Gedeo zone, south Ethiopia, 2020; To determine factors associated with utero-vaginal prolapse among gynecological patients in DURH, Dilla town, Gedeo zone, south Ethiopia, 2020.

Methods and Materials

Study Area and Period

This study was conducted in Dilla referral hospital which is found in Dilla town, located in Gedeo Zone, SNNPR, Ethiopia. Dilla town has nine kebeles, two health centers, and one hospital and located 360 km faraway from Addis Ababa, the capital city of Ethiopia, and 90 km from Hawassa, the capital city of southern nation nationalities and peoples region (SNNPR). The total population is estimated to be 96, 920, and 22,539 of them were women of reproductive age (15-49 years of age). The study was conducted from December 2019 to September 2020 at Dilla University referral Hospital (DURH).

Study Design

This study was a facility based retrospective cross-sectional study design and secondary data from the medical record charts of women admitted in the gynecology ward of the DURH was the source of data.

Source Population

All women's visiting gynecological ward at Dilla referral hospital

Study Population

Participants of this study were all women with utero-vaginal prolapse who visited gynecological ward.

Study Unit:

Individual level

Sample Size Determination

The sample size was determined using a single population proportion formula of a cross-sectional study design. The researchers used the proportion (19.9%) of UVP in gynecologic hospital admissions conducted in Gondar hospital [12].

On the basis of this statistics, desired sample of the study was calculated as:

$$\text{n} = \frac{Z^2 p(1-p)}{d^2}$$

Where,

n=Desired sample size for the study
Z=the standard normal variety, value of Z at 95% CI=1.96
P=prevalence of uterine prolapse Q=1-P
D=permissible errors, value of D is =0.05

Using the above formula, the sample size were calculated as follows:

$$\text{n} = \frac{(1.96)^2(0.199)(1-0.199)}{(0.05)^2}$$

$\text{n} = 244.93 \approx 245$ +5% non-response rate [9]

Therefore, the total sample size of this study was 257.

Sampling Procedure

Researchers selected the required number of samples using systematic random sampling after proportional allocation for each four strata years (2016, 2017, 2018, and 2019). Systematic random sampling was used to select all required samples using intervals (K^{th}) units by dividing the total case notes by the calculated sample size. Finally, a total of 257 women's medical records were selected for conducting this study.

$$K^{th} \text{ int.} = \frac{all gynecologic cases from Sep.2016 - June 2019}{Total no of my sample size \approx 257}$$

$$= \frac{1864}{257}$$

$$= 7.25 \approx 7$$

The researchers selected all required samples (n=257) every 7^{th} interval. Data were extracted from the medical record charts using a pretested self-prepared checklist.

Inclusion Criteria

This study included all participants with full medical information available in the registration book archive of the hospital and admitted from 2016-2019.

Exclusion Criteria

This study excluded those participants with comorbid case in addition to utero-vaginal prolapse

Study Variables

Dependent Variable:

Utero-vaginal prolapse

Independent Variables:

Socio-demographic variables: age, occupation, ethnicity, educational status, address, religion.

Reproductive variables: gravidity, parity, prolonged labor, age at first delivery (years), place of delivery, mode of delivery, perianal tears, family history of UVP, history of UVP.

Medical status: chronic cough, chronic constipation and smoking.

Work related factors: heavy load lifting.

Operational Definition

Pelvic organ prolapses: It is the abnormal herniation of pelvic viscera including uterus, vaginal vault, bladder, rectum, and small or large bowel against the vaginal walls or through the vaginal introits [**??**].

Utero-vaginal prolapse: It is the descent of the uterus/cervix and vaginal segments through the vaginal canal.

Stages of UVP prolapse: Stage 0 UVP: no prolapse demonstrated; Stage 1 UVP: halfway to hymen; Stage 2 UVP: to the level hymen; Stage 3 UVP: halfway past hymen; Stage 4 UVP: maximum descent [7].

Data Collection Instruments

The researchers used standard and validated tool to measure each variables of the study. The researchers conducted pretest for each tool before the actual data collection period.

Data Collection Procedure

After the preparation of the structured questionnaire, the researchers selected three midwifery data collectors and one medical doctor supervisor to collect the outcome and other independent variable information of participants from their admission chart and medical record chart.

Data Quality Control

All data collectors and supervisors have taken two days of training. The researchers conducted a pretest among 5% of the study subjects before the actual data collection time. Supervision was employed on daily basis to check completeness and consistency by both the supervisors and the principal investigator to keep the quality of data.

Data Processing and Analysis

The entire questionnaire was checked for completeness. The data were cleaned, coded and entered into the computer using Epi-data version 3.1 then exported to SPSS 20 version statistical software for analysis. Binary logistic regression statistical model was used to estimate the relationship between dependent and independent variables. P-value ≤ 0.25 were entered into multivariate logistic regression and $p \leq 0.05$ used to identify variables independently predict the outcome variable at 95% confidence interval.

Results

Socio-demographic Characteristics of the Respondent

The response rate for the current study was 100%. Out of all 257 participants, 163 (63.4%) of them were age below 40 years old, and 159 (61.9%) came from a rural area, and 148 (57.6%) were protestant religion followers. 208 (80.9%) of them were married, and 151 (58.8%) of participants cannot read and write, and nearly half 122 (47.5%) of them were housewives (Table 1).

Table 1 Socio-demographic characteristics of respondents

Variable		Frequency (n=257)	Percentage (%)
Age group in years			
	≤ 40	163	63.4
	> 40	94	36.6
Address			
	Urban	98	38.1
	Rural	159	61.9
Marital status			
	Married	208	80.9
	Others*	49	19.1
Religion			
	Orthodox	67	26.1
	Muslim	42	16.3
	Protestant	148	57.6
Ethnicity			
	Gedeo	151	58.8
	Oromo	63	24.5
	Others**	43	16.7
Level of education			
	Unable to read and write	151	58.8
	Able to read and write	24	9.3
	Formal education	82	31.9
Occupation			
	House wife	122	47.5
	Others ***	135	52.5

Note: *widowed and divorced; **Amhara, Silite, and Gurage; ***merchant, employed

Obstetrical Characteristics of Study Participants

Out of all participants, 158 (61.5%) of them gave their first birth at age < 20 years of age, and 150 (58.4%) had > 4 times pregnancy history. More than half 146 (56.8%) of them attended home delivery, and 227 (88.5%) of them delivered vaginally. All of them had no smoking history (Table 2).

Table 2 Obstetrical characteristics of respondents

Variable	Frequency (n=257)	Percentage (%)
Age at first delivery		
≤ 20 year	158	61.5
> 20 year	99	38.5
Parity		
< 2	65	25.3
2-4	42	16.3
> 4	150	58.4
Mode of Delivery		
Vaginal	225	87.5
c/s	32	12.5
Place of delivery		
Home	146	56.8
Health center	111	43.2
Perianal tear		
Yes	88	34.2
No	169	65.8
Chronic constipation		
Yes	95	37.0
No	162	63.0
Chronic cough		
Yes	85	33.1
No	172	66.9
Degree of UVP		
First degree	2	7.4
Second degree	9	33.3
Third degree	13	48.2
Fourth degree	3	11.1
Duration of illness		
<1 year	2	7.4
1-5 years	15	55.6
6-9 years	9	33.3
≥ 10	1	3.7
Family history of UVP		
Yes	35	13.6
No	222	86.4
Prolonged labor		
< 8 hour	108	42.0
≥ 8 hour	149	58.0

Prevalence of Utero-vaginal Prolapse

This study showed that 27 (10.5%) of the participants had utero-vaginal prolapse. Out of that, 13 (48.2%) of them had third-degree UVP, and 15 (55.5%) of them had utero-vaginal prolapse for 1-5 years (Figure 1).

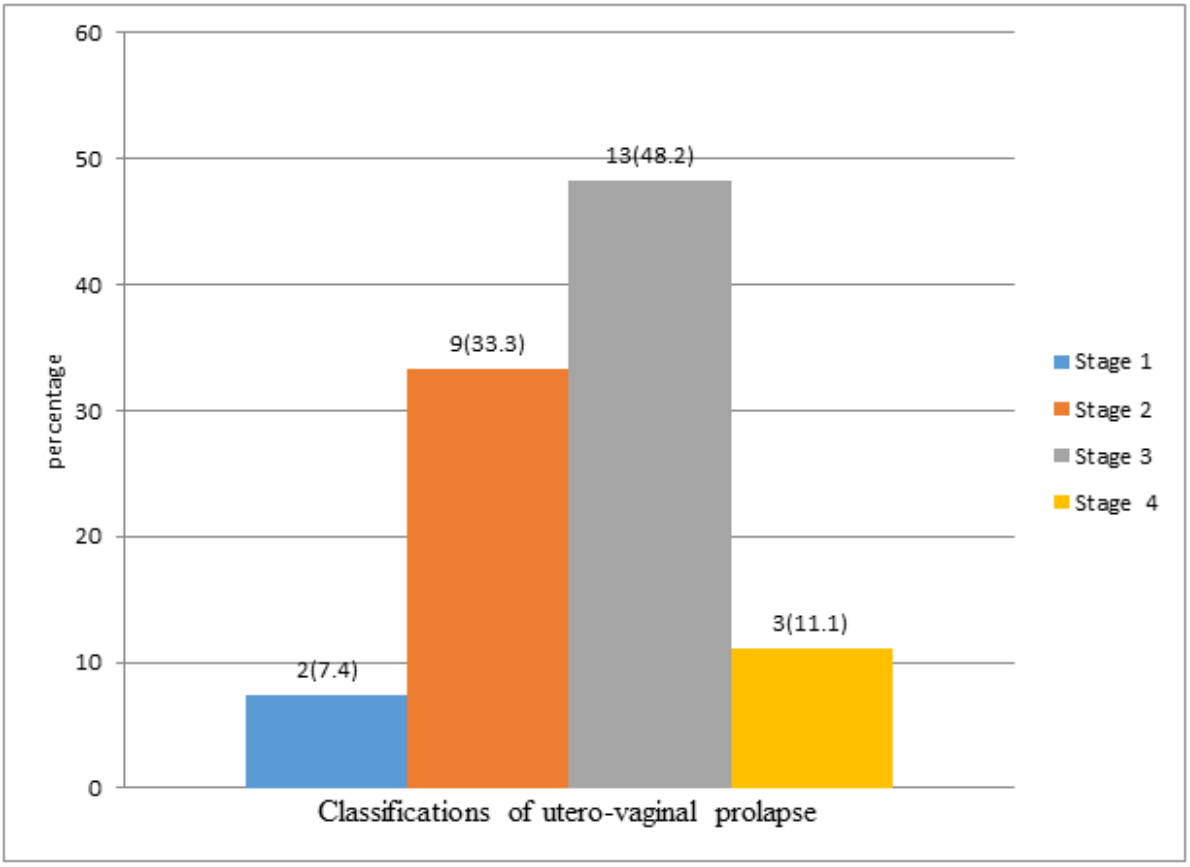

Figure 1 Stages of utero-vaginal prolapse

Factors Associated with Utero-vaginal Prolapse

During multivariate logistic regression; history of perinatal tears, chronic constipation, and cough and family history of UVP were significantly associated with UVP.

Those participants with history of perinatal tears had 10.93 times AOR=10.93, 95% CI (3.97, 30.08) more to develop utero-vaginal prolapse than their counter parts. Those participants with history constipation had 5.90 times AOR=5.9, 95% CI, (2.39, 14.58)* to experience utero-vaginal prolapse (Table 3).

Table 3 Predictors of utero-vaginal prolapse among respondents

Variables	**Utero-vaginal prolapse**		**Multivariable regression analysis AOR, (95% CI, p < 0.05)**
Category	YES	NO	
History of perinatal tears			
Yes	22	66	10.93 (3.97, 30.08)**
No	5	164	1
History of chronic constipation			
Yes	20	75	5.9 (2.39, 14.58)*
No	7	155	1
History of chronic cough			
Yes	21	64	9.08 (3.5, 23.52)**
No	6	166	1
Family history of UVP			
Yes	17	18	20.02 (8, 50.11)***
No	10	212	1
Age at first delivery			
≤ 20 year	78	80	1.57 (0.32-2.83)
> 20 year	46	53	1
Parity			
< 2	30	25	1.34 (0.12-3.25)
2-4	25	17	2.01 (0.33-3.92)
> 4	85	65	1
Mode of Delivery			
Vaginal	103	122	1
c/s	14	18	0.56 (0.11-2.11)
Place of delivery			
Home	85	61	1
Health center	67	44	2.47 (0.11-3.21)
Prolonged labor			
< 8 hour	55	53	1.11 (0.73-2.18)
> 8 hour	82	67	1

1=reference category, p < 0.05, *, P < 0.01, **, p < 0.001, ***

Discussion

This study was conducted to identify the prevalence of UVP and associated factors among women admitted to the gynecology ward of DURH from 1st September 2016 to June 2019. This study found that 27 (10.5%) of the participants had utero-vaginal prolapse, which was lower than the studies done in the United States (14.2%) [24], Nepal 13.7% [20], Gondar (19.9%) and Addis Ababa (17.2%) [12], and Bench-Maji Zone (13.3%) [21]. It might be due to the sociodemographic characteristics, study design, and period differences of study participants. On the other hand, the finding was higher than the studies in Egypt 7.9% [22] and Dabat (North West Ethiopia) 6.3% [23]. It might be due to the cultural and attitudinal differences toward marriage and delivery.

This study found that 124 (48.2%) of respondents had third-degree UVP, which was in contrast with studies done in Nigeria, 83.3% were second degree [24], and in Ghana, 33.3% were second-degree utero-vaginal prolapse [25]. These differences might be due to the awareness gap towards utero-vaginal prolapse, different accessibility of health facilities, and socioeconomic variance.

This study found that 190 (74.1%) of women with UVP had their first child at the age of less than 20 years, which was lower than the study done in Bahir Dar (91.9%) [26]. Early marriage contributes to early pregnancy and delivery, which is the mainstay cause of utero-vaginal prolapse.

This study also found that 85 (35%) of the respondents had a chronic cough and 97 (37.0%) chronic constipation, which was higher than the studies done in Jimma [27] (20.9%) and 30.2%, respectively. It might be due to the difference in their day-to-day life activities, which in these study area women are highly engaged in carrying woods and had no enough nutrition status contribute to different chronic illness.

This study found that nine of women with UVP were from rural residents. Rural women are engaged in '*Kocho*' mining (traditional diet in SNNPR, made from '*enset*'), which is physically demanding and involving leg and back muscle fatigue and risk for utero-vaginal prolapse.

Moreover, the study found that women who have no perianal tear were 98.4% who are less likely to develop utero-vaginal prolapse than their counterparts and supported by a study done in Nepal [20]. It might be explained by sphincter muscles, together with their surrounding tissues, are responsible for keeping/supporting all of the pelvic organs. And this might be due to the perianal tear that may lead to different complications including UVP.

This study's result revealed that women who have no family history of UVP were 96.9%, who are less likely to develop UVP than their counterparts. This finding is supported by a study done in Bahir Dar, Northern Ethiopia [26], which showed that positive family history of pelvic organ prolapse were five times more likely to have had pelvic organ prolapse (POP) compared with their counter parts. This might be due to the risk of the problem may be transferred from their families genetically.

The result of this study showed that women who have no chronic constipation and chronic cough were 98.5% and 98.0% who are less likely to develop UVP than their counterparts respectively. This might be due to chronic constipation and chronic cough that increase pressure on pelvic organ which may increase the risk of UVP.

Limitation of study

This study used secondary data prone for Miss-information. This study was cross sectional study design which might not show the direct cause-effect relationship between the predictor and outcome variable.

Conclusion

According to the findings of this study, utero-vaginal prolapse was a common gynecological problem and reason for admission. Preventing and managing the case needs a collaboration work from different stake holders. Early managing medical conditions such as, constipation, cough and perinatal tears is vital to prevent the occurrence of UVP. Creating awareness about magnitude and risk factors is also another possible solution for the early managements of the case in different health organization.

Assertions

Abbreviations and Acronyms

AOR	Adjusted Odd Ratio
CI	Confidence interval
COD	Crude Odd Ratio
DURH	Dilla University Referral Hospital
EC	Ethiopian calendar
ETB	Ethiopian birr
GC	Gregorian calendar
JUSH	Jimma University Specialized Hospital
MRN	Medical record charts
OR	Odds Ratio
POP	Pelvic organ prolapses
SNNPR	Southern Nation Nationalities and Peoples' Region
SPH	Social Public Health
SPSS	Statistical Package for Social Sciences
UVP	Utero-vaginal prolapse

Acknowledgments

We are grateful to Dilla University, College of Health and Medical Science for the logistical support. We would also like to thank caregivers and card runner's working at gynecological ward.

Ethical Concern

Ethical clearance for this study was obtained from the Dilla university referral Hospital College of health sciences and medicine research review committee. The permission letter to review patient's medical chart was obtained from medical directorate and respective ward clinical coordinators. The issues of privacy and confidentiality issues were addressed throughout the survey.

Consent for Publication - Not applicable

Availability of Data and Materials

The datasets underlying the study are available from the corresponding author up on request.

Competing Interests

We confirm there are no competing interests on this research work.

Funding

This study was funded by Dilla University, College of Health and Medical Science.

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Author's Contributions

Kassahun Alehegn initiated the idea.

Chalachew Kassaw, Moges Mareg, and Daniel Sisay developed the proposal, involved in data collection, research writing, supervised the whole task, and developed the manuscript.

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AFRICAN JOURNAL OF HEALTH SCIENCES AND MEDICINE
AJHSM (2023)02:01
http://www.du.edu.et/duj

RESEARCH ARTICLE

Knowledge and practice towards Cervical Cancer prevention, and its associated factors among female students of Mizan-Tepi University, southwest Ethiopia

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Received: 01 November 2022

Accepted: 02 May 2023

Published: 05 June 2023

DOI:10.20372/ajhsm.v02i01.03

Suggested Citation: Shiferaw D. and Tadesse A., Knowledge and practice towards Cervical Cancer prevention, and its associated factors among female students of Mizan-Tepi University, southwest Ethiopia. Afri. J. Heal. Sci. Med; 2023, 02(01).

Abstract

Background: Cervical cancer is preventable and, most often curable, if identified earlier. Young women, including university students, should be aware of and implement cervical cancer prevention methods. However, limited studies were done about knowledge and practices of cervical cancer prevention among the female population of Ethiopia particularly in the study setting. Thus, this study was aimed to assess the knowledge and practice towards cervical cancer prevention and associated factors.

Methods: An institution-based cross-sectional study was conducted among female students of Mizan-Tepi University, southwest Ethiopia from January to February 2020. A two-stage cluster sampling technique was used to select a total of 715 samples. Data was collected using a pretested self-administered questionnaire. Binary and multivariable logistic regression was conducted to identify associated factors of knowledge and practice towards cervical cancer prevention. The strength of association was determined by Adjusted Odd Ratio (AOR) with 95% confidence interval (CI) and statistically significant variables were identified based on P-value < 0.05.

Result: Data was collected from 665 female students with a 93% response rate. Among the respondents, 31.4% of study participants had good knowledge and 13.5% had a good practice towards cervical cancer prevention. The college where students were studying ($AOR = 34.91$; 95% $CI = 21.03$-57.96) and previous history of cervical cancer screening ($AOR = 3.49$; 95% $CI = 1.52$-8.01) were predictors of good knowledge. Knowledge of how HPV infection is acquired ($AOR = 3.68$; 95% $CI = 1.60$-8.47), age of screening ($AOR = 0.07$; 95% $CI = 0.01$-0.34) and frequency of screening ($AOR = 2.63$; 95% $CI = 1.03$-6.70) were found factors associated with good practice.

Conclusion: Most study participants had poor knowledge and practice towards cervical cancer prevention. Colleges, previous cervical cancer screening experience were found to be associated with student's knowledge. Knowing how HPV infection is acquired and knowing the age and frequency of cervical cancer screening were found predictors of overall cervical cancer prevention practice.

Keywords: Cervical cancer prevention, Female students, Knowledge, Mizan-Tepi University, Practice

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Background

Globally, cancer has become the second cause of death, following cardiovascular disease; with more than 8.7 million deaths. Up to 60% of this death occurs in low-income countries [1,3]. Although the incidence of cancer is common among men population of developed nations, a higher incidence of cancer was also seen among women of less developed countries [2].

Cervical cancer is among the commonest cancers in the world with an estimated 300,000 deaths annually [4]. About 85% of morbidities and mortalities related to cervical cancer occur in resource-limited countries [5]. According to estimates of cancer incidence in Ethiopia done in 2015 using population-based registry data, new cases of all cancers combined were twice among women than men. The difference is mainly due to the higher incidence of breast and cervical cancer among women. In women at the age of 15 and above, cervical cancer was the second most common cancer (22%) following breast cancer, constituting 23% of all cancers in females [3]. Also, in the country, about 7,600 are diagnosed and 6,000 dies of the disease [6].

Human Papilloma Virus (HPV), the most common cause of cervical cancer, is a sexually transmitted infection (STI) and is higher in developing countries [7-10]. Studies have indicated susceptibility to cervical cancer is higher among women with a previous history of multiple sexual partners, early sex archer, early age of marriage and childbirth, multiparity, poor living standard, long term use of hormonal contraceptives, history of STI, and smoking history [11-13].

Cervical cancer is a controllable disease through primary and secondary prevention strategies. An important strategy for primary prevention and control of cervical cancer would include the administration of the HPV vaccine into the national immunization program targeting adolescent girls [14,15].

In developed countries, the incidence of cervical cancer and related deaths has been significantly lowered due to secondary prevention programs such as the Papanicolaou (Pap) smear test for screening cervical premalignant lesion [16]. However, in developing countries, screening services are not accessible for a large portion of the population [17].

In most cases, cervical cancer can be effectively prevented as well as cured if diagnosed earlier [5]. In developing countries, evidence showed that the majority of deaths due to cervical cancer occur in women who were often seek screening services at later stages, or never treated [6,13]. As secondary prevention, the progression of cervical cancer into its later stages can be prevented through timely screening and treatment of premalignant lesions [15,16].

Knowledge and practice towards cervical cancer prevention were found to be inadequate among women including higher institution students in low resource countries [18-21]. Information is important for better knowledge about HPV and cervical cancer [22]. Inadequate information and lower socioeconomic status were cited as barriers to receiving HPV vaccination and cervical cancer screening [21,23].

Studies suggested that young women, including female university students, should be aware of the effective prevention and early treatment of cervical cancer [19,22,24,25]. However, limited studies were done about knowledge and practices of cervical cancer prevention among the female population of Ethiopia, particularly in the study setting. Thus, the study aimed to assess knowledge and practice towards cervical cancer prevention, and its associated factors among female students of Mizan-Tepi University, southwest Ethiopia.

Methods and Materials

Study Design and Setting

A cross-sectional study was conducted among female students of Mizan-Tepi University (MTU) from January to February 2020. Mizan-Tepi University is one of the public universities located in the southwestern part of the country, Ethiopia. The university was established in 2006 and has two campuses found in two towns namely Mizan Aman and Tepi town. Currently, the university is offering education and training for more than 11,600 students (i.e. 4,167 female and 7,433 male) in its 6 colleges (i.e. college of business and economics, college of agriculture and natural resource, college of other social science and humanity, college of medicine and health sciences, college of natural science, and college of engineering and technology), two schools (i.e. school of law and School of Computing & information), 38 departments [26].

Study Population

Selected regular undergraduate female students were included in the study. However, female students who were attending summer, weekend, and distance education, and those who were sick during the data collection period were excluded from the study.

Sample Size Determination

Initially, sample size (n_0) was calculated by using single population proportion formula [27]. Based on a study done among female students of Debre Birhan University of Ethiopia [22], we inferred that the proportion (P) of female university students with good knowledge on cervical cancer and its prevention would be 35.6% (p=0.356) assuming a 95% confidence level and a 5% margin of error (d).

$$n_0 = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

$$n_0 = \frac{(1.96)^2(0.365)(1-0.365)}{(0.05)^2} = 352$$

Then, since the total number of female students of Mizan-Tepi University was less than 10,000 (N=4,167), we applied finite population correction factor to calculate the final sample size (n_f) [28].

$$n = \frac{n_0)}{1+\frac{n_0}{N}} = \frac{352)}{1+\frac{352}{4,167}} = 325$$

The study participants were selected by using a two-stage clustered sampling technique. Thus, the sample size was multiplied by two by considering the design effect (D=2) and then 10% of the non-response rate was added. Finally, the minimum sample size required for this study was 715.

Sampling Procedure

A two-stage cluster sampling technique was conducted to select the students. First, all colleges and schools were categorized as Health and Medical Science College and Non-Health Science Colleges. Then, one college (college of medicine and health sciences) was selected purposely, and four colleges (i.e. college of business and economics, college of agriculture and natural resource, natural science and college of other social science and humanity) and 1 school (school of law) were selected using simple random sampling from Non-Health Science Colleges. Second, Eight departments were selected by simple random sampling technique. Namely, the department of Nursing and Midwifery selected from the College of Medicine and Health Sciences; General forestry, Biology, Management, Natural Resource Management, Sociology, and School of the law were selected from the Non-Health Science Colleges. Finally, the total sample size was divided proportionally to each selected department, based on the number of students found. A list of the students from year one to year five was obtained from each selected department. Then study participants were selected from each year of the selected departments by simple random sampling method using computer-generated random numbers.

Data Collection Tool and Procedure

The data was collected by using a pretested, structured, and unstructured self-administered questionnaire. The questionnaire was prepared by investigators after reviewing related literature [19,22,24,25,29-31]and made it suitable to assess female university students' knowledge and practice towards cervical cancer prevention. The questionnaire was initially prepared in the English version and then translated to the Amharic language for those who cannot understand the English version of the question. Approximately 10-15 minutes were used to complete the instrument.

Most of the questions were closed-ended with predetermined options such as "Yes", "No", and as well as "I don't know". Some questions were developed with multiple options, and few open-ended questions were also included. The questionnaire has two parts. The first part contains general information, including sociodemographic characteristics of students such as age, college, year of study, the residence of origin (rural vs. urban), marital status. The second part contains questions regarding the student's knowledge and practice on cervical cancer prevention.

Before the actual data collection, one orientation was given to those who facilitate the data collection process. A pre-test was done on 5% (36) of the sample among non-study participants from the department of pharmacy and animal science students, and necessary modification was done. Finally, the questionnaire was distributed to the study participants by five data collectors, and two personnel supervised the data collection process.

Operational Definition

Knowledge assessment: Respondent's comprehensive knowledge of cervical cancer prevention was assessed by using 11 questions with responses. The knowledge assessment focused on having information about HPV, cervical cancer, and screening method. Also, knowledge about cervical cancer risk factors, symptoms, and prevention methods was included.

Those who responded "Yes" response to at least 6 questions of all 11 questions were considered as having "Good Knowledge towards cervical cancer prevention" and those who respond "Yes" response to < 5 questions of all 11 questions was considered as having "Poor Knowledge towards cervical cancer prevention"

Practice assessment: Five questions were used to determine the respondent's practice towards cervical cancer prevention. Having a sexual partner, cigarette smoking habits, condom use, previous history of cervical cancer screening, and vaccination against HPV were mainly considered to categorize students' practice. Those who responded "Yes" for questions such as condom use, History of cervical cancer screening and vaccination against HPV; and "No" response to having a sexual partner, smoking habits were considered an appropriate response of good practice. Thus, those who responded > 3 appropriate responses of good practice out of the total five practice questions were considered to have "Good practice".

On the contrary, those who respond "No" for the answer to questions such as Condom use, screening for cervical cancer, and vaccination against HPV; and "Yes" response to having a sexual partner, smoking habits were considered as an indicator of poor practice. Thus, those who mentioned > 3 of poor practice out of the total five practice questions were considered to have "poor practice".

Data Processing and Analysis

After the data collection, filled questionnaires were checked for completeness. The data were coded, entered, and cleaned using Epidata software (Version 3.1) and exported to SPSS version 23 for analysis. First descriptive statics such as the frequency and percentage were done. Then,

binary logistic regression analysis was conducted to measure the potential association between the outcome and each determinant variable. Crude odds ratio (OR) and probability value (P-value) were identified for each independent variable and then all independent variables with a p-value of less than 0.05 were entered into multivariate logistic regression. Finally, multivariate analysis was conducted to identify the factors associated with the level of knowledge and practice on cervical cancer prevention. The strength of association was determined by Adjusted Odd Ratio (AOR) with 95% confidence interval (CI) and statistically significant variables were identified based on P-value < 0.05. Hosmer-Lemeshow goodness of fit test was used to test the model fitness for the final multivariate analysis.

Results

Socio-demographic and Academic Characteristics of the Respondent

Data was collected from 665 female students with a 93% response rate. The age of the students ranges from 18 to 39 years with a mean age (± SD) of 21.12 years (± 2.02). The majority of students (472/71%) were from non-health science colleges and 285 (42.9%) were 2^{nd} year students. More than half, 362 (54.4%), of the students came from urban areas and 607 (91.3%) were single (Table 1).

Table 1 Sociodemographic and academic characteristics of respondents, Mizan-Tepi University, Southern Ethiopia, 2020 (n= 665)

Variables	Frequency	Percentage (%)
Age category		
≤20	315	47.4
21-25	330	49.6
≥26	20	3.0
Colleges		
Medical and health sciences	193	29.0
Non-health science	472	71.0
Year of study		
Year 1	165	24.8
Year 2	285	42.9
Year 3	122	18.3
Year 4	82	12.3
Year 5	11	1.7
Residence		
Urban	362	54.4
Rural	303	45.6
Marital status		
Married	58	8.7
Single	607	91.3

Knowledge about Cervical Cancer Prevention

Overall, 209 (31.4%) study participants had good knowledge, whereas 456 (68.6%) had poor knowledge about cervical cancer and its prevention. About one-third, 218 (32.8%), know at least a single symptom of cervical cancer, and 104 (47.7%) of them reported abnormal vaginal bleeding as a symptom (Table 2).

Table 2 Knowledge of Cervical Cancer and its prevention among respondents, Mizan-Tepi University, Southern Ethiopia, 2020

Variables	Frequency	Percentage (%)
Ever heard about cervical cancer (n= 665)		
Yes	332	49.9
No	333	50.1
Source of information an (n=332)		
Teachers	123	35.7
Health workers	99	28.8
Mass Media	89	25.9
Family and Friends	33	9.6
Do you know the symptoms of cervical cancer?		
Yes	218	32.8
No	447	67.2
The symptoms reported by respondents (n=218)		
Abnormal vaginal Bleeding	104	47.7
Abnormal Vaginal discharge	84	38.5
Bleeding after menopause	16	7.4
Others*b*	14	6.4
Do know about the risk factors of cervical cancer? (n=665)		
Yes	286	43
No	379	57
The types of risk factors (n=286)		
Early age of sexual intercourse	71	24.8
Multiple sexual partners	56	19.6
Human Papilloma virus	52	18.2
Cigarette Smoking	33	11.5
Contraceptives	21	7.3
HIV infection	18	6.3
Others[c]	35	12.2
Ever heard about HPV, n=665		
Yes	216	32.5
No	449	67.5

Variables	Frequency	Percentage (%)
Do you know how HPV infection is acquired? (n=665)		
Yes	214	32.2
No	451	67.8
Routes of acquiring HPV infection (n=214)		
Sexually intercourse	138	64.5
Airborne	30	14
Close contact	46	21.5
Ever heard about cervical cancer screening (n=665)		
Yes	196	29.5
No	469	70.5
Perceived age to be screened for cervical cancer(n=665)		
<15 years	63	9.5
15-30 years	161	24.2
30-49 years	44	6.6
I don't know	397	59.7
Perceived frequency for cervical cancer screening (n=665)		
Every 5 years	38	5.7
Every 3 years	36	5.4
Every year	62	9.3
I don't know	529	79.5
Do you know whether cervical cancer is curable? (n=665)		
Yes	323	48.6
No	128	19.2
I don't know	214	32.2
Do you know whether cervical cancer is preventable? (n=665)		
Yes	110	16.5
No	413	62.1
I don't know	142	21.4
Do you know the means of cervical cancer prevention? (n=665)		
Yes	366	55
No	299	45
Means of cervical cancer prevention (n=366)		
Avoid multiple sexual partners	132	19.8
Vaccination against HPV infection	76	11.4
Abstain from early sexual intercourse	73	11
Quit smoking	46	6.9
Others[d]	39	5.9
Overall knowledge		
Good knowledge	209	31.4
Poor knowledge	456	68.6

[a] more than one response; Others[b]: Abdominal discomfort, pain during urination

Others[c]: Alcohol consumption, hereditary, lack of hygiene

Others[d]: Condom use, avoiding alcohol consumption, keep hygienic, consult a physician

Of the respondents, 286 (43%) know the risk factors of cervical cancer and early initiation of sexual intercourse (24.8%), multiple sexual partners (19.6%), HPV (18.2%) were mentioned as risk factors. Of all, 216 (32.5%) have heard about HPV and 138 (64.5%) stated sexual intercourse as a means of acquiring HPV infection. Of the total study participants, only 196 (29.5%) have heard about cervical cancer screening while only 44(6.6%) of the respondents reported 30 to 49 years as the appropriate age to be screened for cervical cancer. Thirty-eight (5.7%) recommended the frequency of cervical cancer screening every five years while 36 (5.4%) of them said every three years. Also, 323 (48.6%) know whether cervical cancer is curable and only 110 (16.5%) know that cervical cancer is preventable.

The majority, 366 (55.0%), of respondents, know at least one prevention method. Avoiding multiple sexual partners (19.8%), vaccination against HPV infection (11.4%), and abstaining from early sexual intercourse (11.0%) was indicated by the students as means of cervical cancer prevention.

Cervical Cancer Prevention Practice

Most of the study subjects, 636 (95.6%), were not cigarette smokers. Only 218 (32.8%) have had a sexual partner and of this number, 156 (71.6%) had one sexual partner, 154 (70.6%) had started first sexual intercourse between the age of 19-25 years and 81 (37.2%) have had used a condom consistently during sexual intercourse. Only 67(10.1%) study participants had ever screened for cervical cancer and of this proportion, 63 (94%) screened once. However, 598 respondents (89.9%) had not ever screened for cervical cancer. Very few, 52 (7.8%), were ever vaccinated against HPV, but 613 (92.2%) were not vaccinated. From the overall practice score, only 90 (13.5%) participants had good cervical cancer prevention practice (Table 3)

Table 3 Cervical cancer prevention practice among the respondents, Mizan- Tepi University, Southern Ethiopia, 2020 (n=665)

Practice items	Frequency	Percentage (%)
Do you smoke cigarettes? (n=665)		
Yes	29	4.4
No	636	95.6
Do you have a sexual partner? (n=665)		
Yes	218	32.8
No	447	67.2
How many sexual partners? (n=218)		
One	156	71.6
Multiple	62	28.4
At what age did you start sexual intercourse? (n=218)		
11-18 years	64	29.4
19-25 years	154	70.6
Do you use condoms consistently? (n=218)		
Yes	81	37.2
No	137	62.8
Have you ever screened for cervical cancer?		
Yes	67	10.1
No	598	89.9
How many times have you screened for cervical cancer? (n=67)		
Once	63	94
Twice	4	6
Why you did not screen for cervical cancer? (n=598)		
I do not about screening	277	46.3
I think unnecessary	140	23.4
I do not know where to be screened	99	16.6
Others[a]	82	13.7
Have you ever vaccinated against HPV? (n=665)		
Yes	52	7.8
No	613	92.2
Why you did not vaccinate against HPV? (n=613)		
I don't know about HPV vaccination	274	44.7
I don't know where to get an HPV vaccination	95	15.5
HPV vaccination service is not available in my locality	117	19.1
I don't think it's necessary	73	11.9
Others[b]	54	8.8
Overall Practice		
Poor practice	575	86.5
Good practice	90	13.5

Others[a]: Expensive, I don't think I am at risk, afraid; Others[b]: I think too expensive, afraid, fear of side effect

Factors associated with the level of Knowledge and Practice towards Cervical Cancer Prevention

Binary logistic regression was done for both outcome variables (level of knowledge and level of practice). As stated in the methodology part, first bivariate logistic regression analysis was conducted for each independent variable, and then statistically significant variables were entered into multivariate analysis.

Based on the COR (95% CI) and P-value, variables such as age, college, original residence, have ever screened and have ever vaccinated for HPV were associated with the level of knowledge of cervical cancer and its prevention (P<0.05).

The multivariate analysis showed that college (health vs. non-health science), and history of screening for cervical cancer were significantly associated with the level of knowledge. Students who were from medical and health science colleges were 34.91 times more likely to have good knowledge than non-health students (AOR = 34.91; 95% CI = 21.03-57.96). Also, those participants who have ever screened for cervical cancer were 3.49 times more likely to have good knowledge than their counterparts (AOR = 3.49; 95% CI = 1.52-8.01) (Table 4).

Table 4 Bivariate and multivariate analysis showing factors associated with the overall knowledge of cervical cancer and its prevention among female students of Mizan-Tepi University, Southern Ethiopia, 2020 (n=665)

Variables	Overall knowledge		COR (95% CI)	AOR (95% CI)
	Poor Knowledge n (%)	Good Knowledge n (%)		
Age category				
≤20	266(40.0)	49(7.4)	0.12(0.05-0.32)*	0.28(0.07-1.12)
21-25	182(27.4)	148(22.2)	0.54(0.22-1.36)	0.63(0.16-2.44)
≥26	8(1.2)	12(1.8)	1	1
Colleges				
Medical and health science	33(4.9)	160(24.1)	41.85(25.96-67.46)*	**34.91(21.03-57.96)***
Non-health science	423(63.6)	49(7.4)	1	1
Residence				
Urban	236(35.5)	126(18.9)	1.41(1.01-1.97)*	1.01(0.61-1.65)
Rural	220(33.1)	83(12.5)	1	1
Ever screened for cervical cancer				
Yes	23(3.5)	44(6.6)	5.02(2.94-8.57)*	**3.49(1.52-8.01)***
No	433(66.1)	165(24.8)	1	1
Ever vaccinated for HPV				
Yes	22(3.3)	30(4.5)	3.30(1.85-5.88)*	1.06(0.40-2.83)
No	434(65.3)	179(26.9)	1	1

COR: Crude Odds Ratio; *AOR*: Adjusted Odds Ratio; * $P < 0.05$; Bold values are statistically significant

Bivariate analysis done for level of practice showed that Age, college, ever heard about HPV, knowing how HPV infection is acquired, knowing the frequency of screening, knowing the age of screening, and knowing about HPV vaccine were associated with the level of cervical cancer prevention practice ($P < 0.05$). On a multivariate analysis; those students who know how HPV infection is acquired were 3.68 times more likely to have good practice than those who do

not know (AOR = 3.68; 95% CI = 1.60-8.47). Those participants who said screening frequency is every 5 years were 4.3 times more likely to have good practice than those who say 'I don't know (AOR = 4.30; 95% CI = 1.44-12.80) and similarly those who said 'every year' were 2.63 times more likely to have good practice towards cervical cancer prevention than those who said 'I don't know' (AOR = 2.63; 95% CI = 1.03-6.70). Students who said the appropriate age of cervical cancer screening is <15 years were 93% less likely to have good practice than those who said 'I don't know' (AOR = 0.07; 95% CI = 0.01-0.34) (Table 5).

Table 5 Bivariate and multivariate analysis showing factors associated with the cervical cancer prevention practice among female students of Mizan-Tepi University, Southern Ethiopia, 2019 (n=665)

Variables	Overall practice		*COR* (95% *CI*)	*AOR* (95% *CI*)
	Poor Practice *n* (%)	Good Practice *n* (%)		
Age				
≤20	273(41.1)	42(6.3)	0.35 (0.13-0.98)*	0.79(0.22-2.74)
21-25	288(43.3)	42(6.3)	0.34(0.12-0.93)*	0.45(0.13-1.52)
≥26	14(2.1)	6(0.9)	1	1
Colleges				
Medical and health sciences	152(22.8)	41(6.2)	2.32(1.47-3.66)*	1.45(0.69-3.03)
Non-health science	423(63.6)	49(7.4)	1	1
Knows how HPV infection is acquired				
Yes	165(24.8)	49(7.4)	2.97(1.889-4.66)*	3.68(1.60-8.47)*
No	410(61.6)	41(6.2)	1	1
A perceived time interval of cervical cancer screening				
Every 5 years	27(4.1)	11(1.6)	3.12(1.47-6.61)*	**4.30(1.44-12.80)***
Every 3 years	32(4.8)	4(0.6)	0.95(0.32-2.80)	0.70(0.20-2.48)
Every year	48(7.2)	14(2.1)	2.23(1.16-4.29)*	**2.63(1.03-6.70)***
I don't know	468(70.4)	61(9.2)	1	1
Perceived age to be screened for cervical cancer				
<15 years	61(9.2)	2(0.3)	0.20(0.04-0.87)*	**0.07(0.01-0.34)***
15-30 years	139(20.9)	22(3.3)	1.00(0.59-1.71)	0.59(0.30-1.14)
30-49 years	32(4.8)	12(1.8)	2.38(1.15-4.90)*	1.41(0.581-3.44)
I don't know	343(51.6)	54(8.1)	1	1

COR: Crude Odds Ratio; *AOR*: Adjusted Odds Ratio; * P<0.05; Bold values are statistically significant

Discussion

In women at the age of 15 and above, cervical cancer was the second most common cancer following breast cancer, constituting nearly one-fourth of all cancers in females [3]. This makes female university students are at risk of cervical cancer unless they are aware of the risk factors of cervical cancer and involved in its prevention methods. Thus, this study tried to fill gaps

in the information about female university student's knowledge and practice on cervical cancer prevention and its associated factors.

Studies indicated that a lack of source of information about cervical cancer and its prevention was associated with poor knowledge [19,32]. According to our study, nearly half (49.9%) of the participants had ever heard about cervical cancer. Similar studies conducted in less developed countries showed that the only limited proportion of female students had ever heard about cervical cancer [18,22,25,31,33]. In contrast to this study, finding from Turkey showed more than 75% of students had awareness about cervical cancer [34,35]. This discrepancy could be the sociodemographic characteristics of the study participants. Also, this study showed that the main source of information (35.7%) was teachers. This is similar to the finding from a study conducted among Hawasa university female students, which mentioned teachers as the main source of information [29]. The similarities could be both studies include respondents from medical and health students in which their teachers can inform them about the disease and its prevention.

Knowing the symptom might be important to initiate women to seek cervical cancer screening and treatment early. In our study, 32.8% reported that they knew at least one symptom of cervical cancer. A similar result was reported in other similar studies done in Ethiopia and Iran [22,25]. However, this result was lower than the study finding from Dessie, Ethiopia (46.3%), and Eastern Uganda (82.6%) [36,37].

Less than one-third (32.5%) of our respondents had ever heard about HPV, while 64.5% of them reported sexual intercourse as a means of acquiring HPV infection. A similar study result was found from Malaysia and Iran in which sexual intercourse was mentioned as a route of transmission of HPV among 63% and 60.3% of study participants respectively [24,25]. A study done in northern Ethiopia showed that 50.6% of study participants had heard about HPV; however, all respondents were from the College of Medicine and Health Sciences [19]. Our finding was higher than Studies done in Turkey [38] and Nigeria [18] mentioning 16% and 24% had ever heard about HPV respectively. Also, other two studies done among students revealed that 37.5% and 51% of the participants were aware of whether HPV is a sexually transmitted infection, which was lower than the current result [34,39].

According to our findings, 43% of the respondents knew at least one risk factor of cervical cancer, and 18.2% of them mentioned HPV as a risk factor. This is in line with other similar studies conducted in Ethiopia [19]. But, 80.2% of students in Malaysia and 49.7% of Hawasa town of Ethiopia indicated HPV as a cause for cervical cancer [24,29]. This difference could be the former studies were conducted only among medical and health science students. Also, a study conducted among university students in Pakistan revealed that 55% of study participants reported that HPV causes cervical cancer [39]. The possible reason for the difference might be the Pakistani study included both sex, and both undergraduate and postgraduate students.

According to the current study, less than half (48.6%) of participants knew whether cervical cancer is curable. This finding is comparable with a study result found in northern Ethiopia, which revealed 53.9% reported that cervical cancer is curable if detected early [36]. In this study, 62.1% knew that cervical cancer is preventable. This is lower than the study finding from Nigeria in which 90.5% of health students knew that cervical cancer is preventable [40]. More than half (55.0%) of our respondents knew at least one prevention method. This finding was lower than the finding of a study done among medical and health science female students of Hawasa university of Ethiopia [29].

Of the total participants, 29.5% of participants had ever heard about cervical cancer screening. This is much lower than other studies conducted

on a similar topic [23,36,41]. The difference in sociodemographic and study setting of the current and the previous studies might be the possible reason for this discrepancy. In our study, 10.1% had ever screened for cervical cancer. This might be the age of the students included in this study was below the recommended age for cervical cancer screening [42]. But this finding was higher than the study report of another Ethiopian university [19] which revealed that only 3% of the study participants had ever screened.

In this study, 7.8% had ever been vaccinated for HPV. Similarly, different studies done among female university students revealed that a lower proportion had ever been vaccinated against HPV [19,34,38].This showed that less attention was given to vaccinating young women, while most adolescent girls are willing to be vaccinated against HPV [43].

In this study, overall 31.4% of study participants had good knowledge about cervical cancer and its prevention which was low. This finding was comparable with the study finding from northern Ethiopia [22]. But, the current finding was higher than the study finding from Kenya, which showed only 19.3% had good knowledge of cervical cancer [44]. The discrepancy might be the former participants were selected from different universities and they were mainly from non-health science colleges. Surprisingly, our study finding was even lower than community-based studies conducted in Ethiopia and Uganda [32,36,37]. These showed that being a higher institution student cannot ensure better knowledge of cervical cancer and its prevention. Also, the current study was found that overall only 13.5% of participants had good cervical cancer prevention practices. Other similar studies indicated a cervical cancer prevention practice among female university students was low [19,31,34].

Our study revealed that students who were studying in medical and Health Science colleges were 34.91 times more likely to have good knowledge than non-health students. This result was in line with the study finding from Hawasa University in Ethiopia and Turkish university students [24,35]. The reason might be health science students (nurses and midwives) can get more information about the disease from their study participants and teachers than non-health science students. Also study conducted in India indicated that students from biology-major had more knowledge about cervical cancer [20]. In addition, respondents who have ever screened about cervical cancer were 3.49 times more likely to have good knowledge than their counterparts. This is obvious that previous cervical cancer screening experience could increase respondents' awareness about cervical cancer and its prevention.

Our finding showed that those students who knew how HPV infection is acquired were 3.68 times more likely to have good practice than those who didn't know. Those students who knew the risk factors of HPV infection could be easily protected from infection through good practices such as condom use or avoiding sexual intercourse before marriage.

In this study, those participants who mentioned the frequency of cervical cancer screening is every 5 years were 4.3 times more likely to have good practice than those who say 'I don't know' and those who said 'every year' were 2.63 times more likely to have good practice towards cervical cancer prevention than those who said 'I don't know. In this study, 9.5% of respondents reported less than 15 years as the appropriate age to be screened for cervical cancer. Students who perceived the appropriate age of cervical cancer screening is >15 years were 93% less likely to have good practice than those who said 'I don't know'.

Age categories and frequency for cervical cancer screening were stated in national and international guidelines. World health organization (WHO) recommended that screening programs should prioritize 30–49 years old women. Women Less than 30 years of age should not undergo

screening except for known HIV-infected women or residing in areas where the prevalence of HIV is high. The screening interval or frequency should not be less than 5 years [42]. Also, the federal ministry of health (FMOH) of Ethiopia recommends screening every five years following normal results irrespective of HIV status. Screening should be repeated in one year following abnormal screening results and/or treatment. Return to screening every five years, if follow-up cervical cancer screening is normal [45].

Conclusion

Most study participants had poor knowledge and practice towards cervical cancer prevention. Colleges, previous cervical cancer screening experience were found to be associated with student's knowledge. Knowing how HPV infection is acquired and knowing the age and frequency of cervical cancer screening were found predictors of overall cervical cancer prevention practice. The result obtained in this study indicates how useful it will be to establish health education programs to increase student's knowledge about cervical cancer prevention. Also, prevention programs such as cervical cancer screening services should be easily accessible to university students.

Assertions

Abbreviations and Acronyms

AOR	Adjusted Odd Ratio
CI	Confidence interval
FMOH	Federal Minstry of Health
HPV	Human Papiloma Virus
MTU	MizanTepi University
OR	Odds Ratio
STI	Sexually Transmitted Diseases
SPSS	Statistical Package for Social Sciences

Acknowledgments

We acknowledge Mizan-Tepi University for financial support and we are also grateful to the participants of the study.

Ethical Concern

The Helsinki Declaration was considered in the study. Before data collection, permission was obtained from Mizan-Tepi University. Informed oral consent was obtained from each respondent after providing sufficient information about the purpose of the study. Respondent's right to withdraw from the study was assured. Confidentiality of the respondents was kept by avoiding writing their name and identification number on the questionnaires.

Consent for Publication - Not applicable

Availability of Data and Materials

The datasets underlying the study are available from the corresponding author up on request.

Competing Interests

We confirm that there are no competing interests on this research work.

Funding

This study was funded by Mizan-Tepi University.

Author's Contributions

Daniel Shiferaw conceived the idea, involved in methodology, analysis, write up and manuscript preparation.

Abiy Tadesse involved in methodology, analysis, write up and manuscript preparation.

All authors read and approved the manuscript .

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AFRICAN JOURNAL OF HEALTH SCIENCES AND MEDICINE
AJHSM (2023)02:01
http://www.du.edu.et/duj

RESEARCH ARTICLE

Essential newborn care practice and associated factors among Health professionals at rural Gedeo Zone, southern Ethiopia: Cross sectional study

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Received: 22 September 2022

Accepted: 27 April 2023

Published: 01 June 2023

DOI:10.20372/ajhsm.v02i01.04

Suggested Citation: Mareg M., Addisu Y., Nenko G., and Belayneh Z., Essential newborn care practice and associated factors among Health professionals at rural Gedeo Zone, southern Ethiopia: Cross sectional study. Afri. J. Heal. Sci. Med; 2023, 02(01).

Abstract

Background: The neonatal mortality accounts 43% of child death below 5 year in the globe, and 42% in Ethiopia. There is limited evidence regarding the new born care practice of health professionals in rural Gedeo zone of southern Ethiopia. The aim of this study was to assess the essential newborn care practice and associated factors among health professionals at rural Gedeo zone.

Methods: A facility based cross-sectional study design was employed. A total of 233 health professionals (using systematic random selection method) were participated. The EPI-INFO-Version 3.5 and statistical package for social sciences (SPSS) version 20 software was used for data entry and analysis respectively. Significant association was declared by P-value of < 0.05 with a corresponding 95% confidence interval.

Result: A total of 233 health professionals participated with 100% response rate. Among 233 health professionals, 24% had good essential newborn care practice at 95% CI (19.3, 28.9) and above half, 76.0%, of the health professionals missed one or more steps of essential newborn care practices. Older age [adjusted odds ratio (AOR) = 0.18; 95% CI (0.03, 1.12)], female sex [$AOR = 3.08$; 95% CI (1.07, 8.81)], supportive supervision [$AOR = 2.17$; 95% CI (1.12, 4.19)], taking in-service training [$AOR = 4.85$; 95% CI (2.33, 10.10)], and knowing complication of the newborn [$AOR = 1.98$; 95% CI (1.01, 3.89)] were significantly associated with essential newborn care practice.

Conclusion: More than three-fourth of health professionals missed at least one procedure of essential newborn care practice. The finding recommended that the need to strengthen supportive supervision, in-service training, and improve knowledge on complication of newborn to improve essential newborn care of the health professionals at rural health facilities in Gedeo Zone.

Keywords: Ethiopia, Health Professionals, Neonates, Newborn care Practice

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Background

Globally, newborn mortality accounts 45% of less than 5 year old child deaths and account for 40% of under 5year old child deaths in Tanzania, 42% of less than 5 year old child deaths in Ethiopia [1]. Seventy five percent of all neonatal mortality (deaths in the first 28 days of life) occurs in twelve countries, six of them are in sub-Saharan Africa including Ethiopia [2,3].

Birth of newborn is the main challenge to the newborn to transfer positively from intra-uterine to extra-uterine life [4]. Newborn birth and the first few hours of life are serious periods for the advance growth and development of a newborn [5,6]. Amongst the lifespan of the infantile period, newborn period (age of newborn between 1 and 28 weeks) is very crucial as it defines the whole well-being of the child and his/her feature mature life of adult [7]. Utmost newborns are born healthy and at term (gestational age greater than 37 weeks), but the essential newborn care (ENC) they obtain in the first 60 minutes, days, and weeks of existence can define their future health status [8].

Essential new born care practice is an all-inclusive approach planned to improve the health status of new born through interventions before pregnancy, at pregnancy, on and shortly after natal and in the post-delivery period. Essential newborn care protects the newborn against mortality and morbidity which comprises quick commencement and exclusive breastfeeding, warm air care (comprising early drying and jacket at birth, increasing skin-to-skin contact, hindered washing, preserving "warm chain") and cleanliness practices (comprising cord-care and health professionals hand washing) [9,10].

Neonatal mortality is concentrated at less developed countries due to high maternal mortality, and poor essential newborn care [11,12]. In the sub-Saharan Africa countries, maternal death is the uppermost in the glob (56%) and viewing the least advancement among the regions' maternal and new born health for over two decades [13].

The infant and neonatal mortalities rate in Ethiopia was 48/1,000 live births and 29% based on a report of the 2016 Ethiopian Demographic Health Survey (EDHS) respectively [14], Whereas the report of 2019 mini Ethiopian demographic health survey (MEDHS) showed that the current neonatal mortality of Ethiopia increased from twenty nine to thirty percent per 1,000 live births [14].

The major cause of newborn death (less than 28 days) is neonatal asphyxia and birth trauma, which accounts 34%, prematurity 25%, sepsis and other infectious conditions 18%, congenital anomalies 10%, pneumonia 6%, other conditions 4%, tetanus 2%, diarrheal diseases 1%, injuries 1% [1]. In Ethiopia, the primary causes of newborn death (less than 28 days) are neonatal asphyxia and birth trauma, which accounts 34% and becomes higher in rural areas [3]. These conditions could be prevented through quality care (good essential newborn care practice) provided by health care professionals [2,3].

However, in Ethiopia still there is a huge gap in the implementation of essential newborn care practice, studies in different areas revealed that 48.9% and 27.23% of health professionals working in health centers had poor newborn care practice, and educational status, training status, the number of training, national guideline availability, presence of sufficient equipment, health facility type and knowledge level are some of the factors associated with ENCP [11,12]. These studies were conducted at urban areas of Ethiopia. Despite its crucial needs, limited evidence is available regarding ENCP of health professionals at rural Gedeo zone. Therefore, the main objective of this study was to assess the ENCP and associated factors among health professionals working in rural health institutions.

Methods and Materials

Study Design, Period, and Area

A health facility based cross sectional study was employed starting from February 10th - April 30^{th} 2017. It was conducted at Gedeo zone rural districts. Gedeo zone is one of the fourteen Zones in the Southern Nations, Nationalities, and Peoples' Region (SNNPR) of Ethiopia. The two Dilla and Yirgachefe towns are the administrative centers and the former is the Zonal administrative town.

Dilla town is situated at three hundred sixty kilo meters South East from Addis Ababa (the capital city of Ethiopia). According to the Zonal health department, there are six (Bule, Gedeb, Wonago, Kochere, Yirgachefe, and Dilla Zuria) Woredas. Gedeo Zone has one referral hospital, three primary hospitals and thirty two health centers in which ENCP is implemented. Within the four selected districts of the Zone, there are 477 health workers (63 health officers, 13 BSc nurses, 4 Bsc midwives, 68 diploma midwives, and 329 clinical nurses).

Sample Size Determination and Sampling Technique

The researchers used single population proportion formula by considering the assumptions made for sample size calculation i.e. a 95% confidence interval (CI), 5% margin of error and essential newborn care practice (52.4%) based on a study done in Tigray(13). And the results become 382. Since the source of population is below 10,000 (*i.e.* N=477), the researchers used correction formula, the sample were 212. The sample size for the second objective (factors associated with ENCP) was also calculated; and the maximum sample size obtained from the correction formula was taken. By taking a ten percent of non-response rate, the final sample size became 233.

First, from a total of six districts, four districts (Bulie, Wonago, Yirgachefe and Dilla Zuriya) were randomly selected. Within the four randomly selected districts, there were about 23 health facilities (consisting of 477 health professionals) in which essential newborn care practice was implemented. Then, the final sample size (*i.e.* 233) was allocated based on the number of health professionals to the 23 health facilities proportionally. After proportional allocation of samples, random sampling technique (*i.e.* systematic random sampling) was used in order to identify study participants from each health center using skipping interval (K). The skipping interval (K) was obtained by dividing the total numbers of study participants available at the health center to the number of proportionally allocated sample size for that health center. Simple random sampling method was used to select the first study participant between 1 and K. Then, the skip interval (K) value was added subsequently till the planned sample size was achieved.

Data collection instruments

An interviewer administered questionnaire was used for data collection together with direct observations checklist. The interviewer administered semi structured questionnaire was used to assess the socio-demographic characteristics, supervision status and knowledge related to ENCP. The level of ENCP was assessed using a standardized interview guide/tool having two main parts; direct observations check list and interviewer administered questionnaire [14].

The new born care practice was assessed by using observation checklist summarized based on ten important procedures. The level of practice was considered as "**good**" for participants who practiced the whole ten procedures (Immediately dry the whole body-while assessing the baby's breathing- evaluate breathing (if not birthing-call for help and start resuscitation), Cord care (clamping, tying and cutting, sterile blade after1-3minute of birth), place neonate on mother's ab-

domen or kangaroo mother care (KMC), Helps to initiate immediate breastfeeding within 1 hour, introduce eye drop/tetracycline eye cream, provide Vitamin K injection, Place the newborn's ID bands on the wrist and ankle, Weigh the newborn, Vaccinate at birth(OPV0 and BCG) given correctly or "**poor**" if the respondent misses one or more of the 10 step procedures [14].

Knowledge of health professionals regarding newborn care was assessed by using 28 item questions. Respondents who answered above 75% of the questions correctly were considered as "have good knowledge", 50-75% "have fair knowledge" and less than 50% "not knowledgeable" [14].

Data Collection Procedure

First the tools were prepared in English and then translated to Gede'uffa and Amharic (the commonly spoken language in the study area) and again to English to check its consistency. Eight clinical nurses supervised by two BSc level health officers were involved in the data collection after 2 days training. Then, the tool was pre tested at Chuko health center among 5% (12 health professionals) before the actual data collection. The supervisors and data collectors were assigned at different health centers on daily basis. The data were collected by using observation checklist and interviewer administered questionnaire. The data were collected from health professionals by direct observation to see whether they perform the newborn care in line with the 10 essential newborn care procedures or not. The health professionals were aware of whether they were being observed or not during the data collection. After that the researchers interviewed them to get socio demographic, knowledge, training and supportive supervision related information.

Data quality control

Before the actual data collection, an English version questionnaire was translated to the local languages (Gedeufa and Amharic) to make it more understandable. Training was delivered for supervisors and data collectors regarding the contents of the questionnaire, data collection procedures and what they can do if a professional is not knowledgeable for 2 days. Moreover, pretest of the questionnaire was done at Chuko health center among 5% (12 health professionals) before collecting the actual data collection. After the pretest, the expressions of some questions were modified using simple words.

Data processing and management

First, the data were intensively checked for its completeness and uniformity. After checking, the data were entered to EPI-INFO-version 3.5 (software) and exported to statistical package for social science (SPSS) statistical software version twenty for analysis. Uni-variable descriptive statistics was used to quantify the level of ENCP and the characteristics of the study participants. Both Bi-variable and multivariable logistic regression analysis were employed to identify the factors associated with ENCP. After Bi-variable analysis, variables with a P-value of less than 0.25 were considered as candidate for multivariable logistic regression. In multivariable logistic regression analysis, P-value of < 0.05 was considered as statistically significant association with ENCP. Adjusted Odds Ratio (AOR) with corresponding 95% CI was used to measure the level of the association.

Results

Socio-demographic Characteristics of the Respondent

About 233 health professionals participated in the study making 100% response rate. Less than half, 99(42.5%) of the respondents were in the age ranges of 26-30 years. The mean (±SD) ages of the respondents were 27.24 (± 3.58) years. Almost half of the respondents 115(49.4%) were married, 95(40.8%) unmarried, 15(6.4%) divorced, and 8(3.4%) were widowed. More than half of them were male 123(52.8%) (Table 1).

Table 1 Socio-Demographic Characteristics of Health Professionals Providing Essential Newborn Care Practice in Rural Gedeo Zone Health Facilities, Southern Ethiopia, 2017 ($N = 233$)

Variables	Frequency (number)	Percentage (%)
Religion		
Orthodox Christians	105	45.2
Protestant	102	43.7
Muslims	26	11.1
Professions		
Midwifery	75	32.2
Health officer	42	18
Nurse	116	49.8
Place of work		
Health center	206	88.4
Hospital	27	11.6
Work experience		
1-5 years	194	83.4
6-10 years	30	12.8
Above 10 years	9	3.8
Monthly income (USD)		
53.74-76.87	66	28.3
76.87-100.12	81	34.8
100.12- 123.38	60	25.7
123.38- 146.64	13	5.6
> 146.64	13	5.6
Qualification		
Diploma	147	63.1
Degree	86	36.9
Institution they attained education		
Private institution	77	33
Government institution	156	67

Essential Newborn Care Practice

Results from observation of the delivery room at the beginning of labour and delivery, 83.7% were clean. Majority, 222(95.5%) of health professionals prepared cord cutter and clamper before the onset of delivery (Table 2). Almost three fourth, 173(74.3%) of them did not prepare baby identification band; 209(89.7%) of health professionals prepared suction device before the start of delivery. Moreover, 221(94.8%) of health professionals prepared neonatal Ambu bag and mask before the onset of delivery, but only 75 (32.2%) of them provide vitamin K for the newborn, and 177(76%) of them did not place newborn's identification band on the wrist and ankle.

Above half, 138(59.2%) of them practiced hand washing with water and soap and dried by using cloths; most of them, 217(93.1%) put on the sterile glove, and 186(79.8%) of the health professionals wipes the eye and face of the newborn

Table 2 The Level of Essential Newborn Care Practice among Professionals in Rural Gedeo Zone Health Facilities, SNNPR, Southern Ethiopia, 2017 ($N = 233$)

Essential Newborn care practice observed	Frequency	Percentage (%)
Immediately dry the whole body, while assessing the baby's breathing		
Yes	177	76
No	56	24
Evaluate breathing		
Yes	225	96.6
No	8	3.4
Cord care		
Yes	224	96.1
No	9	3.9
Kangaroo mother care (KMC)		
Yes	58	24.9
No	175	75.1
Helps to initiate immediate breast milk feeding within 1 hour		
Yes	189	81.1
No	44	18.9
Administer Eye drop/TTC eye ointment		
Yes	161	69.1
No	72	30.9
Administer Vitamin K injection		
Yes	75	32.2
No	158	67.8
Place the newborn's identification bands on the wrist and ankle		
Yes	56	24
No	177	76
Weigh the newborn		
Yes	190	81.5
No	43	18.5
Vaccination at birth(OPV0 and BCG) given		
Yes	177	76
No	56	24

Note: *OPV*: oral polio virus vaccine, *BCG*: Bacillie Calmete Guarin vaccine

when the head is delivered; 58(24.6%) of them cleaned eyes of the newborn after birth by using a separate swab., and 205(87.6%) of health professionals immediately dried the whole body with cloth/towel. Fifty-eight (44.9%) of health professionals kept warm by putting the baby skin to skin contact or kangaroo mother care (KMC); 211(90.6%) of them covered the baby's body and head with a clean cloth, and all most all health professionals, 225 (96.5%) checked whether the baby is crying while drying. Most of health professionals 161(69.1%) administered Eye drop/TTC eye ointment and 75(32.2%) administer Vitamin K injection. Over all, among the total of 233 respondents, 177(76%) had poor newborn care practice and the rest 56(24%) had good newborn care practice.

Knowledge of Respondents about Newborn Care

From the total of 233 respondents, 47(20.2%) of health professionals had good knowledge, 146(62.7%) had fair knowledge and 40(17.1%) of health professionals were not knowledgeable (scored below the mean). From a total of 233 health professionals, above half, 127(54.5%) did not know all the ten steps of newborn care practice but less than half of them 106(45.5%) knew the ten steps of newborn care practice.

Health professionals were asked about newborn care practice steps and 92.7% of them said that they immediately deliver newborn on mother's abdomen; 91% responded that they dry baby and give eye care. 83.7% of the respondents reported that they assess breathing; 88.8% reported that they practice cord cutting and care; 81.5% of them said they make early initiation of breast feeding. Moreover, 76% of the respondents reported that they practice skin to skin contact; 78.5% provide TTC eye ointment, and 70% provide vitamin K. 76% of the health care professionals provide vaccination and 83.7% weigh the newborn.

Most, 215(92.2%) of health professionals know the complications of immediate newborn, whereas few of them, 18(7.8%) do not know the complications of immediate newborn. Among those who know the newborn complication, 181(77.7%) of them said the complication is hypothermia, whereas174(74.7%) said asphyxia. However, 155(66.5%) of respondents said infection are mostly occurred complications of immediate newborn.

Training and Supportive Supervision

Almost half, 114(48.9%) of health professionals got in service training about essential newborn care, from which 70(30%) trained once, 37(15%) trained two times and 7(3.0%) trained three times. About 97(41.6%) of them got supportive supervision from their higher officials and nongovernmental organizations (NGOs).

Factors associated with essential newborn care practice

Female respondents were three times more likely to provide good newborn care practice than respondents who are male [adjusted odds ratio (AOR) = 3.08; 95% CI (1.07, 8.81)]. Respondents who are in the age group between 36 and 40 years were 81.8% less likely to provide good newborn care as compared to those between 21 and 25 years [AOR = 0.18; 95% CI (0.03, 0.89)].Respondents who have got supportive supervision within the last three month were two times more likely to give good newborn care than those respondents who haven't got supportive supervision [AOR = 2.17; 95% CI (1.12, 4.19)].

The odds of respondents who were trained related to newborn care were four times more likely to provide good newborn care practice than their counterparts [AOR = 4.25; 95% CI (2.33, 10.09)].

The odds of respondents who have knowledge about the complication of newborn are two times more likely to provide good newborn care practice than the odds of respondents who have no knowledge about the complication of newborn [AOR = 1.98; 95% CI (1.00,3.89)] (Table 3).

Table 3 The factors associated with essential newborn care practice among health professionals of rural Gedeo zone health facilities, Southern Ethiopia, February, 2017 (n=233)

List of Variables and Responses	ENCP		*COR* with 95% *CI*	*AOR* with 95% *CI*
	Good	Poor		
Age in years				
21-25	13	62	1	1
26-30	16	83	5.56(1.60,19.29)	1.37(0.50,3.73)
31-35	12	20	6.05(1.79,20.39)	0.75(0.20,2.76)
36-40	8	6	1.94(0.52,7.16)	0.18(0.03, 0.89)*
>40	7	6	0.87(0.19,3.99)	0.18(0.03,1.12)
Sex of respondents				
Male	36	87	1	1
Female	20	90	1.86(1.00,3.46)	3.08(1.07,8.81)*
Religion				
Orthodox	24	81	1	1
Protestant	23	79	1.01(0.53,1.9)	2.60(0.85,7.94)
Muslim	9	17	0.56(0.22,1.41)	0.76(.16,3.55)
Monthly Salary in (USD)				
53.74-76.87	12	54	1	1
76.87-100.12	22	59	7.87(1.98,31.25)	0.92(0.26,3.22)
100.12- 123.38	9	51	4.69(1.25,17.61)	0.50(0.11,2.22)
123.38-146.64	6	7	8.11(2.02,32.59)	3.44(0.22,52.95)
> 146.64	7	6	3.93(0.71, 21.59)	3.50(0.16,72.3)
Training status				
Trained	42	72	4.37(2.22,8.59)	4.25(2.33,10.09)*
Not trained	14	105	1	1
Respondent's work experience				
< 5 years	36	158	1	1
5-10 years	13	13	2.19(0.52,9.19)	0.09(0.01, 0.60)
> ten years	7	6	0.38(0.08,1.82)	1.14(0.16,7.89)
Status of supportive supervision				
Yes	32	65	2.297(1.24,4.23)	2.17(1.12,4.19)*
No	24	112	1	1
knowledge on ENCP				
Yes	17	89	2.32(1.22,4.40)	0.43(1.22,3.81)
No	39	88	1	1
Knowledge on Complication				
Yes	40	148	2.04(1.0,4.12)	1.98(1.00,3.89)*
No	16	29	1	1

Note: * significantly associated factors (P<0.05)

Discussion

A good newborn care is crucial for the survival of newborn [15]. It includes essential basic newborn care practices (*i.e.* ensuring the air way is clear and remove mucus from the mouth, nose and throat with suction, immediate kangaroo mother care to prevent hypothermia, clean and dry newborn with warm towel, clamp and cut umbilical cord with sterile instrument, providing eye care with tetracycline eye ointment or silver nitrate, giving vitamin K and vaccine, weigh newborn and start breast feeding within one hour) [6].

The result of this study disclosed that only 24% of health professionals were providing good essential newborn care practice (newborn care that fulfills all the components of newborn). This finding is in line with other literatures in southern Ethiopia, Chencha district [16]. However, the result of this study presented that the level of ENCP in Gedeo zone health facilities is lower than a study done in Jimma (51.1%) [11], Addis Ababa (80.7%) [17], Tigray (72.77%) [12], and Khartoum (41.1%) [18]. These differences may be due to study sites in which the current study was conducted in rural health facilities where human resource, medication and materials needed for immediate newborn care practice are limited [19,20].

Respondents providing good ENCP among female professionals were three times higher as compared to male professionals. This might be due to the higher commitment and motherhood feeling of females for newborns and children [21,22].

The odds of giving newborn care decrease by 81.8% among health professionals who are within the age ranges of 36-40 years as compared to 21-25 years. This result is supported by a study done at Indonesia [23]. The possible explanation might be due to the older health professionals are less likely to access updated procedures of essential newborn care practice, and professionals may become tiresome for their work as they become older [24].

Respondents who had got supportive supervision within the last three months were 2.2 times more likely to provide good ENCP as compared to those who had not got supportive supervision. This confirms the idea that supportive supervision has a greater value for health professionals by motivating and updating of essential new born care procedures and protocols [25].

The odds of providing good ENCP among respondents attended newborn care related training were 4.2 times higher than those who never attended training. This conclusion is supported by another similar study done in Tigray [11]. This might be due to the attitudinal change, gain of knowledge and experience sharing while attending professional trainings [26,27].

Limitation

There might be Hawthorns effect, and since it is a cross sectional study design, it might not display the direct cause and effects relationship of dependent and independent variables.

Conclusion

The overall essential newborn care practices among health professionals were not good. Age range of 30-40 years, female sex, supportive supervision, attending training, and knowing complication of the newborn were significantly associated factors with essential newborn care practice. This reveals a requirement to strengthen training and supportive supervision platforms to health professionals working in the rural health centers by the Zonal health department and district health offices, and non-governmental organizations.

Assertions

Abbreviations and Acronyms

AOR	Adjusted Odds Ratio
EDHS	Ethiopian Demographic Health Survey
ENAP	Every Newborn Action Plan
ENCP	Essential New Born Care Practice
IRB	Institutional Ethical Review Board
KMC	Kangaroo Mother Care
MEDHS	Mini Ethiopian Demographic Health Survey
NGOs	Non-Governmental Organizations
OR	Odds Ratio
OPV0	Oral Poliovirus Vaccine
QOC	Quality of Care
SPSS	Software Package For Social Science
SNNPR	Southern Nation, Nationalities Peoples Region
USD	United States Dollar

Acknowledgments

We would like to express our cordial thankfulness to Dilla University for ethical clearance. Our gratitude also extends to the staff of Gedeo zone health Bureau and Gedeo zone health centers for their collaboration. We would like to acknowledge data collectors, supervisors and all study respondents who spent their fruitful time for the accomplishment of this study.

Ethical Concern

Before the actual data collection, ethical clearance was obtained from Dilla University institutional ethical review board (IRB), and support letter was accessed from Gedeo Zone Health office. Each respondent gave written consent after clarification about the scope and purposes of the study. The respondents were informed about right of to refuse and or to discontinue their participation at any time they want and no harm will be imposed due to their discontinuation. The filled questionnaires were approved for its completeness and uniformity by the investigators and supervisors. The challenges were solved on time through discussion with concerned bodies. Appropriate explanation/correction was given for a professional found having unfavorable knowledge and or who misses ENCP steps during the data collection.

Consent for Publication - Not applicable

Availability of Data and Materials

The datasets underlying the study are available from the corresponding author up on request.

Competing Interests

We confirm that there are no competing interests on this research work.

Funding

This study has received funding from Dilla University, NORHED Project I.

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AFRICAN JOURNAL OF HEALTH SCIENCES AND MEDICINE
AJHSM (2023)02:01
http://www.du.edu.et/duj

RESEARCH ARTICLE

Travelers' knowledge, attitude, practice towards COVID-19 and associated factors at the bus station of Mizan-Aman town, southwest Ethiopia, 2021

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Received: 10 October 2022

Accepted: 12 June 2023

Published: 15 June 2023

DOI:10.20372/ajhsm.v02i01.05

Suggested Citation: Shiferaw D. and Tadesse A., Travelers' knowledge, attitude, practice towards COVID-19 and associated factors at the bus station of Mizan-Aman town, southwest Ethiopia, 2021. Afri. J. Heal. Sci. Med; 2023, 02(01).

Abstract

Background: Overcrowded situations; such as mass transport, can highly expose people to the novel coronavirus infection unless strictly adhered to preventive measures recommended by the health authorities. This study aimed to assess traveler's knowledge, attitude, practices towards COVID-19, and associated factors at the bus station of Mizan-Aman town, southwest Ethiopia.

Methods: A cross-sectional study was conducted among travelers who were found at the bus station of Mizan-Aman town from January 1-15, 2021. A consecutive sampling method was employed to collect data from travelers. Knowledge and attitude data were collected by interviewer-administered questioner, whereas the face-mask wearing practice was assessed by observation. .

Result: A total of 406 travelers were interviewed with a 96.2% response rate. All the travelers had heard about COVID-19. 216(53.2%) had good knowledge, 208(51.2%) had a positive attitude while only 45(11.1%) had worn face-mask. Poor knowledge was significantly associated with illiterates (AOR=7.5, CI: 3.0-19.1), primary school (AOR=6.6, CI: 3.0-14.8), and urban residents (AOR=0.21, CI: 0.12-0.37). The negative attitude was significantly associated with a good attitude (AOR=0.32, CI: 0.21-0.48), and not wearing a face-mask was significantly associated with marital status (AOR=3.5, CI: 1.43- 8.81).

Conclusion: All travelers had awareness about COVID-19. More than half had good knowledge and a positive attitude while very few had a good practice. Level of education and residence were found determinants of the level of knowledge while the level of knowledge itself was a significant predictor of the level of attitude. Face-mask wearing practice was associated with marital status.

Keywords: Attitude, Bus station, COVID-19, Knowledge, Mizan-Aman town, Practice, Traveler, Southwest Ethiopia

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Background

Coronavirus disease 2019 (COVID-19) is a viral respiratory disease caused by a new strain of coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first human case of COVID-19 was reported in China in December 2019. Since then, COVID-19 has been disseminated throughout the world, and still, morbidity and mortality have been raising [1-4]. On January 30^{th}, 2020, the World Health Organization (WHO) declared the novel coronavirus (COVID-19) as a global epidemic (pandemic) [5].

After a year of the diseases, as of o4 February 2021, there have been 103,989,900 confirmed cases of COVID-19 including 2,260,259 deaths in 222 countries, areas, or territories in the world is USA, India, and Brazil the leading three countries with the highest cumulative cases [6]. As of 29 January 2021, a total of 3,555,356 cumulative COVID-19 cases with 90,529 deaths and 3,037,832 recoveries have been reported in African Union member (55) states being South Africa, Ethiopia and Nigeria are the first three with the highest cumulative COVID-19 cases in the continent [7].

The first COVID-19 positive case in Ethiopia was found in the capital city Addis Ababa on March 13, 2020. Since then, subsequently, the cases and deaths are rising [8]. As of 05 February 2021, in Ethiopia 140,157 cases were tested positive and 2,126 deaths. Addis Abeba, DireDawa, and Jigjiga were the three cities with the highest confirmed cases of COVID-19 6, [9]. Studies done in Ethiopia revealed that higher proportions of the communities had awareness and enough knowledge about COVID-19 [10-14]. Also, most showed a promising attitude towards COVID-19 prevention [11,14-16]. However, the morbidities and mortalities are expanding in the country because the community didn't adhere to the prevention and control measures of COVID-19 [10,12,17].

Varies evidence showed that mass gatherings, such as sport and traveling in public transport make people highly vulnerable to the novel coronavirus [18-20]. For instance, a single-day football match held in Bergamo province of Italy left 7,000 people tested positive for the coronavirus and more than 1,000 people have died, which makes the province the most heavily hit during the COVID-19 outbreak [19]. Also, an outbreak of COVID-19 was reported from Yokohama Port of Japan among passengers and crew members who were traveling using a ship that left over a hundred tested positive for novel coronavirus [20].

Thus, to strengthen COVID-19 prevention and control strategies set by the ministry of health of Ethiopia attention should be given to gathering such as bus stations where peoples use communal transport in an overcrowded manner. However, to the author's knowledge, no similar study was conducted among the travelers in Ethiopia, particularly in the study area. Assessing the traveler's KAP is important in identifying gaps and takes preventive measures towards combating the disease. Thus, this study was aimed to assess the KAP towards COVID-19 among travelers who shared public transport in the bus station of Mizan-Aman town of southwest Ethiopia.

Methods and Materials

Study Area and Period

The study was conducted from January 1 to 15, 2021, at bus stations of Mizan-Aman town, southwest Ethiopia. Mizan-Aman is the zonal administrative town of Bench-Sheko Zone, located 561 km to the southwest of Addis Ababa, which is the capital city of Ethiopia.

Study Design

Cross-sectional study design was used.

Source Population

All adult travelers who were found at the bus station and sitting in the buses and ready to travel to their destinations.

Study Population

selected travelers who were found sitting in the buses and ready to travel to their respective destinations.

Inclusion Criteria

All adults above and equal to 18 years, able to communicate verbally.

Sample Size

The sample size was used to calculate using a single population proportion formula,

$$(n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}) \text{ [21]}$$

We inferred the proportion (P) 50% (0.5) since no literature showed the KAP of travelers towards COVID-19 considering a 95% confidence level and 5% margin of error (d).

Then, 10% of the non-response rate was added. Finally, the minimum sample size required for this study was 422.

Sampling procedure

Study units were selected consecutively until the total sample size was met.

Data Collection tool, Procedure, and Personnel

Knowledge and attitude data were collected by using pretested interviewer-administered structured and semi-structured questioner. Face-mask wearing practice data were collected by observation. The knowledge and attitude questions were adopted from a related study conducted COVID-19 in the country [27,29-31].

The questionnaire was initially prepared in the English version and then translated to the local Amharic language, again translated back to English to check its consistency. Approximately 10-15 minutes were used to complete the instrument.

The questionnaire had four parts. The first section was socio-demographic characteristics such as age, sex, residence, marital status, educational status, occupation, and income. The second part was questions related to awareness of COVID-19 (item 1 & 2, the first item is "Yes" or "No" question and the next item depends on the first answer and had multiple responses). The third part had 12 items that were used to assess knowledge of COVID-19.

The response of the knowledge questions was either "one or multiple", "True" or "False" or "Not Sure" bases. During analysis, 1 point was given for correct answer and 0 points were given for incorrect answer [24,33]. The total knowledge score ranges from 0 to 12.

The overall knowledge category (Good vs. Poor) was based on the mean of all knowledge scores of the respondents. Thus, those individuals who had scored above and equal to the mean were categorized as “Good knowledge”, whereas individuals who had scored below the mean were categorized as “Poor knowledge”.

The fourth section was used to assess participant’s attitudes towards coronavirus prevention using 11 items. The possible response was either “Agree” or “Not sure” or “Disagree”. "Agree" was a positive response for items 1, 2, 4, 8, 9, and 11 of the attitude questions, whereas "Disagree" was a positive response for items 3, 5, 6, 7, and 10 of the attitude questions. For analysis purposes, 1 point was given for each positive

response, and 0 points were given for the rest [33]. Thus, the total positive attitude response ranges from 0 to 11.

Based on the mean of the total positive response of all attitude questions, those above and equal to the mean were categorized as "positive attitude" while those below the mean were categorized as " negative attitude" towards COVID-19 prevention.

Finally, COVID-19 prevention practice was assessed by observing whether the travelers wear face-mask while they were in the buses.

The interviews were conducted by six health extension workers (data collectors) and one supervisor (nurse) by wearing a face-mask, donning a glove, and keeping a 2-meter distance from the traveler. The interviews were conducted before the study participants were started their journey. Before the actual data collection, training was given for data collectors and supervisors for half-day, and a pre-test was done among 5% of the sample (21 travelers) who had used a taxi in the town (Mizan-Aman), and then necessary modification was done.

Data processing and analysis

After the data collection, filled questionnaires were checked for completeness. The data were coded, entered, and cleaned using Epidata software (Version 3.1) and exported to SPSS version 23 for analysis.

First descriptive statics such as frequency and percentage were conducted. Next binary logistic regression analysis was conducted for each independent variable and then all independent variables with probability value (P-value) of less than 0.25 were used to enter into multivariate analysis. Finally, factors associated with the KAP of travelers towards COVID-19 were identified by multivariable logistic regression analysis.

The strength of association was determined by Adjusted Odd Ratio (AOR) with 95% confidence interval (CI) and statistically significant variables were identified based on P-value < 0.05. Hosmer-Lemeshow goodness of fit test was used to assess the model fitness.

Ethical consideration

The Helsinki Declaration was considered in the study. Before data collection, a formal letter was obtained from Mizan-Tepi University, college of medicine and health science, and then submitted to the administrative body of the bus station for permission. Informed oral consent was obtained from each respondent after providing sufficient information on the purpose of the study. Respondent's right to withdraw from the study was also assured. Confidentiality of the respondents was kept by avoiding writing their name and identification number on the questionnaires. The data collectors have strictly adhered to COVID-19 prevention measures.

Results

Socio-demographic Characteristics of the Respondent

A total of 406 travelers were interviewed with a 96.2% response rate. The mean age of the respondents was (31.0 ±11.0) years and ranging from 18 to 70 years. The majority of the travelers were male (70.7%), married (67.2%), and rural residents (57.9%).

Of the total respondents, 40.6% attended primary school and nearly half of them (49.3%) were farmers. Regarding the economic status, the mean monthly income of the participants was 4290.53 ± 2578.1 Ethiopian birr ranging from 1,000 to 17,000 birr but 63(15.5%) reported no monthly income at all (Table 1).

Table 1 Sociodemographic characteristics of travelers at bus stations of Mizan-Aman town, 2021 (n=406)

Variables	Responses	Frequency	Percentage (%)
Age categories (in years)	18-30	265	65.3
	31-45	99	24.4
	46-60	28	6.9
	>60	14	3.4
Gender	Male	287	70.7
	Female	119	29.3
Marital status	Single	133	32.8
	Married	273	67.2
Area of residence	Urban	171	42.1
	Rural	235	57.9
Educational status	Illiterate	64	15.8
	Primary school (1-8 grade)	165	40.6
	Secondary School grade (9-12)	109	26.8
	College or University	68	16.7
Occupation	Farmer	200	49.3
	Government employee	74	18.2
	Student	63	15.5
	Daily laborer	19	4.7
	Housewife	35	8.6
	Merchant	15	3.7
Average monthly income	<5,000 Birr	230	56.7
	≥5,000 Birr	113	27.8
	No income	63	15.5

Awareness of travelers about COVID-19

All the travelers had heard about COVID-19 where most of them mentioned more than one source of information. Mobile (53.9%), health worker (51.7%), radio (44.1%), television (31.0%), individuals (23.9%) and internet (13.1%) were mentioned as a source.

Knowledge of travelers about COVID-19

The mean knowledge score was 8.45(±2.47). More than half (53.2%) of the respondents had good knowledge (score ≥8.45) while the remaining 190(46.8%) had poor knowledge. Almost half of the respondents, 204(50.2%) mentioned a virus as a cause of COVID-19. Similarly, half of the study participants (50.7%) reported respiratory droplets as a mode of transmission of the novel COVID-19.

The majority (88.9%) reported at least one of the main symptoms of COVID-19 and 396 (97.5%) mentioned at least one of the prevention methods of the disease (Table 2).

Wearing face mask, hand hygiene, keeping a 2-meter distance, avoiding mass gatherings, avoiding shaking hands, avoiding touching face frequently, covering mouth and nose while sneezing and coughing.

Table 2 Travelers' response to knowledge questions towards COVID-19 at bus stations of Mizan-Aman town, 2021 (n=406)

	Knowledge questions	Correct response	Study participants with correct response n (%)
1.	What is the cause of COVID-19?	Virus	204(50.2%)
2.	What is the mode of transmission of COVID-19?	Respiratory droplet	206(50.7%)
3.	What is/are the main symptoms of COVID-19?	Mentioned either fever, dry cough, fatigue, breathing problem, muscle pain	361(88.9%)
4.	What is/are the prevention methods of COVID-19?	Mentioned at least one of preventive methods a	396 (97.5%)
5.	Infected peoples can transmit the virus to others even if they are asymptomatic	True	295 (72.7%)
6.	Eating raw meat can transmit the virus	True	230 (56.7%)
7.	The coronavirus can stay on the surface of objects for hours	True	232 (57.1%)
8.	People of all ages are affected but older people and people with medical illnesses succumb more easily to severe illness	True	299 (73.6%)
9.	COVID-19 can lead to severe outcomes including death	True	303(74.6%)
10.	No effective treatment is found for COVID-19 other than supportive care.	True	282 (69.5%)
11.	Isolating infected people with COVID-19 and providing care is effective to reduce the spread of the virus	True	270 (66.5%)
12.	Immediate isolation of people who have contact with COVID-19 is important.	True	308(75.9%)
	The overall level of knowledge	Good knowledge	216(53.2%)
		Poor knowledge	190(46.8%)

The attitude of travelers towards COVID-19 prevention

The mean positive response was 5.6. More than half of the respondents (51.2%) had a positive attitude towards COVID-19 prevention while 44.8% had a negative attitude.

Among the respondents, 318(78.3%) agreed that COVID-19 exists in their locality and 74.4% agreed that everyone including them is at risk of acquiring COVID-19 while 64% disagree that white peoples are more affected than black. 339(83.5%) agreed that traveling by mass transport and attending gatherings can increase their risk of acquiring COVID-19. Less than half, 44.8% disagree that vaccination can protect all people from COVID-19, and only near to a fourth of the study participants (27.6%) agreed that the disease will finally be successfully controlled (Table 3).

During the survey, only forty-five (11.1%) of the total respondents were observed wearing face masks while the remaining 89.9% were not.

Table 3 Travelers' response to attitude questions towards COVID-19 at bus stations of Mizan-Aman town, 2021 (n=406)

	Attitude questions	Agree	Not sure	Disagree
1.	COVID-19 exists in your locality	**318(78.3%)**	76(18.7%)	12 (3.0%)
2.	Everyone including you is at risk of acquiring COVID-19	**302(74.4%)**	85(20.9%)	19(4.7%)
3.	COVID-19 affects white peoples than black	29(7.1%)	117(28.8%)	**260(64.0%)**
4.	Traveling by mass transport and attending gatherings can increase your risk of acquiring COVID-19	**339(83.5%)**	54(13.3%)	13(3.2%)
5.	COVID-19 cannot affect people's living in hot weather	25(6.2%)	100(24.6%)	**281(69.2%)**
6.	COVID-19 can be treated with modern antibiotics	25(6.2%)	175(43.1%)	**206(50.7%)**
7.	Traditional medicines are curative to COVID-19.	135(33.3%)	87(21.4%)	**184(45.3%)**
8.	Staying at home minimizes your risk of infection	**333(82.0%)**	55(13.5%)	18(4.4%)
9.	Everyone can be protected by applying the prevention methods of COVID-19	**377(92.9%)**	24(5.9%)	5(1.2%)
10.	Vaccination can protect all people from COVID-19	70(17.2%)	154(37.9%)	**182(44.8%)**
11.	COVID-19 will finally be controlled successfully	**112(27.6%)**	226(55.7%)	68(16.7%)
	The overall level of attitude towards COVID-19		Positive attitude	208(51.2%)
			Negative attitude	198 (48.8%)

Note: Bold numerical values are a positive response

Factors associated with knowledge, attitude, and practice of travelers towards COVID-19

First, binary logistic regression was conducted between each independent variable and the outcome variables. Accordingly, residence and educational status were found potentially variables, Level of knowledge and monthly income for attitude, and marital status and educational status for face-mask-wearing practice. Then, these potential variables were entered into multivariable logistic regression.

In multivariable analysis residence and educational status were found to be significantly associated with the level of knowledge of the respondents. According to this finding, the odds of poor knowledge among urban residents were 79% (AOR=0.21, 95% CI: 0.12-0.37) less likely lower than their counterparts, and having poor knowledge were 7.5 times more likely among illiterates than college or university attendees (AOR=7.5, 95% CI: 3.0-19.1) and also having poor knowledge about COVID-19 were 6.6 times more likely among primary school than those with history of attending college or university (AOR=6.6, 95% CI: 3.0-14.8).

The level of knowledge was significantly associated with the level of attitude towards COVID-19 prevention. The odds of negative attitude among study participants with a good knowledge were 68% (AOR=0.32, 95% CI: 0.21-0.48) less than those with poor knowledge. Also, it was found that face-mask wearing practice has a significant association with marital. Not wearing a face-mask was 3.5 times more likely among single travelers than married (AOR=3.5, 95% CI: 1.43- 8.81) (Table 4).

Table 4 Factors associated with Knowledge, Attitude, and Practice of travelers towards COVID-19 at bus stations of Mizan-Aman town, 2021 (n=406)

Factors associated with Knowledge towards COVID-19				
Variables	**Level of knowledge**		*COR* **(95%** *CI***)**	*AOR* **(95%** *CI***)**
	Good	**Poor**		
Residence				
Urban	136(33.5%)	35(8.6%)	0.13(0.08-0.21)***	0.21(0.12-0.37)***
Rural	80(19.7%)	155(38.2%)	1	1
Educational status				
Illiterate	18(4.4%)	46(11.3%)	14.8(6.2-35.2)***	7.5(3.0-19.1)*
Primary school	51(12.6%)	114(28.1%)	13.0(6.1-27.4)***	6.6(3.0-14.8)*
Secondary School	89(21.9%)	20(5.0%)	0.30(0.57-2.9)	0.83(0.34-2.0)
College or University	58(14.3%)	10(2.5%)	1	1
Factors associated with Attitude towards COVID-19				
Variables	**Level of Attitude**		*COR* **(95%** *CI***)**	*AOR* **(95%** *CI***)**
	Positive	**Negative**		
Level of knowledge				
Good	140(34.5%)	76(18.7%)	0.30(0.20-0.50)**	0.32(0.21-0.48)*
Poor	68(16.8%)	122(30.0%)	1	1
Monthly income				
<5,000 Birr	117(28.8%)	113(27.8%)	1.8(1.0-3.2)*	1.4(0.75-2.5)
≥5,000 Birr	50(12.3%)	63(15.5%)	2.3(1.2-4.4)**	1.9(0.96-3.6)
No monthly income	41(10.1%)	22(5.4%)	1	1
Factors associated with Practice towards COVID-19				
Variable	**Face-mask wearing practice**		*COR* **(95%** *CI***)**	*AOR* **(95%** *CI***)**
	Yes	**No**		
Marital status				
Single	6(1.5%)	127(31.3%)	3.5(1.4-8.6)**	3.5(1.43- 8.81)**
Married	39(9.6%)	234(57.6%)	1	1
Educational status				
Illiterate	16(3.9%)	48(11.8%)	0.14(0.04-0.50)	0.13(0.03-0.58)
Primary school	11(2.7%)	154(37.9%)	0.65(0.17-2.39)	0.58(0.13-2.57)
Secondary School	15(3.7%)	94(23.1%)	0.29(0.08-1.04)	0.36(0.09-1.34)
College or University	3(0.7%)	65(16.0%)	1	1

*p<0.05, ** p<0.01, ***p< 0.001, 1: Reference

Discussion

Despite the availability of vaccination against novel coronavirus, it's spreading alarmingly throughout the world. This indicates the necessity of public adherence to preventive measures mentioned by the health authorities, which is achieved by increasing the populations'KAP towards COVID-19. Thus, this study aimed to assess travelers'KAP towards covid-19 in Mizan-Aman town of southwest Ethiopia.

All the travelers had heard about COVID-19 where most of them mentioned mobile (53.9%) and health workers (51.7%) as main sources of information. Similar results were found from the studies done in Ethiopia and India [24,25]. Thus countries could use a mode of communication such as mobile to disseminate health education for a vast section of their population. Health professionals can play a major role in aware the community including COVID-19.

In the current study, half of the respondents knew that virus is a cause of COVID-19. This finding was much lower than the study finding from Indonesia where most (97.42%) knew the causative agent of COVID-19 [26]. The reason for this variation might be due to a difference in the socioeconomic status of the study participants.

In this study, the majority (88.9%) knew at least one of the main symptoms of COVID-19 like fever, dry cough, fatigue, breathing problem, muscle pain. This is in line with a previous study finding [27]. But lower than the finding from Saudi Arabia where 98.02% of study participants knew the main clinical manifestations. The possible reason for this discrepancy might be the difference in the socioeconomic and methodological difference where larger sample size and online interview were used in the previous study [28].

This study showed 50.7% of respondents knew that respiratory droplet is a mode of transmission of the novel COVID-19. This is lower than the finding reported by Mechessa *et al* where 77.4% of the study participants mentioned a respiratory droplet as a mode of transmission of the COVID-19 virus [27]. The possible reason for this discrepancy might be due to the difference in the study setting where the former study was conducted among urban residents, whereas most (57.9%) of these respondents were from a rural area.

The magnitude of good knowledge among the current respondents was 53.2%. This is higher than the study finding from Addis Abeba, Ethiopia (37.2%) [29]. The possible reason for the variation might be methodological variation. The previous study was conducted among larger sample sizes using a self-administered questionnaire, and the previous knowledge score was categorized based on Bloom's cutoff point.

According to multivariate analysis, the odds of poor knowledge about COVID-19 among urban residents was by 79% less than the rural residents, 7.5 times more likely among illiterates, and 6.6 times more likely among primary school than those with a history of attending college or university. This finding is comparable with the study finding reported by Akalu et al from northern Ethiopia where poor knowledge was more likely among rural residents and those peoples who cannot read and write [30]. Also, the study finding from southern Ethiopia stated that lack of formal education was associated with poor knowledge about COVID-19 [27]. The possible justification might be most COVID-19 related information was being disseminated mainly through WebPages, written forms like leaflets that cannot be accessible either to the rural residents or the illiterates.

In this study, more than half (51.2%) had a positive attitude towards COVID-19 prevention. This is similar to the previous studies [24,29]. The level of knowledge was found significantly associated with the respondent's attitude towards COVID-19 prevention.

The odds of negative attitude among those study participants with good knowledge were nearly 70% less than those with poor knowledge. Similarly, as indicated in the study finding of Haftom *et al*, good knowledge was associated with a promising attitude towards the prevention of COVID-19 prevention [31]. Another study finding was also stated that knowledge is a prerequisite for promoting favorable attitudes and taking prevention measures [10].

The WHO and health ministry of Ethiopia launched strict preventive measures such as physical distancing and mask-wearing when peoples leave their homes [9] but this is not the case on the ground. For instance, in our study setting, only a few of them had face-mask wearing practice. This is in line with studies done in Ethiopia [14,30,31], Saudi Arabia [28], and Iran [32].

Also, it was found that COVID-19 prevention practice has a significant association with the marital status of the study participants. This is comparable with the study finding from northern Ethiopia [30]. The possible reason might be married peoples feel protecting oneself from an infection will prevent them from being a source of infection for their spouse and other family members.

Conclusion

More than half of the travelers had good knowledge and a positive attitude while very few of them had a face-mask wearing practice. Level of education and residence were found determinants of knowledge while the level of knowledge itself was a significant predictor of attitude. Face-mask wearing practice was associated with marital status. Health education given about COVID-19 should address people with lower educational status, single youths, and rural residents. Health authorities should promote preventive measures such as the benefit of wearing face masks at crowded places such as bus stations.

Acknowledgments

We would like to thank all respondents, data collectors, and supervisors.

Consent for Publication - Not applicable

Availability of Data and Materials

The datasets underlying the study are available from the corresponding author up on request.

Competing Interests

We confirm that there are no competing interests on this research work.

Funding

No funding was earned from any source.

Author's Contributions

Both authors conceived the study, conducted the statistical analysis, and prepared the manuscript. Finally, the authors approved the final manuscript for publication.

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