Original article

Time-to-recovery from obstetric fistula and associated factors: The case of Harar Hamlin Fistula Center

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Abstract

Background: Obstetric fistula has caused a significant number of morbidity and mortality throughout the world especially in developing countries.

Objective: The purpose of this study is to determine mean time to recovery from obstetric fistula and identify the potential risk factors associated with time to recovery of patients from obstetric fistula.

Methods: An institutional-based retrospective cohort study was conducted among 433 patients that were selected by simple random sampling. Data were collected by using structured check list. Epi Data, Statistical Package for Social Science (SPSS) version 20 and R version 3.0.2 software's were used for data entry and processing. Descriptive nature of data was examined using frequency tables and Kaplan-Meier curve. Furthermore, bi-variable and multivariable Cox proportional hazard regression analyses were used to identify predictors. The crude and adjusted hazard ratios together with their corresponding 95% confidence intervals were computed and interpreted accordingly. To ensure the proportional hazards assumption is valid, the numerical and graphical methods of Goodness of fit test method that contains p-value and schoenfeld plot were used in this study.

Result: The mean survival time of obstetric fistula patients to become recovered in this study is 18.71 days with standard deviation of 6.68 days. The standard Cox proportional hazard analysis shows that being having complete bladder neck distraction (AHR=0.1324, CI: 0.0360, 0.4867), partial urethral damage (AHR=0.6929, CI: 0.4812, 0.9976) and severe vaginal scaring (AHR=0.269, CI: 0.1399, 0.5174) have significant effect on mean time to recovery from obstetric fistula.

Conclusion: In this study, a substantial proportion of obstetric fistula patients had recovered from the obstetric fistula and nearly one third of patients were censored observations. This study provides further evidence on the role of vaginal scarring, urethral and bladder neck involvement in predicting the time to recovery from obstetric fistula.
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Key words: Obstetric Fistula, Time to Recovery, Cox Proportional Hazard.

Background

Obstetrics fistulas are the abnormal communications created between the vaginal wall and the bladder (Vesico-Vaginal Fistula (VVF)) and/or the rectum (Recto-Vaginal Fistula (RVF)). There are three prominent causes of obstetric fistula. The first cause is ischemia of the soft tissue between the vagina and the urinary tract or between the vagina and the rectum by compression of the fetal head. The second most common cause is the direct tearing of the same soft tissue during precipitous delivery or obstetric maneuvers. The third cause is elective abortion (1).

Obstetric fistula is a physically and socially disabling obstetric complication that affects many women annually. It has a devastating social, economic and psychological effect on the health and well-being of the affected women (2-3). The stigma, deep sense of loss and loss of dignity and identity associated with fistula has a negative impact on quality of life (3).

Obstetric fistula was a global problem. However, it was eradicated in Europe and North America following improved obstetric care, but the condition remains prevalent in Sub-Saharan Africa (SSA) and Asia. Based on the number of women seeking treatment, the World Health Organization (WHO) estimates that, there are at least 2,000,000 women living with untreated obstetric fistula and an annual incidence of 50,000 to 100,000 cases in the world (4).

Ethiopia is one of the high-burden countries that constitute to the fistula belt in the world. In Ethiopia alone an estimated 0.25% of the total population of women suffer with untreated obstetric fistula and another 9,000 women develop fistula each year. By this estimation 46,000 of the women in Ethiopia are affected (5).

A number of factors have been identified which may be associated with obstetric fistula, such as the place of birth and presence of a skilled birth attendant, the duration of labor and the use of a partograph, the lack of prenatal care, early marriage and young age at delivery, older age, lack of family planning, gender inequality, malnutrition, poor education, lack of access to health center and removal of reproductive body. In the developing countries factors such as lack of access to maternal health service and emergency obstetric care are contributing to the silent epidemic (1).

Obstetric fistula has lately begun to generate interest in reproductive health. African Medical Research Foundation (AMREF) among other surgical teams has

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continued to perform surgical repairs to women affected by this condition. The repairs, therefore, offer a new lease of completeness to the affected women but, there is inadequate study to establish whether or not the demographic and health related factors like obstetric and fistula related factors associated with time of obstetric fistula treatment outcome (6).

Despite the growing number of studies examining factors influencing fistula repair outcomes, there remains limited evidence on the time of fistula treatment outcome. More empirical evidence on independent predictors of the duration repair outcomes would serve several purposes. Additional evidence of demographic, obstetrics and fistula characteristics independently associated with time of treatment outcomes could guide discussions with fistula patients regarding possible duration of their recovery and evidence regarding predictors. Time to recovery would provide useful information to guide clinical practice, including decisions about how a given fistula should be repaired.

Evidence up to now fails to demonstrate an independent role of any patient demographic, obstetrics and fistula related characteristic in predicting time to recovery from obstetric fistula. The studies have been useful in identifying factors that could lead to unsuccessful fistula treatment outcome and poor recovery, such as obstetric, fistula related and demographic factors that may influence time to recovery from obstetric fistula. Therefore, this study aims to determine mean time to recovery from obstetric fistula and identify the potential risk factors associated with time to recovery of patients from obstetric fistula.

Methods

Study design, period, and setting: A quantitative institutional-based retrospective cohort study was conducted from March 1, 2015 to March 15, 2015 in Harar Hamlin Fistula Center found in Harar city, Eastern Ethiopia. It was based on retrospective record review from January 2008 until December 2014. The Harar City is found 526km away from Addis Ababa which is the capital city of Ethiopia. Harari People's Regional State is populated 183,344 people among which 92,218 are male and 91,126 are female (7). The Harar Hamlin Fistula Center provides fistula treatment since 2008 and capable of giving service to more than 480 patients annually. The center is the only fistula center in the region that was built as an extension of the Addis Ababa Hamlin Fistula Center.

In this study, time to recovery means the time starting from the day the surgery performed for obstetric fistula patient in the center and start the follow up until the patient discharged from the centre. It is measured by the days.

Sample size determination and sampling techniques: To determine the sample size for this study outcome variable and various factors significantly associated with the outcome variables are considered. Accordingly, for each objective the sample size was calculated and the larger sample size was used for this study as follows:

The required sample size for the first specific objective of this study was calculated using single population mean estimation formula with the following assumption: Where the maximum allowable difference between the maximum likelihood estimate and the unknown population parameter (d) desired to be 0.05. The parameter = 0.593 represents population standard deviation (8). Hence the sample size with, N=1730, together with finite population correction formula and above specification n_f is 412. By adding a 5% non-response rate the sample size is 433 individuals.

For the second objective two population proportion formula was used to determine the sample size by using Epi info version 3.5.3 based on the following assumptions.

To have the proportion of the population's place of delivery of the patients was considered as independent factor (8). The proportion of patients delivered at home are = 76.1% and the proportion of patients delivered at institutions are = 90.1%, Confidence level of 95%, power of 80% and ratio of one to one is used. Accordingly the calculated sample size was 250. By considering a 5% non-response rate, the possible sample size for this objective is 256.

Accordingly, the required final sample size for this particular study were decided by taking the maximum from the first (433) and second (256) objectives sample size calculation results which were 433 individuals.

In this study, secondary data from Harar Hamlin fFistula center registry was used to retrieve data on individual obstetric fistula patients from initial date of surgery performed in the center up to the end of the follow up. In this study, the sampling frames are those who had treated during data retrieval period of seven consecutive years from January 2008 to December 2014 in Harar Hamlin Fistula Center. A simple random sampling technique was applied on the list of individuals for each year of data retrieval period by using lottery method.

Data collection procedures and instruments: A structured data collection check list was used for the data collection. Information was collected from registration forms, follow-up forms and patient cards by four trained diploma nurses and was supervised by the principal investigator and one nurse.

A bi-variate Cox proportional hazards model analysis was performed (at $p<0.25$) for each independents and outcome of interest (time to recovery from obstetric fistula) to identify independent predictors. Any variable whose bivariate test has a p-value <0.25 was a candidate for multivariable model along with all variables. Additionally, context and previous studies were also considered to make a variables candidate for multivariate analysis. Once the variables were identified, multivariable analysis was performed by forward stepwise cox proportional hazards model analysis.

Finally, the importance of each variable included in the multi-covariate model was verified by different model

assessment both graphically and numerically. In order to decide whether or not a variable is significant, associations with each parameter was estimated with p-value less than 0.05 the final model. The crude and adjusted hazard ratios together with their corresponding 95% confidence intervals computed and interpreted accordingly.

Ethical consideration: Ethical clearance was obtained from Haramaya University College of Health and Medical Sciences Institutional Health Research Ethical Review Committee (IHRERC). Written consentwas requested from the Director of Harar Hamlin Fistula Center. For the purpose of confidentiality, there were no linkages with individual patient and all recorded data was kept in a very secure area where only principal investigator can access to it.

Result

Socio-Demographic Characteristics of the Study Participant: Complete data was obtained for the total of 433 obstetric fistula patients, planned for the study. From these patients, 291 (67.21) of them have an recovered from the obstetric fistula and 142 (32.79) patients were censored observations. The mean and median time to recovery of the patients was 18.71 and 17 days respectively.

Out of the total sample 91(21%), 151(34.9%), 191(44.1%) where in the age groups of ≤18, 18-30 and ≥ 30 respectively. The proportion of patients with weight < 50kg and ≥ 50 were 320 (73.9) and 113 (26.1), respectively. Patients with height <150cm accounted 140 (32.3) and patient with height ≥150cm are 293 (67.7) in the sample. Concerning educational status, 421 (97.2) had no formal education and 12 (2.8) possess some formal education (Table 1).

Obstetric Characteristics: The proportion of patients who has ANC follow up was 194 (44.8) and who has no ANC follow up was 239 (55.2), most of the fistula patients were delivered at home 242 (55.9%), 191 (44.1%) delivered at a health facility, most of the participants had been delivered vaginally 280 (64.7%) and majority 263(60.7%) of the participants had been in labour for >2 days (Table 2).

Fistula Characteristics: The average length of the fistula hole for patients studied was 1.83 cm. The proportion for the length of fistula hole patients found in the sample were 334(77.1), 93(21.5) and 6(1.4) with ≤ 2cm, 3-5cm and >5cm respectively. Patients with status of urethra were found 289 (66.7), 132 (30.5) and 12(2.8) with intact, partially damaged and complete destructed **o**f urethra, respectively. The patients with none, mild, moderate and severe vaginal scaring have proportion of 13 (3), 163 (37.7), 162(37.4), and 95 (21.9) from the total sampled population, respectively (Table 3).

Table 1: **Socio-demographic characteristics of obstetric fistula patients in Harar Hamlin fistula center, Eastern Ethiopia, 2015**

Co-variates	Frequency	Percent
Age (Years)		
≤ 18	91	21.0
18-30	120	27.7
≥ 30	222	51.3
Height (cm)		
< 150	140	32.3
≥ 150	293	67.7
Weight (kg)		
< 50	320	73.9
≥ 50	113	26.1
Educational Status		
Have no formal Education	421	97.2
Have some formal Education	12	2.8
Marital status		
Married	256	59.1
Separate	81	18.7
Others	96	22.2
Total	**433**	**100**

Table 2: **Obstetric characteristics of obstetric fistula patients in Harar Hamlin fistula center, Harar, Eastern Ethiopia, 2015**

Co-variates	Frequency	Percent
ANC follow up		
Yes	194	44.8
No	239	55.2
Duration of labor (day)		
<1	46	10.6
1-2	124	28.6
>2	263	60.7
Place of delivery		
Home	242	55.9
Institution	191	44.1
Mode of delivery		
Vaginal	280	64.7
Others	153	35.3
Total	433	100

Kaplan-Meier Survival Curves: The KM curve shows that the pattern of the patients who have ANC follow up lying above those who have no ANC follow up, this means that patient who have follow up of antenatal care had slightly shorter recovery time compared with patients who have no follow up of antenatal care service.

In order to investigate if there is significant difference between the survivals of a patient by status of urethra, Kaplan-Meier survivor estimates for the three groups of urethra showed that the patient with complete destruction of urethra had taken more time to recovered than those who had intact and partially destructed urethra groups (figure 1).

Table 3: **Fistula characteristics of obstetric fistula patients in Harar Hamlin fistula center, Harar, Eastern Ethiopia, 2015**

Co-variates	Frequency	Percent
Duration of Incontinence (year)		
< 3	259	59.8
4-7	41	9.5
≥ 7	133	30.7
Width of fistula (cm)		
< 2	304	70.2
3-5	121	27.9
≥ 5	8	1.8
Length of fistula (cm)		
< 2	334	77.1
3-5	93	21.5
≥ 5	6	1.4
Status of urethra		
Intact	289	66.7
Partially damaged	132	30.5
Complete destructed	12	2.8
Status of bladder neck		
Intact	263	60.7
Partially damaged	138	31.9
Complete destructed	32	7.4
Circumferential Defect		
Absent	396	91.5
Present	37	8.5
Vaginal Scaring		
None	13	3.0
Mild	163	37.6
Moderate	162	37.4
Severe	95	21.9
Total	433	100

Kaplan-Meier Survival Curves

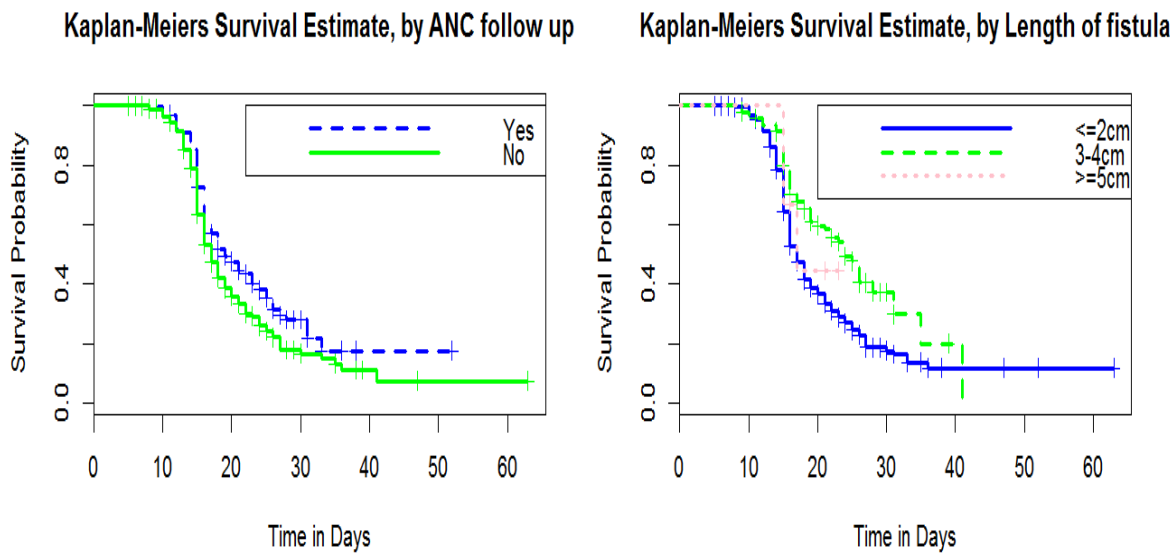

Figure 1: **Kaplan- Meier estimates for obstetric fistula data set by ANC follow up, Length of fistula, Status of urethra, and level of vaginal scaring**

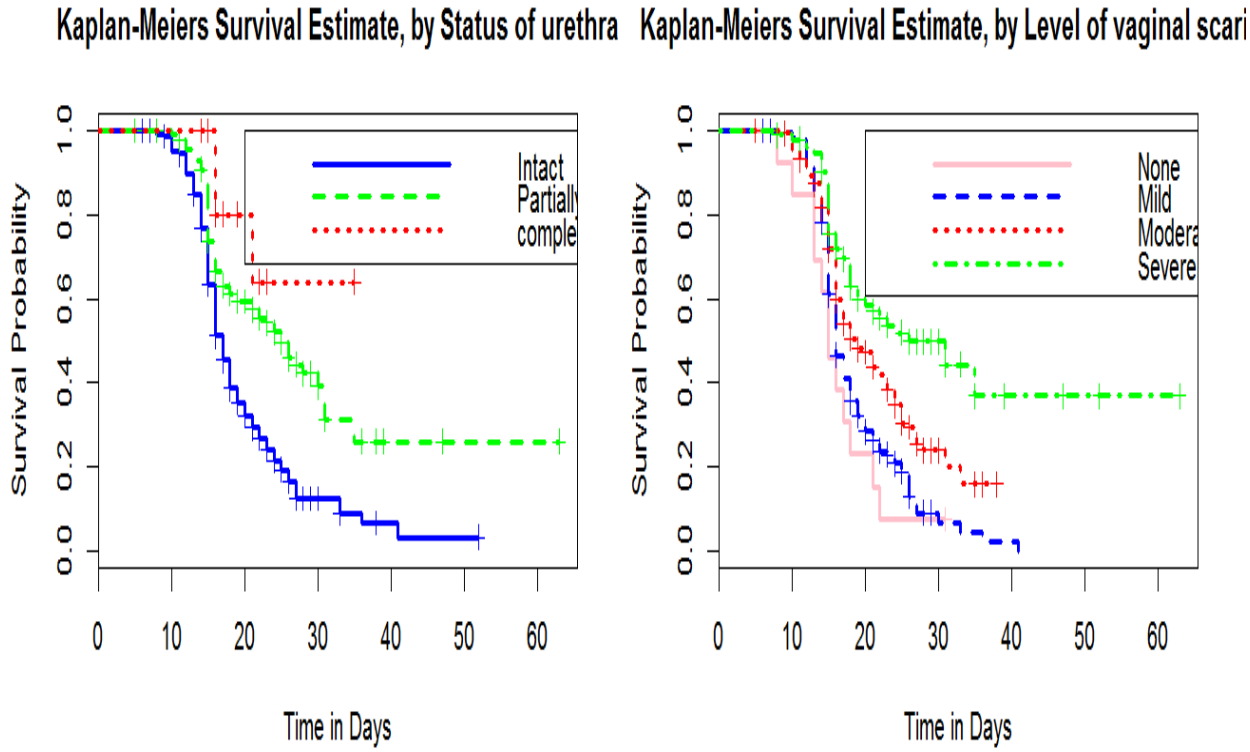

Figure 2: **Cox-Snell Residual plot of the best fitted model**

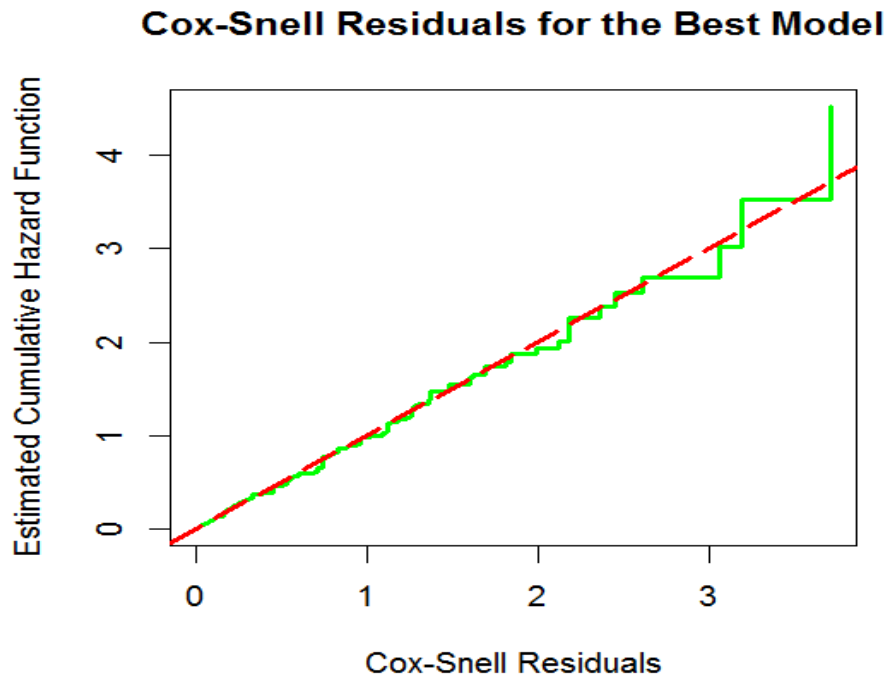

Figure 3: **Martingale rresiduals plot of the best fitted model**

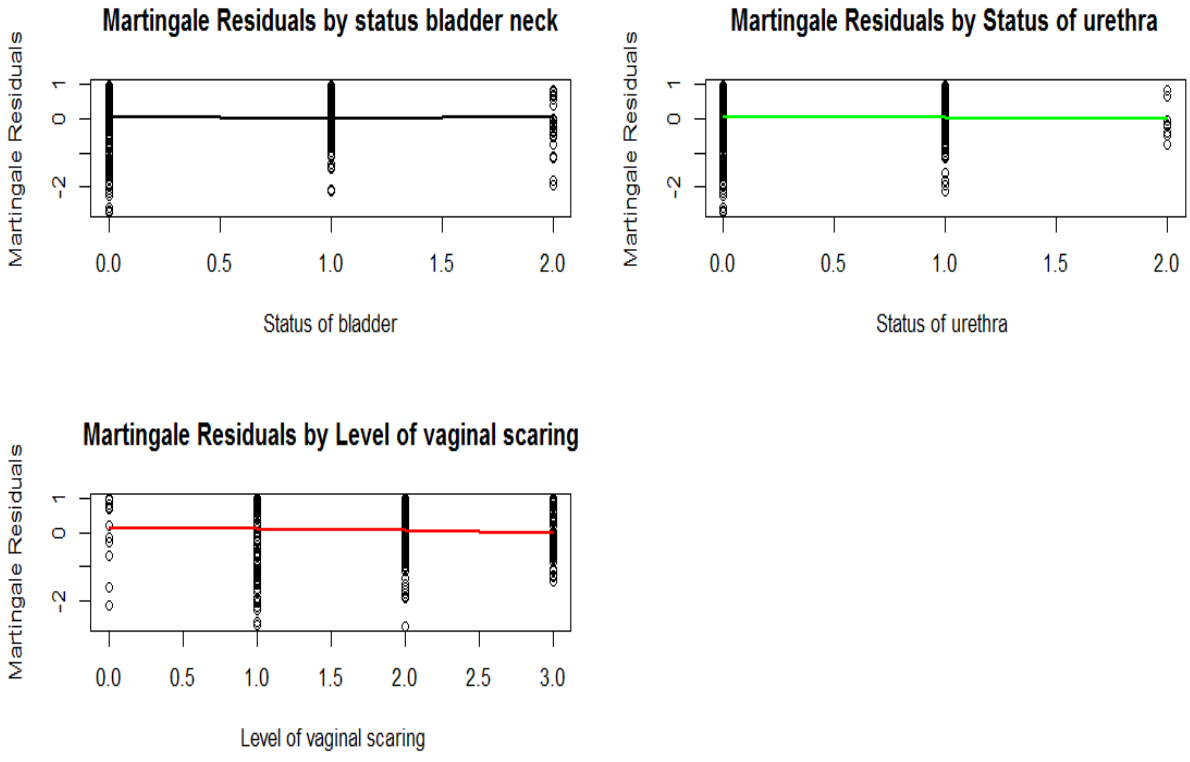

Figure 4: **Deviance Residuals plot of the best fitted model**

Comparison of Survival Curves by Log-Rank-Test
Based on the result of this study, the co-variates that have a smaller p-value as compared to 5% level of significance are age, ANC follow up, width of fistula, length of fistula, status of urethra, status of bladder neck, presence of circumferential defect and level of vaginal scaring. These results confirmed that there is a significant difference between the survival curves between the different groups of these co-variates, but there is no significant difference between the survival curves for a variables height, weight, educational status, marital status, duration of labor, place of delivery, mode of delivery and duration of patient incontinence. (Table 4).

Table 4: **Comparison of survival time to recovery experience on obstetric fistula patients using log-rank-test Harar, Eastern Ethiopia, 2015**

Co-variates	Chi-Square	DF	P-value
Age	6.6	2	0.0374
Height	2.4	1	0.12
Weight	0.8	1	0.377
Educational Status	0.2	1	0.693
Marital Status	3.7	2	0.159
ANC follow up	6.3	1	0.012
Duration of labor	3.1	2	0.207
Place of delivery	0.8	1	0.383
Mode of delivery	0.6	1	0.45
Duration of Patient Inc.	3.2	2	0.207
Width of fistula	20.3	2	3.85e-05
Length of fistula	13.7	2	0.00108
Status of urethra	36.6	2	1.11e-08
Status of bladder neck	36.8	2	1.04e-08
Circumferential defect	14.6	1	0.00013
Level of vaginal scaring	38.7	3	1.97e-08

Bivariable Analysis of Factors Associated with Time to Recovery

In the bi-variable analysis of the co-variates age, height, marital status, ANC follow up, duration of labor, duration of incontinence, width of fistula, length of fistula, status of urethra, status of bladder neck, presence of circumferential defect and level of vaginal scaring are statistically significant at 25% modest level of significance so it is possible to be included in the multivariate analysis for further investigation. (Table 5).

Multivariable Analysis for Factors Associated with Time to Recovery

Based on the multivariable analysis result in table 6 from all variable that had filtered at bivariable analysis and included in the multivariable analysis the co-variates width of fistula hole, status of bladder neck, status of urethra and level of vaginal scaring passed the first filtration of variables for multiple co-variates analysis at 5% level of significance and then step wise variable selection method was first applied on the model that includes the all variables that had significance in bivariate analysis to select the important variables to be included in the best final cox proportional hazard model.

Table 5: **Bivariable Analysis of Cox Proportional Hazards on time to recovery from obstetric fistula, Harar, Eastern Ethiopia, 2015**

Co-vitiates	Bivariate Analysis		
	P-Value	CHR	95% CI for CHR
Age(Years)			
≤ 18	0.8277	1.03668	(0.7494, 1.434)
18-30	0.0682	0.75654	(0.5605, 1.021)
≥ 30(R)		1	
Height (cm)			
< 150	0.117	1.2240	(0.9504, 1.576)
≥ 150(R)		1	
Weight (kg)			
< 50	0.345	1.1327	(0.8744, 1.467)
≥ 50(R)		1	
Educational Status			
Not formal	0.718	1.1304	(0.5818, 2.196)
Some Formal(R)		1	
Marital status			
Married(R)		1	
Separated	0.2247	0.8288	(0.6120,1.122)
Others	0.0767	0.7621	(0.5641, 1.030)
ANC followup			
Yes	0.0133 *	1.3421	(1.063, 1.694)
No(R)		1	
Duration of labor (day)			
<1	0.234	0.7840	(0.5252,1.17)
1-2	0.071	0.7080	(0.4866, 1.03)
>2(R)		1	
Place of delivery			
Home	0.375	1.1106	(0.8807, 1.401)
Institutional(R)		1	
Mode of delivery			
Vaginal	0.464	1.09444	(0.8595, 1.394)

Others(R)		1	
Duration of Incon. (year)			
≤ 3(R)		1	
4-7	0.234	0.7840	(0.5252,1.17)
≥ 7	0.071	0.7080	(0.4866, 1.03)
Width of fistula (cm)			
≤ 2 (R)		1	
3-5	6.46e-05 ***	0.5645	(0.4264, 0.7473)
≥ 5	0.047 *	0.3150	(0.1008, 0.9849)
Length of fistula(cm)			
≤ 2 (R)		1	
3-5	0.000321 ***	0.5702	(0.4198, 0.7743)
≥ 5	0.545742	0.7038	(0.2252, 2.1996)
Status of urethra			
Intact (R)		1	
Partially damaged	1.05e-07 ***	0.4741	(0.3601, 0.6242)
Completely d.	0.0101 *	0.2236	(0.0714, 0.6997)
Status of bladder neck			
Intact (R)		1	
Partially damaged	6.5e-09 ***	0.4389	(0.3323, 0.5796)
Completely d.	0.101	0.6732	(0.4197, 1.0797)
Presence of circumferential defect			
Absent(R)	0.000302 ***	0.3932	(0.237, 0.6524)
Present		1	
Level of Vaginal Scaring			
None(R)		1	
Mild	0.3207	0.7410	(0.4101, 1.3389)
Moderate	0.0174 *	0.4835	(0.2657, 0.8798)
Severe	9.93e-05 ***	0.2784	(0.1462, 0.5301)

In order to decide whether a variable is included in the best final model or not, the p-value associated with each parameter has been estimated and the variables that have p-value less than 0.05 cut point are considered as important variables and thus, are included in the final best model that will fitted the obstetric fistula data set of this study. Therefore, after conducting the forward stepwise method of variable selection the variables status of bladder neck, status of urethra and level of vaginall scaring are statistically significant at 5% level of significance to be included in the best final model of this study. This best model was selected from the lists of other models based on its lowest value (3052.461) of AIC (Akaikie Information Criterion). This means that the smaller the AIC value the best model of the study.

Table 7 shows that the time-dependent covariates were not significant which justifies the proportional hazard assumption holds at 5% level of significance. The plot of the scaled Schoenfeld also shows that the residuals are random without any systematic pattern and the smoothed plot looks straight line without any departure from the horizontal line. Thus, there is no violation of proportional hazards assumption (Figure 5).

Table 6: **Multivariable Analysis of Cox Proportional Hazards on time to recovery from obstetric fistula at Harar Hamlin fistula center, Harar, Eastern Ethiopia, 2015**

Co-vitiates	**Bivariate Analysis**		
	P-Value	**CHR**	**95% CI for CHR**
Age(Years)			
≤ 18	0.586415	1.09866	(0.7828, 1.5420)
18-30	0.749780	0.94850	(0.6853, 1.3127)
≥ 30(R)		1	
Height (cm)			
< 150	0.444790	1.10770	(0.8521, 1.4400)
≥ 150(R)		1	
Marital status			
Married(R)		1	
Separated	0.769098	0.95413	(0.6973,1.3055)
Others	0.218120	0.81967	(0.5973, 1.1248)
ANC followup			
Yes	0.303184	1.14840	(0.8825, 1.4945)
No(R)		1	
Duration of labor (day)			
<1	0.419277	0.84450	(0.5604, 1.2727)
1-2	0.575916	0.89503	(0.6068, 1.3201)
>2(R)		1	
Length of fistula(cm)			

≤ 2	0.534214	0.89029	(0.6172, 1.2843)
3-5	0.526355	1.60197	(0.3729, 6.8826)
≥ 5 (R)		1	
Width of fistula (cm)			
≤ 2	0.280818	0.82394	(0.5795, 1.1715)
3-5	0.029997 *	0.19768	(0.0457, 0.8547)
≥ 5 (R)		1	
Duration of Incon. (year)			
≤ 3(R)		1	
4-7	0.419277	0.84450	(0.5604, 1.2727)
≥ 7	0.575916	0.89503	(0.6068, 1.3201)
Status of urethra			
Intact (R)		1	
Partially damaged	0.080894	0.68403	(0.4466, 1.0478)
Completely distracted	0.002596 **	0.13050	(0.0347, 0.4910)
Status of bladder neck			
Intact (R)		1	
Partially damaged	0.041442 *	0.67824	(0.4670, 0.9850)
Completely distracted	0.007138 **	2.69668	(1.3091, 5.5552)
Presence of circumferential defect			
Present	0.451458	0.79248	(0.4326, 1.4518)
Absent(R)		1	
Level of Vaginal Scaring			
None(R)		1	
Mild	0.063546 .	0.55899	(0.1589, 0.6162)
Moderate	0.013116 *	0.45059	(0.2400, 0.8459)
Severe	0.000779 ***	0.31288	(0.3024, 1.0333)

Table 7: **Statistical test for Proportional Hazards Assumption (PHA) of the covariates and their interaction with log of time and Schoenfeld residual, 2015**

Covariates	rho	Chi-square	P-Value
Status of bladder neck	-0.0241	0.1860	0.666
Status of urethra	0.0122	0.0379	0.846
Level of vaginal scaring	-0.0824	2.0845	0.149
GLOBAL	NA	2.5844	0.460

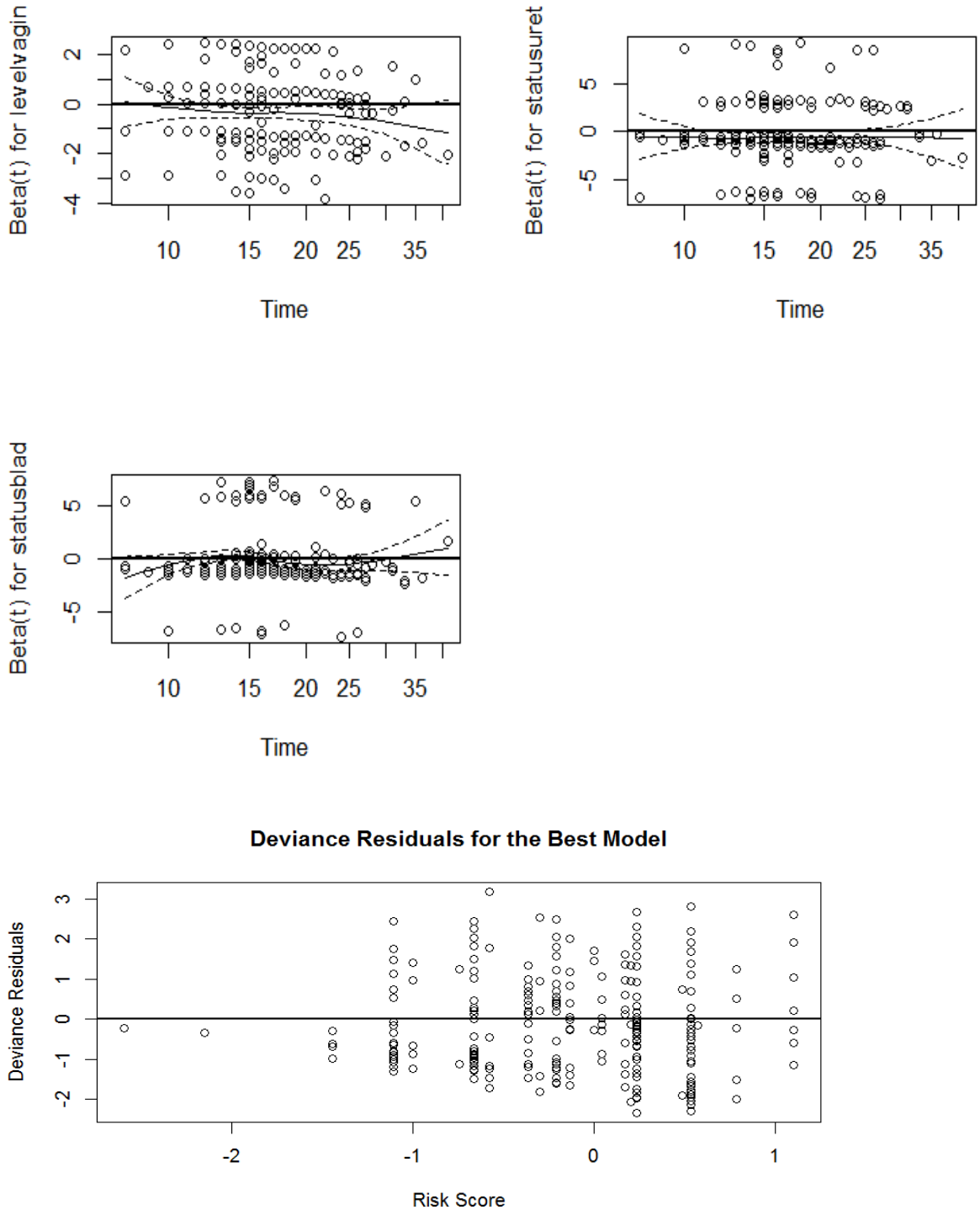

Figure 5: **Plots of scaled Schoenfeld residuals for each covariate in a best mode**

Discussion

This study clearly indicates that the average time to recovery from obstetric fistula in the center was 18.71 days. In a study done in southern part of Ethiopia at Yirgalem (8), the mean time to recovery was 32.48 days, which is quite higher than what was observed by the current study. This could be due to the difference in the time from which the subjects were to be followed in this study from the days at which the surgery performed but in the other study it is started from the day the patient was admitted to the centre. But, these 18.71 days of recovery was in line with days that the patients should be recovered from obstetric fistula surgery within 14-21 days from the day of surgery (9).

In this study, the status of urethra is one of the predictor that has a significant effect on the mean time to recovery of an obstetric fistula patient. The hazard rate for being recovered within 21 days from obstetric fistula surgery

of obstetric fistula patient with partially damaged urethra were 0.6929 times less likely than the hazard of those patients who have intact urethra (AHR=0.6929, CI: 0.4812, 0.9976). This finding is similar to other studies (8-10). This is probably because urethral fistula repair is a complex procedure, whereby surviving tissues must be reassembled as a supple functional organ, which acts both as a passageway for urine, and as a "gatekeeper," ensuring that passage of urine occurs at appropriate times. A scarred nonfunctional urethra is left behind leading to incontinence and long recovery time.

The other co-variates that have a significant effect in mean time to recovery are levels of vaginal scaring. None vaginal scaring group was in an acceptable range recovery time than those who had mild, moderate and severe vaginal scaring groups. The hazard rate for being recovered with in an acceptable range time from obstetric fistula surgery of a patient with mild vaginal scaring group were 0.5664 times less likely than the patients with none vaginal scaring (AHR=0.5664, CI: 0.3105, 1.0330), the hazard rate for those patients who have moderate vaginal scaring were 0.4194 times less likely than those who have non vaginal scaring (AHR=0.4194, CI: 0.2292, 0.7674) and the hazard rate for those patients who have severe vaginal scaring were 0.269 times less likely than those who have non vaginal scaring (AHR=0.269, CI: 0.1399, 0.5174). Similar associations were observed on the outcome of obstetric fistula surgery in other studies (9,11,12). This is probably because scar tissue has a poor blood supply hence less likely to heal. Also scarred fistula is difficult to mobilize from the surrounding tissues like vagina and pubic bone making a tension free repair nearly impossible. Extensive scarring also not only inhibits access to the fistula, but also requires use of unhealthy tissue to close the defect. Vaginal scarring can also cause the urethra to be held open, preventing it from functioning normally.

Status of bladder neck of a patient is also one of a prognostic factor that significantly predicts the recovery time of obstetric fistula patient. Being having intact bladder neck has shorter recovery time than those who have partially damaged bladder neck and complete bladder neck distraction. The hazard rate for being recovered with shorter mean time from obstetric fistula surgery of obstetric fistula patient with partially damaged bladder neck was 0.5860 times less likely than the hazard of those patients who have intact bladder neck (AHR=0.5860, CI: 0.3902, 0.8801). The hazard rate for being recovered with shorter mean time from obstetric fistula surgery of obstetric fistula patient who have complete bladder neck distraction was 0.1324 times less likely than those who have intact bladder neck (AHR=0.1324, CI: 0.0360, 0.4867). This result is in accordance with other studies (8,11). This association could be due to the fact that the difficulty in anastomosing a distracted bladder neck and the ischemic process that causes the fistula may also lead to further destruction of the urinary bladder that results incontinence mechanisms severe hence leaving the women incontinent even after having the fistula closed and prolong the prognosis of the patients.

The results of this study do not support an independent role of socio-demographic characteristics in predicting mean time to recovery. For-instance age at surgery has no relation with mean time to recovery. In contrast other studies found associations between younger age at repair and poor repair prognosis (11-12). This variation may be due to the relationship between patient age and repair outcomes is mediated by fistula characteristics, since age is related to pelvic size and may thereby influence the degree of damage caused by the obstructed labor, in turn influencing the prognosis of the repair.

Even though the study attempted to exhaust wide variety of fistula characteristics and several contextual factors, the study was observational and the results may be subject to confounding by factors that were not measured or controlled for. Socio-demographic, obstetric history and causative delivery data were subject to the inaccuracies and reporting biases inherent in self-reported data. Lack of standard definitions for some fistula characteristics may have led to underreporting or bias in our results. But it is believed that errors in exposure measurement were non-differential, and that any bias would be toward the null.

Conclusion

In this study, a substantial proportion of obstetric fistula patients had recovered from the obstetric fistula and nearly one third of patients were censored observations. For these population, on average 18.71 days to be cured and discharged from the centre were needed. This mean time was within acceptable range of time for recovery. The hazard of being recovered with long mean time from obstetric fistula was significantly related to parameters such as complete urethral damage, complete bladder neck distraction and marked severe vaginal scarring. Therefore, this study provides further evidence supporting the role of vaginal scarring, urethral and bladder neck involvement in predicting the time to recovery from obstetric fistula. Those institution who are committed to obstetric fistula surgery needs to take in to consideration these factors when they treat their patient in order to have a better prognostic time.

Competing interest:

The authors declare that there was no competing interest in connection to this research and its result.

Authors' contribution

SH and EM conceived and designed the study, developed data collection instruments and supervised data collection. SH and EM participated in the testing and finalization of the data collection instruments and coordinated study progress. SH and EM performed the statistical analysis, SH wrote all versions of the manuscript. All authors read and approved the final manuscript.

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