

Determinants of Ectopic Pregnancy among Pregnant Women Who Were Managed in Nekemte Referral Hospital, Oromia Region, Ethiopia

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Abstract

Ectopic pregnancy (EP) is a pregnancy in which the implantation of the embryo occurs outside the uterine cavity. It is the leading cause of maternal death during the first trimester of pregnancy. A better understanding of its risk can help prevent its incidence. This case-control study was carried out to evaluate the risk factors for ectopic pregnancy in Nekemte Referral Hospital, Ethiopia. The objective of this study was to identify the determinants of ectopic pregnancy among pregnant women who were managed in Nekemte Referral Hospital, 2015. The design was hospital based unmatched case control study. Detailed reviews of patient record were made by using structured check list all required information have been collected 99 cases with ectopic pregnancy were taken as a whole whereas 200 controls have been selected with simple random sampling method. Data was entered and cleaned using Epi Info version 7 then exported to SPSS version 20 for analysis. Bi-variable analysis was executed then all explanatory variables with p-value of < 0.25 were entered into multivariable logistic regression. Determinant factors have been identified based on p-value of 0.05 and AOR with 95% CI. From January 2010 to December 2013, there were 99 cases of ectopic pregnancy in Nekemte Referral Hospital. The average (\pm SD) of patient's age was 27 (\pm 5) years. The risk factors identified were marital status and history of contraception use. Accordingly, women with single marital status were 10.81 times (95% CI AOR (3.601, 32.465)) more likely to develop ectopic pregnancy than married ones. Those who used contraception were 2.27 times (95% CI, AOR (0.214, 24.02)) more likely to develop ectopic pregnancy than who did not use contraception.

Keywords: Ectopic pregnancy; Determinants; Oromia; Ethiopia

Introduction

Ectopic pregnancy is derived from the Greek word "ektapos" means out of place and it refers to implantation of a fertilized egg in a location outside of the uterine cavity^[1,2]. It occurs in approximately 1 - 2% of pregnancies and it is the most important cause of maternal morbidity and mortality in the first trimester^[3,4]. The etiology of ectopic pregnancy is not well understood. However, multiple risk factors have been associated with ectopic pregnancy, although some patients may not have any risk factor.

Theoretically, any condition that prevents or retards the normal transport of the fertilized ovum to the uterus could predispose women to ectopic gestation^[5-7]. Several risk factors for ectopic pregnancy have been identified, including a history of pelvic inflammatory disease (PID), smoking at the time of conception, previous ectopic pregnancy, previous pelvic surgery, induction of ovulation, and intrauterine device usage. An

understanding of the risk factors for ectopic pregnancy assists more rapid diagnosis and could result in a reduction in the need for surgery, and an improvement in preventive strategies against ectopic pregnancy^[8].

A "classic" presentation of ectopic pregnancy is characterized by the triad of delayed menstruation, pain, and vaginal bleeding or spotting^[9]. Classically, the diagnosis is based on a

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history of pelvic pain associated with amenorrhea, a positive pregnancy test with or without slight vaginal bleeding^[10].

The treatment of ectopic pregnancy is influenced by the clinical state of the patient, site of the ectopic gestation, the reproductive wish of the patient as well as availability of facilities and technological expertise. However, surgical intervention remains as the norm of treatment^[11].

Statement of the problem

Ectopic pregnancy is the leading cause of maternal morbidity and mortality worldwide^[12].

In the western world, the incidence of EP is approximately 1 - 2% in the general population but as high as 20%, in patients who have undergone tubal surgery. Risk factors for EP after natural conception (e.g., tubal surgery, previous EP, pelvic inflammatory disease, and infertility) have been well described. Ectopic pregnancy remains a leading cause of maternal mortality and morbidity in the first trimester of pregnancy in developing countries^[13].

Ethiopia is one of the six countries which have contributed to more than 50% of all maternal deaths across the world^[14,15]. Among the causes of maternal mortality, ectopic pregnancy is the leading in the first trimester of pregnancy. Approximately 1 - 2% of all naturally conceived pregnancies end up with ectopic pregnancy^[16,17]. In the past decades, the occurrence of ectopic pregnancy has been raised in many countries though the condition varies from country to country depending on the risk factors predominant in the geographical region^[5].

The identified risk factors for ectopic pregnancy include prior history of ectopic pregnancy, history of appendectomy, previous pelvic surgery, history of pelvic infection, early age, prior spontaneous and medical abortion, history of contraceptive use including emergency pills, cigarette smoking in dose dependent manner, history of having multiple sexual practices, history of infertility, usage of artificial reproductive technology, presence of a hydrosolpinx or fibroid^[18,19].

Worldwide, different risk factors are identified but women in Ethiopia, Nekemete have different characteristics (cultural, religious, socio-demographic characteristics, sexual behavior and beliefs, contraception usage and preference). Therefore, risk factors for ectopic pregnancy may differ from place to place. So, this case-control study conducted to identify the risk factors in the study area.

Methods

Study design and Period

A hospital based unmatched case control study was employed. The study was conducted on October 1-30, 2015 in NRH.

Source population and Study population: Source population of this study was record of all pregnant women who had visited NRH in Gynecological OPD, ANC and maternity ward from 1/07/ 2014 to 1/07/2015. The study population of this study was record of pregnant women who were diagnosed by ultrasound to have intra-uterine pregnancy or ectopic pregnancy in Gynecological OPD, ANC clinic, maternity ward and operation room.

Eligibility criteria

Inclusion criteria: Record of pregnant women who were diagnosed to have intra-uterine pregnancy or ectopic pregnancy at any gestational age and both singleton and multiple type of pregnancy in gynecological OPD, ANC clinic, maternity ward and operation room.

Exclusion criteria: Record of pregnant women with incomplete data (gravidity, abortion history, ectopic history, history of STI, history of contraceptive use, obstetric and gynecologic surgery, etc) from patient medical record folder.

Sample size and sampling technique

Sample size was calculated using Epi Info version 7 for unmatched case control study design (Table 1) based on the assumption that PID is significant risk factor for ectopic pregnancy. From previous case control study with 3.0% of controls and 13.4% of cases were having prior history of PID and the level of significance $\alpha = 0.05$, the power of the test $(1-\beta) = 80\%$, the control to case ratio $(r) = 2$, the proportion of exposure among controls $(p_1) = 3\%$ with the proportion of exposure among cases $(p_2) = 13.4\%$ and AOR = 5. The final sample size calculated by using the above assumption gives 88 cases and 176 controls with a total of 264 study subjects. However, since there are 99 actual cases in the study period, it was found preferable to take all the total cases in 1:2 ratios to have a total of 299 study subjects.

Table 1: Epi Info sample size calculation^[20]

	Kelsey	Fleiss	Fleiss with CC
Sample Size – Exposed	66	75	88
Sample Size-Non exposed	132	149	176
Total sample size:	198	224	264

Sampling procedure

Simple random sampling technique was used to select study participants with intra uterine pregnancy (controls) while for cases all subjects were included as their number was only 99 from 1/07/ 2014 to 1/07/2015.

Variables of the study

Dependent variable: State of pregnancy (Ectopic pregnancy or Normal pregnancy)

Independent variables: Socio-demographic variables (Age, Marital status, Religion, Ethnicity, Address, Habits (Alcohol drinking, cigarette smoking))

Obstetric and Gynecological variables (Gravidity, Abortion history, Ectopic history, History of STI, History of contraceptive use, Obstetric and gynecologic surgery)

Co-morbid diseases

Data collection procedure

The available information on the patient records had been first observed and appropriate data extraction format was prepared in English. Then the data were collected by year one 4 IESO students using the prepared data collection format on the already existing records after half a day theoretical and half a day practical training was given. One data clerk also supported them by identifying the charts. One supervisor and principal investigator were controlling every activity during data collection.

Charts were retrieved using the patient registration number which was found in the registration of Operation Theater, ANC and GYN OPD and maternity sections of the hospital.

Data quality control

Quality of data were maintained by recruiting data collectors who are IEOS year one and supervisor IESO year three. The data collectors and supervisor were given intensive training for one day before the data collection on the objective of the study and how to retrieve data for this study purpose using the data extraction format. They briefed on the definition of variables on the questionnaires and registration charts. The data extraction tool was pre-tested for consistency of understanding the review tools and completeness of data items on 10 charts at the same facility as it was a secondary data and the necessary amendment were made on the final data extraction format. The retrieval process was closely monitored by the principal investigator throughout the data collection period. Completed questionnaires were checked regularly for completeness of information and any gaps identified were immediately communicated to the data collectors.

Data processing and analysis

Data were first checked manually for completeness and consistency by supervisor and principal investigator during data collection and rechecked again before data entry. Data was entered and cleaned using Epi Info version 7 then exported to SPSS version 20 for analysis and interpretation. Descriptive analysis was conducted to summarize the data. Bi-variable analysis was executed to see the association between independent and outcome variables. All explanatory variables associated with outcome variables with $p < 0.25$ were entered into Multivariable logistic regression analysis. Back ward conditional method was used and Variables with a p -value < 0.05 in multi-variable analysis were considered as significant risk factor for ectopic pregnancy.

Ethical Consideration

Ethical clearance was obtained from the Institutional review board of Jimma University College of health sciences. Permission letter was obtained from Nekemte Referral Hospital's management, and oral permission also obtained from focal person in the respected wards to use the secondary data for the purpose of this study. The name or any other identifying information was not recorded on the questionnaire and all information taken from the chart was kept strictly for confidential and in a safe place. The information retrieved was used only for the study purpose.

Limitations of study

Since the study is based on secondary data, this study faced limitation of detailed information like; details of socio-demographic variables. Since the study is institutional based, findings couldn't generalize the general population unlike prospective population based study.

Results

Socio-Demographic, clinical characteristic of participants

From October 1-30, 2015, there were 99 cases of ectopic pregnancy in Nekemet hospital. The average age was 27 ± 5 years. Majority of participants were married 91.31% (273 of 299) and almost half of them 50.5% (151 of 299) came from Nekemte town.

Only 5.0% (15 of 299) and 18.39% (55 of 299) of study participant had previous history of ectopic pregnancy and abortion respectively while 23.41% (70 of 299) had previous history of surgery with 48.5% (34 of 70) cases of C/s. one third 29.10% (87 of 299) of participants had history of STI with 57.4 % (50 of 87) of PID and 42.5 % (37 of 87) of vaginal discharge.

Among Contraceptive users 207 of 299 (69%), Depo-Provera was highest one 62.3% (129 of 207). one in three (32.78%) , had four or more history of gravida and about 21.4% (64 of 299) had co-morbid disease including hypertension 64% (41 of 64), DM 17.2%(11 of 64), HIV 12.5% (8 of 64) and asthma6.3% (4 of 64) (Table 2).

Table 2: Distribution of Ectopic Pregnancy with socio demographic and clinical characteristics, Nekemte Referral Hospital, 2015.

Variables		State of pregnancy		Frequency	Percentage (%)
		Ectopic (cases = 99)	Normal (controls = 200)		
Age	<= 20	14	16	30	10.03
	21 - 30	66	136	202	67.56
	>= 31	19	48	67	22.41
Marital Status	Single	16	2	18	6.02
	Married	79	194	273	91.31
	Divorced	2	3	5	1.67
	Widowed	2	1	3	1.00
Address	Nekemet	50	101	151	50.50
	Out of Nekemet	49	99	148	49.50

Habits	Alcohol drinking	30	60	90	30.10
	Non alcohol drinking	69	140	209	69.90
	Non cigarette smoking	99	200	299	100
	Cigarette smoking	0	0	0	0
Hx of Abortion	Yes	21	34	55	18.39
	No	78	166	244	81.61
No. of Abortion	0	78	166	244	81.61
	1	17	26	43	14.38
	>= 2	4	8	12	4.01
Hx of Ectopic pregnancy	Yes	7	8	15	5.01
	No	92	192	284	94.98
Hx of surgery	Yes	21	49	70	23.41
	No	78	151	229	76.59
Type of surgery	C/s	9	25	34	11.37
	Others	12	24	36	12.04
	No Hx	78	151	229	76.59
Hx of STI	Yes	25	62	87	29.10
	No	74	138	212	70.90
STI syndrome	PID	18	32	50	16.72
	Vx discharge	7	30	37	12.37
	No Hx	74	138	212	70.90
Hx of Contraceptive use	Yes	60	147	207	69.23
	No	39	53	92	30.77
Type of Contraceptive use	IUCD	11	13	24	8.03
	Depo	33	96	129	43.14
	Implanon	4	17	21	7.02
	OCP	12	21	33	11.04
	No	39	53	92	30.77
Gravidity	I	29	48	77	25.75
	II	22	46	68	22.74
	III	18	38	56	18.73
	>= Iv	30	68	98	32.78
Co-morbid Disease	Yes	17	47	64	21.40
	No	82	153	235	78.60
Type of Co-morbidity	No Hx	82	153	235	78.60
	Hypertension	6	35	41	13.71
	Diabetic mellitus	6	5	11	3.68
	HIV	5	3	8	2.68
	Asthma	0	4	4	1.34
Hgb level	< 11gm/dl	51	23	74	24.75
	>= 11gm/dl	48	177	225	75.25

Others; types of surgery other than CS

Risk factor for Ectopic pregnancy

Findings from bi-variable logistic regression analysis showed that age, marital status, history of contraceptive user, type of contraceptive used and prior history of STI syndrome had association with ectopic pregnancy with p-value of less than 0.25. However, in multi-variable regression analysis, only marital status and history of contraceptive use remained statistically significant risk factor for ectopic pregnancy.

Accordingly, women with single marital status were 10.81 (95% CIAOR (3.601,32.465), p - value 0.001) times higher risk to developed ectopic pregnancy than married ones and history of contraceptive use was 2.27 AOR (0.214,24.02) times more likely to develop ectopic pregnancy than those who had no history of contraceptive use (Table 3).

Table 3: Sociodemographic and clinical characteristics of women with state of pregnancy (ectopic vs. intrauterine pregnancy).

Variables		State of pregnancy		OR (95%)	
		Ectopic	Normal	COR	AOR
Age	<= 20	14	16	2.21 (0.91,5.40)	
	21 -	66	136	1.23 (0.67,2.25)	
	> = 31	19	48	1	
Marital status	Single	20	6	8.19 (3.17,21.15)	10.81 (3.60,32.47)
	Married	79	194	1	Reference
Address	Nekemet	50	101	1.00 (0.62,1.62)	
	Out of Nekemet	49	99	1	
Abortion Hx	Yes	21	34	1.31(0.72,2.41)	
	No	78	166	1	
Hxof # Abortion	0	78	166	1	
	1	17	26	1.39 (0.71,2.41)	
	>= 2	4	8	1.06 (0.31,3.64)	
Ectopic Hx	Yes	7	8	1.83 (0.64,5.19)	
	No	92	192	1	
Hx of surgery	Yes	21	49	0.83 (0.47,1.48)	
	No	78	151	1	
Type of surgery	No	78	151	1	
	C/s	9	25	0.70 (0.31,1.57)	
	Others	12	24	0.97 (0.46,2.04)	
Hx of STI	Yes	25	62	0.75 (0.44,1.30)	
	No	74	138	1	
STI syndrome	No	74	138	1	
	PID	18	32	1.05 (0.55,1.99)	
	Vx discharge	7	30	0.44 (0.18,1.04)	
Hxof Contraceptive use	Yes	60	147	0.56 (0.33,0.93)	2.27 (0.21,24.02)
	No	39	53	1	
Type of Contraceptive used	No	39	53	1	
	IUCD	11	13	1.15 (0.466,2.837)	1.32 (0.53-3.34)
	Depo	33	96	0.47 (0.264,0.828)	0.56 (0.31,1.0)
	Implanon	4	17	0.32 (0.100,1.025)	0.26 (0.73,0.9)
	OCP	12	21	0.78 (0.342,1.765)	0.41 (1.44,1.16)
Gravidity	One	29	48	1.37 (0.729,2.572)	
	Two	22	46	1.08 (0.557,2.109)	
	Three	18	38	1.07 (0.530,2.176)	
	Four and more	30	68	1	
Co-morbid Diseases	Yes	17	47	0.68 (0.364,1.250)	0.74 (0.39,1.42)
	No	82	153	1	

Discussion

This case control study tried to identify the determinants of EP in Nekemte Referral Hospital. In this study the mean age was 27 ± 5 years, similar studies done in Lagos, Nigeria and Niger Delta showed the mean age was 27.8 ± 6.21 years and 26.8 years respectively^[12,17].

Majority of participants in this study were married 91.3% (273 of 299) which is the same as that of the study done in Aminu Kano Hospital Nigeria^[21].

In this case control study many variables that have been well studied and identified as a risk factor do not appeared to show association with ectopic pregnancy and the variable that were identified as risk factors for ectopic pregnancy were marital status and history of contraception use^[18-21]. This may be real differences in the risk of developing ectopic pregnancy in study participants.

Worldwide, different risk factors are identified but women in Ethiopia, Nekemete have different characteristics (cultural, religious, socio-demographic characteristics, sexual behavior and beliefs, contraception usage and preference). Therefore, risk factors for ectopic pregnancy may differ from place to place.

Thus, women with single marital status were 10.81 (95% CI AOR (3.60, 32.47)) times higher risk to developed ectopic pregnancy than married ones. This may be because single women are prone for having multiple sexual partners^[23,24], PID, STI and likely to use contraceptive like emergency pills that are likely to increase the risk of ectopic pregnancy than those married women.

To my knowledge this is the first study that tries to identify risk factor to ectopic pregnancy in the study area. Like other case control studies it has certain limitation^[25]. The first was ascertained based on the written records in clients chart. The other was difficulty of findings similar research to compare the main findings of this thesis. The last but not the least was as it is based on chart review, it was impossible to get complete record of other variables like educational status, alcohol use, cigarette smoking and so on which could have impact on the occurrence of ectopic pregnancy.

Conclusion

Although several risk factors for ectopic pregnancy are known, the only factors associated were marital status and history of contraception use. Accordingly, women with single marital status were 10.81 times (95% CI AOR (3.601, 32.465)) more likely to develop ectopic pregnancy than married ones. Those who used contraceptive were 2.27 times (95% CI, AOR (0.214, 24.02)) more likely to develop ectopic pregnancy.

Recommendation

Though it is not identified in this study, there are known risk factors for ectopic pregnancy, thus large scale study shall be conducted to identify possible determinates of ectopic pregnancy. Tracing and integrated management of sexually transmitted infection is very important so as to reduce the incidence of pelvic infection and EP. The clinicians need to record all the findings on medical charts of the patients and Patient's medical records should be kept appropriately.

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