

Determinants of Delayed Treatment-Seeking for Childhood Diarrheal Diseases in Southwest Ethiopia: A Case–Control Study

This article was published in the following Dove Press journal:
Pediatric Health, Medicine and Therapeutics

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Background: Although there are low cost and effective interventions to prevent and treat diarrhea, it is one of the leading causes of morbidity and mortality among under-five children in developing countries. Deaths from diarrheal diseases are largely due to lack of prompt seeking of medical care. This study aimed to identify determinants of delayed treatment-seeking for diarrheal diseases among under-five children in Southwest Ethiopia.

Methods: Unmatched case–control study was conducted among 324 under-five children paired with their mothers/caregivers from 1st April to 30th May 2019. Cases were under-five children paired with their mothers/caregivers who sought treatment after 24 hours of the onset of signs and symptoms of diarrheal diseases, and controls were under-five children paired their mothers/caregivers who sought treatment within 24 hours of the onset of signs and symptoms of diarrheal diseases. Consecutive sampling was used, and data were collected through interviews and chart reviews. Multivariable binary logistic regression analysis was performed, and variables with a P-value <0.05 were considered statistically significant.

Results: A total of 324 (162 cases and 162 controls) under-five children paired with their mothers/caregivers were included in this study. Being rural residents (AOR=1.93, 95% CI: 1.13,3.31), children from households with more than two children (AOR=2.05, 95% CI: 1.15–3.66), preferring traditional healers for the treatment of diarrhea (AOR= 4.78, 95% CI: 1.74,13.12), not having television or radio for the households (AOR=2.05, 95% CI: 1.11–3.66), living in more than 10 km from the nearest health facility (AOR=4.80, 95% CI: 2.61–4.83), and perceiving diarrhea can cure without treatment (AOR=2.11, 95% CI: 1.15–3.87) were significant determinants of delayed treatment-seeking.

Conclusion: Being rural residents, larger family size, physical inaccessibility of health facilities, not having access to electronic media (television or radio), preferring traditional healers for the treatment of diarrhea, and having the perception that diarrhea can be cured without treatment were determinants of delayed treatment-seeking for diarrheal diseases among under-five children. Thus, multidimensional approaches that can address accessibility of health facilities and improve caregivers' awareness are necessary to encourage prompt treatment-seeking for diarrheal diseases among under-five children.

Keywords: delay, treatment-seeking, medical care, diarrhea, case-control

Introduction

Globally, diarrheal disease is one of the leading causes of morbidity and mortality among under-five years of children. Every day, approximately 2195 children die due to diarrheal diseases, which accounts for 1 in 9 child deaths worldwide.¹ In 2017, nearly 1.6 million people died due to diarrheal diseases worldwide, and one-third of these

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deaths occurred among under-five children. Approximately 90% of deaths due to diarrheal diseases occurred in South Asia and sub-Saharan African countries. Diarrhea is the third leading cause of child mortality globally, next to pneumonia and preterm birth complications.^{2,3} In Africa, diarrheal diseases caused an estimated 330,000 deaths in 2015.⁴ Ethiopia Demographic and Health Survey 2016 report showed that about 12% of under-five children had experienced a diarrheal episode in the two weeks before the survey.⁵

There are low cost and effective interventions that can prevent and treat diarrheal diseases;⁶ thus, deaths from diarrhea are largely preventable if adequate treatment is sought timely in the course of the illness.⁷ However, diarrheal diseases disproportionately affect low-income and middle-income countries^{2,8} because of poor access to health care, lack of safe water and sanitation,⁹ and lack of prompt recognition and delayed presentation to the health facility.¹⁰⁻¹²

Morbidity and mortality from childhood illnesses can be reduced if appropriate care is sought promptly.¹³ Delayed care seeking could affect child health significantly and can lead to complications that make medical care less effective or, in some cases, useless.¹⁴ The majority of caregivers of children with diarrheal diseases in developing countries did not seek healthcare timely^{7,11,15} or not sought at all.¹⁶⁻²⁰ For instance, a study from India reported that about 33.8% of children with diarrheal diseases were taken to a health facility one day after the onset of the illness.⁷ Studies done in Nigeria and Rwanda showed that about 61.9% and 35% of children sought treatment after 24 hours of the onset of the illness, respectively.^{10,11} According to a study from Ethiopia, only 13.7% of children were taken to health facilities within 24 hours after recognition of the illnesses.¹⁶

Although different studies have been conducted in Ethiopia to identify the prevalence of diarrhea²¹⁻²³ and health-seeking behavior of mothers for childhood diarrheal diseases,^{16,19,23,24} studies regarding determinants of delay in treatment-seeking for this prevalent illness remain scarce in the country. Hence, this study aimed to identify the determinants of delayed treatment-seeking for diarrheal diseases among under-five children in Mizan-Tepi University Teaching Hospital and Tepi General Hospital, Southwest Ethiopia.

Methods

Study Setting and Design

A health facility-based unmatched case-control study was conducted in Mizan-Tepi University Teaching Hospital (MTUTH) and Tepi General Hospital (TGH) from 1st

April to 30th May 2019. These hospitals are found in Southern Nations, Nationalities, and Peoples Regional State, Southwest Ethiopia. MTUTH is found in Mizan Aman town at 574 km from Addis Ababa. It provides different services to Bench Sheko, West Omo, Sheka, Kafa zones, and some parts of Gambella Regional State. Tepi General Hospital is found in Sheka Zone at 585 km from Addis Ababa, and it provides different services for the population from its catchment areas (Sheka Zone, and some parts of Gambella Regional State).

Study Population

This study was conducted among under-five children paired with their mothers/caregivers who sought treatment for diarrheal diseases from the hospitals. Cases were under-five children paired with their mothers/caregivers who sought care from the health facility after 24 hours of the onset of signs and symptoms of diarrheal diseases, and controls were under-five children paired with their mothers/caregivers who sought care from health facility within 24 hours of the onset of signs and symptoms of diarrheal diseases. Mothers/caregivers who could not remember the time of onset of the illness were excluded from the study.

Sample Size and Sampling Procedure

The sample size was calculated using Epi Info™ 7.2.2.6 sample size estimation for unmatched case-control study design. Age was an exposure variable used to estimate the optimum sample size for the study. From a related study, it was found that 60% of children aged ≥ 24 months sought treatment within 24 hours and the odds ratio was 2.1.⁶ Assuming a 95% level of confidence, 80% power, 1:1 case to control ratio, and 10% contingency for non-response rate, the total sample size was 324 children-paired with their mothers/caregivers (162 cases and 162 controls). The sample was proportionally allocated to the facilities based on the total number of under-five diarrhea cases reported by each facility in two months before the data collection period. All under-five children with their mothers/caregivers were included consecutively based on their arrival until the sample size was fulfilled for both cases and controls. Both cases and controls were selected from the same hospital. A mark (\checkmark) was put on the medical chart of the interviewed patients to avoid repeated inclusion of study participants upon revisiting the health facility due to failure of recovery or experiencing another episode of diarrhea within the data collection period. In case of

ambiguity, we cross-checked the interviewed participants using a unique medical registration number.

Study Variables

The outcome variable of interest was the length of time to treatment-seeking after the onset of signs and symptoms of a diarrheal disease, which was categorized as timely (control group) or delayed (case group). The mother/caregiver was asked after how long of the onset of diarrhea the child had taken to the health facility. If the treatment was sought within 24 hours of the onset of signs and symptoms of diarrheal diseases, it was considered as timely treatment-seeking; otherwise, delayed. The respondents were assisted to recall the period from recognition of the illness to treatment-seeking using the number of night (s) and day(s) elapsed since the first episode of diarrhea to visit the health facility.

The independent variables were age of mother, maternal education, father education, marital status, place of residence, occupation of mother/caregiver and father, person who decides on child health care, sex of child, age of child, birth order, number of children in a household, cost of treatment, distance from a nearest health facility in km, preferred facilities for treatments diarrhea, access to media (TV or radio), caregivers belief of diarrheal diseases can harm children, and if diarrhea cure without treatment, history of diarrhea in the past six months, type of diarrhea, and dehydration status. The type of diarrhea and dehydration status were reviewed from patients' medical charts as recorded by healthcare providers, while all rest variables were measured based on respondents' reports.

Data Collection Tool and Procedure

The data were collected through an interviewer-administered structured questionnaire that was developed by reviewing different literatures.^{6,7,25,26} The questionnaire was translated into the local language "Amharic" then back to English to ensure its consistency. The data collection tool was pre-tested on 5% of the sample size at Bonga Hospital before the actual data collection. The data were collected by trained clinical nurses and closely supervised by public health officers.

Data Processing and Analysis

Data were checked for completeness, coded, entered to epi-data manager version 4.0.2, and exported to SPSS version 21.0 for analysis. Descriptive statistics were done for different variables. Bivariate logistic regression analysis was

conducted to select variables for multivariable binary logistic regression at a p-value less than 0.25. Finally, the multivariable binary logistic regression model was fitted to identify independent determinants of delayed treatment-seeking for childhood diarrheal diseases. Variables with a p-value less than 0.05 in the multivariable binary logistic regression model were considered statistically significant. Model fitness was evaluated using the Hosmer-Lemeshow goodness of fit test, and the final model was good fitted (P-value =0.18).

Results

Sociodemographic Characteristics

A total of 324 under-five children paired with their mothers/caregivers (162 cases and 162 controls) participated in this study, resulting in a 100% response rate. The mean age of mothers/caregivers in both the case and control groups was 27 years. Ninety-nine (61.1%) mothers/caregivers in the case group and eight three (51.2%) mothers/caregivers in the control group were aged 25–34 years. About 60% of the cases were rural residents whereas 58.6% of the controls were urban residents. About 40% of mothers/caregivers in the case group and 30% of mothers/caregivers in the control group did not attend formal education. Nearly three-fourths of mothers/caregivers in both the case and control groups were housewives. More than half of the children in the case and control groups were males (54.3% and 53.1%, respectively). The mean age of children in the case group was 14 months and 15 months for the control group. More than half (61.7%) of the cases' and nearly three-fourths (72.8%) of the controls' households had two or fewer children. Most mothers/caregivers in both the case and control groups reported that the cost of treatment for diarrhea was easy to pay (60% and 69%, respectively). About two-thirds (66.7%) of the cases and the majority (84%) of the controls preferred governmental health facilities for treatment of diarrheal diseases. Less than half (46%) of the cases and majority (86%) of the controls lived within 10 km distance from the nearest health facility. (Table 1).

Disease-Related Characteristics

About two-thirds (68.5%) of the cases and three fourths (73.5%) of the controls had presented with watery diarrhea. Less than 10% of both cases and controls presented with severe dehydration. Nearly two-thirds (64%) of the cases and almost half (48.8%) of the controls had experienced diarrhea within the past six months of the study. About 37% of the cases and 21% of the controls had the

Table 1 Socio-Demographic Characteristics of Mothers/ Caregivers of Under Five Children with Diarrheal Disease in MTUTH and TGH, 2019

Variables	Responses	Case	Control
		No ⁻ (%)	No ⁻ (%)
Age of mother/caregiver	18–24 25–34 ≥35	43(26.5) 99(61.1) 20(12.3)	59(36.4) 83(51.2) 20(12.3)
Place of residence	Urban Rural	60(37.0) 102(63.0)	99(61.1) 63(38.9)
Marital status of mother/ caregiver	Married Single Divorced Widowed	135(83.3) 11(6.8) 13(8) 3(1.9)	124(76.5) 5(3.1) 24(14.8) 9(5.6)
Religion of mother/ caregiver	Protestant Orthodox Muslim	62(38.8) 52(32.5) 46(28.7)	80(49.4) 60(37.0) 22(13.6)
Educational status of mother/caregiver	No formal education Primary education Secondary or above	67(41.4) 64(39.5) 31(19.1)	52(32.1) 65(40.1) 45(27.8)
Educational status of father	No formal education Primary education Secondary or above	80(49.4) 51(31.5) 31(19.1)	57(35.2) 69(42.6) 36(22.2)
Occupation of mother/ caregiver	Housewife Farmer Government employee Merchant Daily laborer Student	117(72.2) 17(10.5) 12(7.4) 6(3.7) 6(3.7) 4(2.5)	114(70.4) 8(4.9) 23(14.2) 9(5.6) 6(3.7) 2(1.2)
Occupation of father	Farmer Government employee Merchant Daily laborer Student Other	51(31.5) 35(21.6) 53(32.7) 16(9.9) 4(2.5) 3(1.9)	65(40.1) 27(16.7) 51(31.5) 12(7.4) 4(2.5) 3(1.9)
Sex of child	Male Female	88(54.3) 74(45.7)	86(53.1) 76(46.9)
Age of child (in months)	≤11 12–23 24–59	80(49.4) 46(28.4) 36(22.2)	72(44.4) 52(32.1) 38(23.5)

(Continued)

Table 1 (Continued).

Variables	Responses	Case	Control
		No ⁻ (%)	No ⁻ (%)
Birth order of child	1st birth 2nd or more birth	48(29.6) 114(70.4)	58(35.8) 104(64.2)
Number of children in household	≤2 >2	88(54.3) 74(45.7)	118(72.8) 44(27.2)
Cost of treatment for childhood diarrhea	Easy to pay Moderate Difficult to pay	97(59.9) 34(21.0) 31(19.1)	112(69.1) 28(17.3) 22(13.6)
Distance to the nearest health facility (km)	≤10 >10	75(46.3) 78(53.7)	140(86.4) 22 (13.6)
Having TV or radio	Yes No	32(19.8) 130(80.2)	55(34.0) 107(66.0)
Preferred place for treatment of children with diarrhea	Government health facility Traditional healers Private or NGO clinic	108(66.7) 34(21.0) 20(12.3)	136(84) 7(4.3) 19(11.7)
Decision making power for care seeking	Mother/ caregiver Father Both mother and father Grand parent	29(17.9) 7(4.3) 126(77.8) 0(0)	53(32.7) 10(6.2) 93(57.4) 6(3.7)

perception that diarrheal diseases can be cured without any treatment. (Table 2).

Determinants of Delayed Treatment-Seeking

In bivariate binary logistic regression analysis, age of mothers/ caregivers, place of residence, marital status, religion, educational status of mothers and fathers, number of children, cost of treatment for diarrheal diseases, having TV or radio, distance from the nearest health facility, preference for health facilities for treatment of diarrhea, a perception that diarrhea can be cured without treatment, believing diarrhea can harm children, and previous history of the diarrheal episode had a P-value ≤ 0.25. Hence, these variables were included in the multivariable binary logistic regression model.

In the multivariable binary logistic regression model, place of residence, number of children, distance from the

Table 2 Disease Related Characteristics of Mothers/Caregivers of Under-Five Children with Diarrheal Diseases, 2019

Variables	Responses	Case	Control
		No- (%)	No- (%)
Type of diarrhea	Watery	111(68.5)	119(73.5)
	Bloody	38(23.5)	28(17.3)
	Mucoid	13(8.0)	15(9.3)
Dehydration status	No dehydration	113(69.8)	139(85.8)
	Some dehydration	34(21.0)	19(11.7)
	Severe dehydration	15(9.2)	4(2.5)
General danger sign	Yes	13(8.0)	6(3.7)
	No	149(92.0)	156(96.3)
Previous history of diarrheal episode	Yes	104(64.2)	79(48.8)
	No	58(35.8)	83(51.2)
Did your child visit health facility for previous illness	Yes	55(40.4)	81(59.6)
	No	3(60)	2(40)
Did the previous visit help you for your today's visit?	Yes	55(94.8)	81(97.6)
	No	3(5.2)	2(2.4)
Diarrhea can be cured by itself	Yes	60(37)	34(21)
	No	102(63)	102(79)
Diarrhea can harm children	Yes	148(91.4)	158(97.5)
	No	14(8.6)	4(2.5)

nearest health facility, preference for health facilities, having TV or radio, and the perception that diarrhea can be cured without treatment were significantly associated with delayed treatment-seeking (P -value <0.05).

The odds of delayed treatment-seeking among rural residents was nearly double as compared to their urban counterparts (AOR=1.93, 95% CI: 1.13–3.31). The odds of delayed treatment-seeking for children from households with more than two children was twice as high as those from households with two or fewer children (AOR=2.05, 95% CI: 1.15–3.66). The odds of delayed treatment-seeking for children who were from more than 10 km to the nearest health facility was almost five times higher than those within a 10 km radius (AOR=4.80, 95% CI: 2.61–4.83). The odds of delayed treatment-seeking among children whose mothers/caregivers preferred traditional healers for treatment of diarrhea was 4.78 times higher compared to those who preferred government health facilities (AOR= 4.78, 95% CI: 1.74–13.12). The odds of delayed treatment-seeking among children from households that had no television or radio was twice as high

as those from households that had television or radio (AOR=2.05, 95% CI: 1.11–3.66). The odds of delayed treatment-seeking among children whose mothers/caregivers perceived that diarrhea can cure without treatment was two times as high as compared to those whose mothers/caregivers perceived diarrhea cannot cure without treatment (AOR=2.11, 95% CI: 1.15–3.87). (Table 3).

Discussion

This study attempted to identify the determinants of delayed treatment-seeking for childhood diarrheal diseases by mothers/caregivers. It was revealed that place of residence, distance from the nearest health facility, number of children in the household, preferred facility by mothers/caregivers to seek care, having television or radio, and perception of diarrhea can be cured without treatment were significant determinants of delayed treatment-seeking for diarrheal diseases among under-five children.

Children from rural areas had higher odds of delay to be taken to health facilities for medical care for diarrheal diseases than children from urban areas. This could be because most of the time health facilities are clustered in urban areas, and as a result of this, rural residents might have difficulty in accessing health facilities. Moreover, challenges related to transportation might hinder timely treatment seeking. Furthermore, mothers/caregivers from rural areas have limited access to health information for different reasons.

This study also revealed that children of mothers/caregivers who lived in more than 10 km from a nearby health facility had higher odds of delayed treatment-seeking compared to those who lived within a 10 km radius. This finding is consistent with results from other studies.^{7,15} Being far away from health facilities imposes a challenge on mothers/caregivers because it enforces them to travel long distances which could result in tiredness, being off from a job, and may incur additional costs for transportation.

Children of mothers/caregivers who had more than two children demonstrated higher odds of delayed treatment-seeking compared to those from mothers/caregivers who had two or fewer children. Findings from other studies also revealed that mothers'/caregivers' healthcare-seeking behavior for childhood illnesses could be influenced by family size.^{19,24} This could be due to the fact that mothers/caregivers from large family sizes give less attention to sick children due to high workload and limited resources. Furthermore, another study has also shown that financial

Table 3 Determinants of Delayed Treatment-Seeking Among Mothers/Caregivers of Under- Five Children with Diarrheal Diseases, MTUTH and TGH, 2019

Variables	Responses	Case	Control	COR (95% CI)	AOR (95% CI)
		No- (%)	No- (%)		
Age of mother/caregiver	18–24	43(26.5)	59(36.4)	1	1
	25–34	99(61.1)	83(51.2)	1.64(1.00,2.67)	1.78(.98,3.21)
	≥35	20(12.3)	20(12.3)	1.37(.66,2.86)	0.67(.27,1.67)
Place of residence	Urban	60(37.0)	99(61.1)	1	1
	Rural	102(63.0)	63(38.9)	2.67(1.70,4.18)	1.93 (1.13,3.31) *
Marital status mother/caregiver	Married	135(83.3)	124(76.5)	1	1
	Single	11(6.8)	5(3.1)	2.02(.68,5.98)	0.99(.23,4.29)
	Divorced	13(8.0)	24(14.8)	0.50(.24,1.02)	0.61(.26,1.42)
	Widowed	3(1.9)	9(5.6)	0.31(.08,1.16)	0.39(.09,1.73)
Educational of mother/caregiver	No formal education	67(41.4)	52(32.1)	1.87(1.04,3.35)	1.87(.89,3.91)
	Primary	64(39.5)	65(40.1)	1.43(.81,2.53)	1.37(.66,2.83)
	Secondary or above	31(19.1)	45(27.8)	1	1
Educational of Father	No formal education	80(49.4)	57(35.2)	1.63(0.90,2.93)	0.84(.38,1.86)
	Primary	51(31.5)	69(42.6)	0.86(.47,1.57)	0.67(.30,1.50)
	Secondary or above	31(19.1)	36(22.2)	1	1
Birth order of child	1st birth	48(29.6)	58(35.8)	1	1
	2nd or more	114(70.4)	104(64.2)	0.75(.47,1.20)	0.68(.34,1.36)
Number of children in household	≤2	88(54.3)	118(72.8)	1	1
	>2	74(45.7)	44(27.2)	2.25(1.42,3.59)	2.05 (1.15,3.66) *
Cost of treatment for childhood diarrhea	Easy to pay	97(59.9)	112(69.1)	1	1
	Moderate	34(21.0)	28(17.3)	1.40(.79,2.48)	1.04(.50,2.15)
	Difficult to pay	31(19.1)	22(13.6)	1.62(.88,2.99)	1.34(.57,3.12)
Distance to the nearest health facility (km)	≤10	75(46.3)	140(86.4)	1	1
	>10	78(53.7)	22 (13.6)	7.38(4.28,12.73)	4.80(2.61,4.82) *
Preferred place for treatment of children with diarrhea	Government	108(66.7)	136(84)	1	1
	Traditional healers	34(21.0)	7(4.3)	6.11(2.61,14.34)	4.78(1.74,13.12) *
	Private or NGO clinic	20(12.3)	19(11.7)	1.34(.67,2.61)	1.45(0.67,3.16)
Having TV or radio	Yes	32(19.8)	55(34.0)	1	1
	No	130(80.2)	107(66.0)	2.09(1.26,3.46)	2.02(1.11,3.66) *
Previous history of diarrheal episode	Yes	104(64.2)	79(48.8)	1	1
	No	58(35.8)	83(51.2)	1.88(1.21,2.94)	1.51(.88,2.56)
Diarrhea can be cured by itself	Yes	60(37)	34(21)	2.21(1.35,3.63)	2.11(1.15,3.87) *
	No	102(63)	102(79)	1	1
Diarrhea can harm children	Yes	148(91.4)	158(97.5)	1	1
	No	14(8.6)	4(2.5)	3.74(1.20,11.61)	2.46(.69,8.79)

Note: *significant at P-value less than 0.05.

constraints are higher among households with larger family sizes.¹⁹

The odds of delayed treatment-seeking among mothers/caregivers who had no TV or radio was higher than their counterparts. One study conducted in Bangladesh showed

that exposure to electronic media was positively associated with caregivers' healthcare-seeking behavior.¹⁷ This implies, increasing media exposure can improve the health-seeking behavior of mothers/caregivers. In this study, it was also revealed that mothers/caregivers who preferred traditional

healers for the treatment of childhood diarrhea had higher odds of delayed treatment-seeking compared to those who preferred government health facilities. This finding is in line with a study conducted in Rwanda, which showed that caregivers who sought care from traditional healers and those who used special prayers provided by ministers of God before seeking healthcare were delayed to seek treatments.¹¹ Another study in Ethiopia also reported similar findings.⁶

Lastly, mothers/caregivers who perceived diarrhea can be cured without treatment showed higher odds of delayed treatment-seeking compared to those who perceived diarrhea cannot be cured without treatment. A study conducted in Rwanda showed that caregivers who perceived that the illness was mild were more likely to be delayed to seek medical care.¹¹ Other studies also showed that wrong perceptions about the illness could negatively affect treatment-seeking behavior.^{15,27}

Limitation of the Study

Variables such as distance from the health facility, history of diarrhea in the past six months of study, and time from the onset of illness to treatment-seeking were measured based on reports of the respondents; thus, there might be risks of bias.

Conclusion

Place of residence, distance from the health facility, number of children in the household, preferred facility by mothers/caregivers to seek care from, having television or radio, and the perception that diarrhea can be cured without treatment were significant determinants of delay in treatment-seeking for childhood diarrheal diseases. Thus, multidimensional approaches that can address accessibility of health facilities and improve mothers'/caregivers' awareness are necessary to encourage prompt treatment-seeking.

Abbreviations

AOR, adjusted odds ratio, COR, crude odds ratio, CI, confidence interval, MTUTH, Mizan-Tepi University Teaching Hospital, TGH, Tepi General Hospital, WHO, World Health Organization.

Data Sharing Statement

The datasets used and analyzed during the current study are available from the corresponding author and can be released upon reasonable request.

Ethical Approval and Consent to Participate

Ethical clearance was obtained from the Institutional Review Board (IRB) of Mizan-Tepi University. A letter of permission was obtained from MTUTH and TGH administrations. Informed written and signed consent was obtained from all study participants before the interview. Confidentiality of the information was ensured throughout the study.

Acknowledgments

We would like to express our heartfelt gratitude to Mizan-Tepi University for supporting this research project. We also extend our thanks to Mizan Tepi Teaching Hospital and Tepi General Hospital for their cooperation in providing us valuable information needed to prepare this research project.

Funding

Not applicable.

Disclosure

The authors declare that they have no competing interests.

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