

Ectopic Pregnancy and Seasonal Variation: A Retrospective Study from the South Western Region of Saudi Arabia

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Objective: To determine whether there is seasonal variation in the incidence of ectopic pregnancy in our community.

Design: A retrospective study.

Setting: Abha Maternity Hospital, Saudi Arabia

Subjects: One hundred and thirty patients who were treated for ectopic pregnancy during a seven-year period.

Main outcome measures: Season when the ectopic pregnancy took place.

Results: The overall incidence of ectopic pregnancy was $0.61\% \pm 0.50\%$. There was an increase in the general trend ($r=0.24$, $P=0.025$). The highest mean incidence rate was noticed during the winter season (0.87%) while the lowest mean incidence rate was during spring (0.41%). This difference was statistically significant. ($F3/80=3.495$, $P=0.019$).

Conclusion: There is a seasonal variation in the incidence rate of ectopic pregnancy with the highest mean incidence in the winter season in our environment. The findings may suggest an association between meteorological factors and ectopic pregnancy.

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The increase in the incidence of ectopic pregnancy throughout the world¹ and its contribution to maternal death^{2,3} has generated a lot of interest across the globe regarding its etiology^{1,4-6}. Numerous etiological factors have been proposed including pelvic inflammatory disease, tubal surgery, previous ectopic pregnancy, 'in-utero'

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exposure to diethylstilbestrol and use of intrauterine contraceptive devices⁴⁻⁶. However, in most cases of ectopic pregnancy, there are no known risk factors. As a result of the influence of season on ovarian activity⁷, it may be plausible to anticipate a seasonal variation in the incidence of ectopic pregnancy. To date, there are conflicting reports on the influence of season on the incidence of ectopic pregnancy⁸⁻¹⁵. There are four seasons in Abha, southwest of Saudi Arabia where the study was conducted consisting of winter, spring, summer and autumn. During the winter months, the temperature drops to about minus two degrees Celsius with ice patches in the mountainous areas. This study was therefore conducted to determine whether there is seasonal variation in the incidence of ectopic pregnancy in our community.

METHODS

A retrospective study was conducted on pregnancies managed at Abha Maternity Hospital, Saudi Arabia over a seven-year period from June 1992 to May 1999. During this period, 21,564 pregnancies were recorded out of which 130 patients were treated for ectopic pregnancies. The overall and annual incidence of ectopic pregnancy was calculated. The mean incidence of ectopic pregnancy according to season (summer, autumn, winter, spring) was also calculated. Statistical analysis was performed using the correlation coefficient of incidence over time and the one-way ANOVA test. A 5% level was chosen as the level of significance.

RESULTS

The mean and standard deviation of incidence of ectopic pregnancy according to the calendar year is shown in Table 1. There was a significant increasing general trend ($r=0.24$, $P=0.025$) while the mean incidence during the year 1997 and 1999 was significantly higher than that during 1993 ($F_{7/76}=2.3200$, $P=0.034$). Table 2 shows the mean and standard deviation of the incidence of ectopic pregnancy according to season. The highest mean incidence was noticed during the winter season (0.87%) while the lowest was in spring (0.41%). This difference was statistically significant ($F_{3/80}=3.495$, $P=0.019$).

Table 1. Mean and standard deviation of the incidence of ectopic pregnancy according to the calendar year (June 1992- May 1999)

Calendar year	Mean	Standard Deviation
June 92- December 92	0.64	0.24
January 93- December 93	0.38	0.34
January 94- December 94	0.55	0.42
January 95-December 95	0.50	0.43
January 96- December 96	0.42	0.20
January 97- December 97	0.96	0.67
January 98- December 98	0.70	0.69
January 99- May 99	0.97	0.40
F-value	2.320	
P-value	0.034	

Table 2. Mean and Standard deviation of the incidence of ectopic pregnancy according to season

Season	Mean	Standard deviation
Summer	0.62	0.41
Autumn	0.54	0.33
Winter	0.87	0.71
Spring	0.41	0.36
F-value	3.495	
P value	0.019	

DISCUSSION

The total pregnancy reported in this study related only to those patients who presented themselves at Abha Maternity Hospital either for delivery, or pregnancy complications; for example: miscarriage or ectopic pregnancy. Our environment is a mountainous area at an altitude of about 7000 ft above sea level and on these two precepts, we have based our discussions. Previous studies have shown conflicting reports about the seasonality in the incidence of ectopic pregnancy^{8-10,12-15} probably as a result of the methodology of their study and the unique nature of their environment. Some studies for example failed to relate the ratio of the ectopic pregnancies to the exact time of conception^{8-11,13} while in others, the number of ectopic pregnancies was related to the number of deliveries^{10,13}.

Lastly, absolute values of ectopic pregnancies were considered in some studies without reference to the total number of pregnancies¹¹. In our study, we have related the number of ectopic pregnancies to the total number of pregnancies in the hospital during the study period. The time of conception was based on the date of the last menstrual period. The accuracy of the time of conception is limited in the sense that some patients are not sure of the date of their last menstrual period while in others, there was lactational amenorrhea. However, we found in our study a statistically significant peak in the incidence of ectopic pregnancy during the winter season only and a trough during spring.

Some authors (Goldenberg et al)¹² demonstrated that the peak incidence of ectopic pregnancy occurs in the winter and spring which was explained by the peak of conception between winter and spring¹⁶⁻¹⁷ as a result of the seasonal variation in sperm quality¹⁸. At the same time, conception has been shown to vary according to the photoperiod and temperature^{7,19} and this is thought to be different at different altitudes. One may expect seasonal variation in the incidence of ectopic pregnancy to be different depending on the geographical location of the study. This may explain why the incidence of ectopic pregnancy peaked during only one season (winter) in our environment which is mountainous and at high altitude. The total number of pregnancies in this study were those registered in our hospital. Also, the date of conception is only an approximation because of the reasons mentioned earlier. These, together with the fact that the study was retrospective makes it difficult to draw definite conclusions. However, our study has supported the view that there is variation in the incidence of ectopic pregnancy with reference to season. A further study is needed to evaluate the effect of environment on the rate of ectopic pregnancy and validate our findings.

CONCLUSION

There was a seasonal variation in the incidence of ectopic pregnancy with highest mean incidence in the winter season in our environment.

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