

## Research article

# The Rate of Ectopic Pregnancy Among Adolescent Girls at Tu Du Hospital in 2022

Nguyen Hong Ngoc Duyen<sup>1,\*</sup>, Viet Thi Minh Trang<sup>2</sup>, Vu Thi Kim Chi<sup>3</sup>, Nong Thi Nuong<sup>4</sup>, Vo Thi Thanh Hoa<sup>4</sup>, Nguyen Thi Hien<sup>4</sup>, Hien Nguyen<sup>5</sup>, Thach Nguyen<sup>1,5</sup>

<sup>1</sup> Tan Tao University, School of Medicine, Long An, Vietnam

<sup>2</sup> Hung Vuong Hospital, Ho Chi Minh City, Vietnam

<sup>3</sup> Head of Department of Obstetrics and Gynecology of Tan Tao University of Medicine, Long An, Vietnam

<sup>4</sup> Tu Du Hospital, Ho Chi Minh City, Vietnam

<sup>5</sup> Cardiovascular Research Department, Methodist Hospital, Merrillville, IN, USA

\*Corresponding author:

**Nguyen Hong Ngoc Duyen**

Tan Tao University, School of Medicine, Long An, Vietnam

Email: nguyenhongngocduyen@gmail.com

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## ABSTRACT

**Objective:** To assess the percentage of ectopic pregnancy (EP) among adolescent girls at Tu Du Hospital in 2022 in Vietnam.

**Method:** A retrospective cross-sectional study based on medical records of 59 cases at Tu Du Hospital in 2022 with a structured questionnaire and analyzed data using Excel and SPSS 18.0. We recorded data related to the rate of EP in adolescent patients at Tu Du Hospital in 2022, including demographic characteristics, medical history, initial assessment at the time of admission, clinical and para-clinical symptoms, treatment, and hospital stay.

**Result:** The rate of EP in adolescent girls was 1.31% (late adolescent accounted for 91.5%). The group of workers had the highest rate (30.5%), followed by students (25.4%). Most of the patients admitted to hospital with abdominal pain (42.4%). The proportion of para-uterine mass on vaginal examination and ruptured EP were 62.7% and 23.7%, respectively. There was 1 case of shock at the time of admission (1.7%).

**Conclusion:** This study will provide an overview of love, the sex of adolescence, and accompanying consequences. It is necessary to strengthen communication and health education on safe sex and sexually transmitted diseases, as well as enhance the role of parents towards adolescent girls.

**KEYWORDS** Adolescent, ectopic pregnancy.

## INTRODUCTION

World Health Organization (WHO) defines adolescence as the age range from 10 - 19 years old, including early adolescents (10 - 13 years old), middle adolescents (14 - 16 years old) and late adolescents (17 - 19 years old). This is the transition period from children to adults, marked by the first menstruation in girls and ejaculation in boys of puberty. At this age, teenagers tend to explore gender, love, and sex, in which unsafe sex often leads to many unfortunate consequences, such as unplanned pregnancy and especially ectopic pregnancy. WHO (2012) [1], the pregnancy rate among adolescent girls was 11%, and UNICEF (2022) reported a recent

increase in data (14%) [2].

With these reports, the number of EPs in adolescent girls will be quite high when the frequency of EP is about 1/80 of natural pregnancies. An EP is when a fertilized egg implants outside of the uterus, in which the most common site is the fallopian tube (95%). It will be dangerous because the embryo mass can rupture, causing hemorrhagic shock and even death. The rate of EP among adolescent girls varies between countries. Research in the United States (2006 and 2013) showed an increase from 11% to 13.7 [3], while the figure was significantly lower in China (2022) (0.72 - 1.93%) [4] or estimated percentage was 5.85% in Nigeria (2002 -

2012) [5].

In general, the EP has a serious impact on health, spirit, and treatment costs, especially on fertility in the future. In addition, lack of knowledge about safe sex and prevention of sexually transmitted diseases also contributes to increasing the risk factors of EP. Many types of research on EP have been done in Vietnam over the years by years, but there are not many studies on this topic in adolescent girls. That is the reason why we conducted this survey at Tu Du Hospital.

**METHOD**

This retrospective cross-sectional description trial enrolled all cases of EP in adolescent girls admitted to Tu Du Hospital in Vietnam between January 2022 and December 2022. This investigation was conducted over a period spanning from 23<sup>rd</sup> March to 30<sup>th</sup> July 2023 at Tu Du Hospital. Ethical clearance was granted by Tan Tao University in Long An (approval number: 13/QĐ-DHTT.23) and the Ethics Committees for Medical and Biological Research of Tu Du Hospital (approval number: 586/QĐ-BVTD on March 23).

The study’s criteria for participant inclusion encompassed adolescent girls diagnosed with EP at the Department of Endoscopy and Department of Emergency of Tu Du Hospital from 1<sup>st</sup> January to 31<sup>st</sup> December 2022 and full information in the medical record. Exclusion criteria included patients does not meet the criteria for diagnosis of EP. All collected information was written down on a structured survey questionnaire.

Our study does not have any interventions on the participants. The information obtained was completely based on medical records and was kept secret for this survey. The study involved a total of 59 EPs who satisfied the selection criteria. We collected data through the following three steps. In step 1 (screening subjects), we listed all cases of EP admitted to the Department of Emergency and Department of Endoscopy of Tu Du Hospital in 2022, and we selected the cases that met the criteria (patients under 20 years old diagnosed EP). After that, we found medical records of all selected adolescent females in the records storage room through the patient code and their names. In step 2 (collecting information), we noted all necessary information from the medical records of each patient in the questionnaire. We conducted data analysis based on the obtained information in step 3.

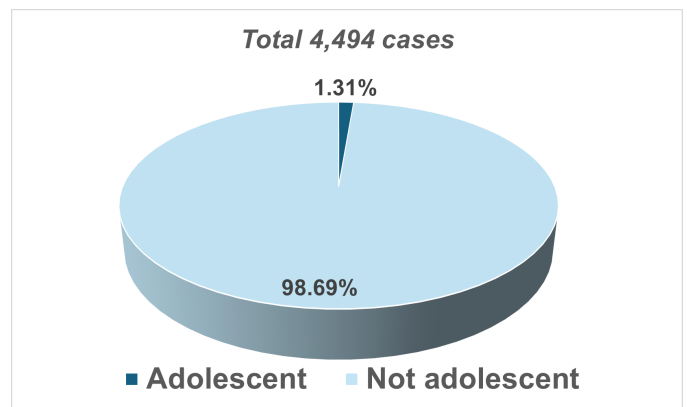


**FIGURE 1. Procedure diagram.**

Collected data were coded, imported, and analyzed by using Excel and SPSS 18.0. Quantitative variables were expressed as mean ± standard deviation, minimum, and max. Qualitative variables were reported as frequencies and percentages. Confidence interval 95, *p*-value < 0.05, was regarded as statistically significant. The results will be presented in tables and diagrams.

**RESULT**

From 1<sup>st</sup> January to 31<sup>st</sup> December 2022, a total of 4,494 cases of EP were recorded (59 adolescent patients) at the Department of Emergency and Department of Endoscopy. The rate of EP in adolescent girls was 1.31% (late adolescent and middle adolescent accounted for 91.5% and 8.5%, respectively). The group of workers had the highest rate (30.5%), followed by students (25.4%). The age of first menarche was 13.07 ± 1.127 (10 - 15). The rate of history of abortion and miscarriage was 22%. Most of the patients admitted to hospital with abdominal pain (42.4%). The proportion of para-uterine mass on vaginal examination and ruptured EP were 62.7% and 23.7%, respectively. Patients who needed surgical intervention were 42.4%, in which the rate of blood loss < 200ml was estimated at 60%. There was 1 case of shock at the time of admission (1.7%).



**FIGURE 2. Ratio of ectopic pregnancy in adolescent girls.**

*The total ectopic pregnancies in 2022 at Tu Du Hospital were 4,494 cases, of which 59 adolescent patients (1.31%) and 4,435 cases were not adolescent group.*

The highest rate of EP was in late adolescents (91.5%), followed by the middle group (8.5%), and no cases were reported in the early group. The majority of patients were outside Ho Chi Minh City (84.7%) and Kinh ethnic (93.2%). Workers and pupils/students accounted for 30.5% and 25.4%, respectively. Most of the patients were single (74.6%), and the mean age at marriage was 17.27 ± 1.22 (15 - 19).

Three adolescents gave birth (5.1%), and the abortion rate at least once or more than twice was 20.3% and 1.7%, respectively. We recorded 1 case of EP with gynecological history (1.7%) caused by vaginitis and no previous medical or surgical history.

Abdominal pain was the major reason for admission (42.2%) and one patient (1.7%) with shock. Patients with delayed menstruation for 2 - 3 weeks accounted for 23.7%, and gestational age at admission was about 5 - 6 weeks (66.1%). More than half of patients (57.6%) were admitted 48 hours after the first symptom occurred.

The percentage of normal BMI among 59 female adolescents was 62.7%. Vaginal bleeding via speculum insertion was quite high (61%). The uterine size was normal in the

**TABLE 1. Described demographic characteristics (N = 59).**

Characteristics	Number (N)	Rate (%)
<b>Age group</b>		
- Early adolescent (10 - 13 years old)	0	0
- Middle adolescent (14 - 16 years old)	5	8.5
- Late adolescent (17 - 19 years old)	54	91.5
<b>Residence</b>		
- HCM City	9	15.3
- Other provinces	50	84.7
<b>Ethnic</b>		
- Kinh	55	93.2
- Others	4	6.8
<b>Occupation</b>		
- Worker	18	30.5
- Housewife	17	28.8
- Pupils - students	15	25.4
- Trading	4	6.8
- Others	5	8.5
<b>Marital status</b>		
- Single	44	74.6
- Married	15	25.4
<b>Age of marriage</b>	17.27 ± 1.22 (15 – 19)	
<b>Age of menstruation</b>	13.07 ± 1.127 (10 – 15)	

**TABLE 2. Describe personal history (N = 59).**

History	Number (N)	Rate (%)
<b>Obstetrical history (PARA)</b>		
<i>Birth at term</i>		
- None	56	94.9
- Once	3	5.1
<i>Preterm birth</i>		
- None	59	100
- Once	0	0
<i>Miscarriage, abortion</i>		
- None	46	78
- Once	12	20.3
- ≥ twice	1	1.7
<i>Children still alive</i>		
- None	56	94.9
- 1 child	3	5.1
<b>Gynecological history</b>		
- Yes	1	1.7
- No	58	98.3
<b>Medical and surgical history</b>		
- Yes	0	0
- No	59	100

majority of cases (71.2%), and nearly 2/3 (62.7%) had para-uterine mass. Besides, we noted 35.6% of patients with pouch pain and 10.2% of them with abdominal wall response.

One patient had anemia, while almost all routine tests were in the normal range.

Endometrial thickness (< 8 mm) accounted for 54.2%. More than half (54.2%) of para-uterine mass was < 3 cm. Although embryo and heartbeat were not detected in this survey, the rate of fetal mass rupture was 23.7%. In addition, the rate of abdominal fluid and pouch of Douglas fluid was 30.5% and 45.7%, respectively.

**TABLE 3. Characteristics at initial assessment (N = 59).**

Characteristics	Number (N)	Rate (%)
<b>Reason for hospitalization</b>		
- Late period	19	32.2
- Abdominal pain	25	42.4
- Bleeding	15	25.4
<b>Number of clinical signs</b>		
- 1	20	33.9
- 2	29	49.2
- 3	10	16.9
<b>Late period for</b>		
- < 2 weeks	1	1.7
- 2 - 3 weeks	14	23.7
- > 3 weeks	4	6.8
- Forget	40	67.8
<b>Gestational age</b>		
- 3 - 4 weeks	12	24.5
- 5 - 6 weeks	39	66.1
- > 6 weeks	8	9.4
<b>Vital signs</b>		
- Shock	1	1.7
- Without shock	58	98.3
<b>Time from symptom to admission</b>		
- < 24 hours	20	33.9
- 24 - 48 hours	5	8.5
- ≥ 48 hours	34	57.6

**TABLE 4. Clinical characteristics (N = 59).**

Characteristics	Number (N)	Rate (%)
<b>BMI</b>		
- < 18.5	16	27.1
- 18.5 - 24.9	37	62.7
- ≥ 25	6	10.2
<b>Bleeding (speculum)</b>		
- Yes	36	61
- No	23	39
<b>Cervical observation</b>		
- Close	58	98.3
- Open	1	1.7
<b>Size of uterus</b>		
- Larger than normal	16	27.1
- Normal	42	71.2
- Unidentified	1	1.7
<b>Para-uterine mass (bimanual exam)</b>		
- Yes	37	62.7
- No	22	37.3
<b>Pouch pain</b>		
- Yes	21	35.6
- No	38	64.4
<b>Abdominal wall response</b>		
- Yes	6	10.2
- No	53	89.8

All patients were tested  $\beta$ -hCG at admission. The second and third  $\beta$ -hCG quantification rate was 37.3% and 13.5%, respectively.  $\beta$ -hCG concentration ranged from 1,000 to 3,000 mUI/mL in 37.3% of patients.

The study showed that 13 adolescent patients (22%) were naturally monitored, and 21 others (35.6%) received an intramuscular injection of Methotrexate. Most patients (88%) underwent laparoscopic salpingectomy in 25 cases of surgical treatment. We noted that the EP mass was in the fallopian tube in most cases (96%), of which the most common lo-

**TABLE 5. Tests performed (N = 59).**

Para-clinical tests	Number (N)	Rate (%)
<b>Full blood count</b>		
- Anemia	1	1.7
- Without anemia	58	98.3
<b>Blood groups</b>		
- O	21	35.6
- A	20	33.9
- B	12	20.3
- AB	6	10.2
<b>Rhesus</b>		
- Negative (-)	0	0
- Positive (+)	59	100
<b>Blood clotting disorder</b>		
- Yes	0	0
- No	59	100
<b>Glucose; liver - renal function; urine test</b>		
- Abnormal	0	0
- Normal	59	100

**TABLE 6. Result of ultrasound (N = 59).**

Ultrasound	Number (N)	Rate (%)
<b>Endometrium</b>		
- Thin (< 8mm)	32	54.2
- Thick (≥ 8mm)	27	45.8
<b>Size of para-uterine mass</b>		
- < 3 cm	32	54.2
- 3 - 5 cm	22	37.3
- > 5 cm	5	8.5
<b>Embryo and heartbeat</b>		
- Embryo, heartbeat (+)	0	0
- Not embryo	59	100
<b>Embryo mass</b>		
- Not ruptured	45	76.3
- Ruptured	14	23.7
<b>Abdominal fluid</b>		
- Yes	18	30.5
- No	41	69.5
<b>Pouch of Douglas fluid</b>		
- Yes	27	45.7
- No	32	54.3

**TABLE 7. Beta-hCG surveillance (N = 59).**

Beta-hCG	Number (N)	Rate (%)
<b>β-hCG quantification</b>		
- At admission	59	100
- After 48 hours	23	46.9
<b>Number of β-hCG tests</b>		
- Once	59	100
- Twice	22	37.3
- Thrice	8	13.5
<b>First β-hCG result</b>		
- < 1,000 mUI/mL	19	32.2
- 1,000 - 3,000 mUI/mL	22	37.3
- > 3,000 mUI/mL	18	30.5

cation was ampullar. Blood loss of more than 1,000 ml and the need for blood transfusion occurred in only one patient. Pathological results showed that most cases (95.8%) had chorionic villus.

Among 59 adolescent patients, 22 were hospitalized in the

**TABLE 8. Expectant management and results.**

(\* 3 patients required laparoscopy because of MTX failure;\*\* 1 case without pathology)

Treatments	Number (N)	Rate (%)
<b>Treatments (N = 59)</b>		
- Natural surveillance	13	22
- Methotrexate (IM)	21	35.5
- Laparoscopy*	25	42.4
<b>Laparoscopy (N = 25)</b>		
- Preservation	3	12
- Salpingectomy	22	88
<b>Site of embryo mass</b>		
- Interstitial	3	12
- Isthmic	3	12
- Ampullar	17	68
- Fimbrial	1	4
- Others	1	4
<b>Blood loss</b>		
- < 200 ml	15	60
- 200 - < 500 ml	6	24
- 500 - < 1,000 ml	3	12
- ≥ 1,000 ml	1	4
<b>Pathology** (N = 24)</b>		
- Chorionic villus	23	95.8
- None	1	4.2

**TABLE 9. Treatment process (N = 59).**

Treatment process	Number (N)	Rate (%)
<b>Departments of first admission</b>		
- Emergency	22	37
- Endoscopy	37	63
<b>Complication</b>		
- Yes	0	0
- No	59	100
<b>Time in hospital</b>		
	3.95 ± 1.43 (2 - 10)	

Department of Emergency (37%), and 37 other cases were in the Department of Endoscopy at first admission (63%). No complications were recorded during the treatment process. The average hospital stay was about 4 days.

## DISCUSSION

Ectopic pregnancy is a common obstetric emergency, and EP rupture threatens the patient's life. In our study, the rate of EP among adolescent girls at Tu Du Hospital (2022) was 1.31%. This is quite similar to the result of Nimonkar S et al. (2020) [6] conducted in women under 20 years old (1.6%) but lower than the study by Nguyen Thi Hong et al. (2022) [7] (4.8%) and Huynh Trinh Thuc et al. (2019) [8] (8.05%). Differences in the region and living context may affect survey results. Differences in the region and living context may affect survey results. This confirms the rising EP in our environment and the world over.

Our study showed that the average age of patients was 18.25 ± 1.01 (15 – 19 years old) in the late adolescent group. Nguyen Thi Lan Phuong et al. (2014) [9] reported the lowest age was 16. We recorded the highest rate of forced labor among female adolescents as workers (30.5%), followed by pupils/ students (25.4%). Compared to Nguyen Thi Lan

Puong *et al.* (2014) [9] conducted a general study on EP, workers accounted for 45.98%. We should pay attention to pupil or student groups because we can support them through health education programs.

Abdominal pain, late period, and vaginal bleeding are three common symptoms of EP. Accordingly, we noted that patients had 1 sign (33.9%), 2 signs (49.2%) or 3 signs (16.9%) at admission. Compared to the survey of Nong Thi Hong Le *et al.* (2021) [10], the rate was 13.82%, 52.12%, and 44.68%, respectively. In both studies, patients with 2 symptoms at the time of first clinical examination are the most common. Missing period was about 1/3 cases (32.2%) in this study. Our data is higher than the result of Nong Thi Hong Le *et al.* (2021) [10] (13.82%), but much lower than reports of Pham Ngoc Anh *et al.* (2022) (28,8%) [11] and Huynh Trinh Thuc *et al.* (2019) (84,21%) [8], Nguyen Van Sang *et al.* (2021) [12] (77%). The missing period depends largely on the subjective feelings of patients because they often forget or do not care about their periods, especially young women in the early stage of menstruation, whose cycles are often irregular, so they are easy to forget.

Besides taking medical history, we also recorded clinical symptoms. The percentage of patients with the para-uterine mass on clinical examination in our survey was 62.7%. Our result is higher than the study of Nguyen Van Sang *et al.* (2021) [12] (41%) but much lower than that of authors Vu Van Du *et al.* (2022) [13] (93.1%) and Huynh Trinh Thuc *et al.* (2019) [8] (95.4%). We also found 35.6% of adolescents with pouch pain on clinical examination. Compared to author Huynh Trinh Thuc *et al.* (2019) [8], our rate is higher (9.2%) but lower than the studies of Nguyen Van Sang *et al.* (2021) [12] (50.8%) and Vu Van Du *et al.* (2022) [13] (71.6%). The proportion of patients with abdominal wall response in our survey was 10.2%. This figure is higher than that of Vu Van Du *et al.* (2022) [13] (7.3%) but lower than that of Nguyen Van Sang *et al.* (2021) [12] (31.1%). Differences in the rates of symptoms detected on clinical examination between authors may depend on gestational age, time of admission, ruptured fetal mass requiring urgent management, or partly due to the examiner's subjectivity and the patient's pain threshold.

There was one patient of shock due to rupture of the EP mass (1.7%) among 59 cases at the admission. Our figure is lower than reports of domestic studies such as Nguyen Van Sang *et al.* (2021) [12] (11.5%), Vu Van Du *et al.* (2022) [13] (6%) while foreign author Ranji G.G *et al.* (2018) [14] or Nimonkar S *et al.* (2020) [6] showed the percentage of shock was 11.8% and 4.4%, respectively. These differences may be derived from the subjects who participated in the research or the sample size.

The first para-clinical test in diagnosing EP is  $\beta$ -hCG measurement. In this survey,  $\beta$ -hCG < 1,000 mUI/mL at first quantification was 32.2%. Our result is higher than that of Nguyen Van Sang *et al.* (2021) [12] (27.9%) but much lower than the research of Vu Van Du *et al.* (2022) [13] (52.2%) or Huynh Trinh Thuc *et al.* (2019) [8] (74.41%). First, it helps

make decisions for treatment at admission, and the threshold < 1,000 mUI/mL directly affects the success of single-dose MTX (50mg/mm<sup>2</sup>) [15].

Ultrasound is an imaging method that supports the diagnosis of EP.  $\beta$ -hCG We noted that the rate of EP rupture was 23.7%, higher than that of Nguyen Van Sang *et al.* (2021) [12] (13.1%) but much lower than the report of Dao Nguyen Hung *et al.* (2022) [16] (85.23%). Perhaps we only assess adolescent girls with a small sample size, so this would make some difference. In this study, the percentage of pouches of Douglas fluid by ultrasound was 45.7%. This rate was lower than that of Nong Thi Hong Le *et al.* (2021) [10] (69%), Nguyen Van Sang *et al.* (2021) [12] (73.8%), Vu Van Du *et al.* (2022) [13] (79.3%). Meanwhile, the patients with abdominal fluid were 30.5%, lower than the result of Huynh Trinh Thuc *et al.* (2019) [8] (31.03%) and Nguyen Van Sang *et al.* (2021) [12] (60.6%).

In clinical practice, there are three main ways to treat EP: assessment of natural regression of EP, medical treatment (intramuscular Methotrexate), and surgery (laparoscopy). There were 22 cases (88%) undergoing salpingectomy, which did not seem to be different from the result of Nong Thi Hong Le *et al.* (2021) [10] (87.23%). most fetuses implanted at the ampullary segment (68%). Our figure is lower than that of Nong Thi Hong Le *et al.* (2021) [10] (72.34%). However, the total number of cases of EP in the fallopian tube in this study was 96%, almost similar to the literature.

During surgery, we noted that blood loss < 200ml occurred in most cases (60%). Only one case had a loss of blood > 1,000ml (4%) with signs of shock (tachycardia, low blood pressure) due to rupture of EP mass. She underwent laparoscopic surgery and a blood transfusion. There might be complications after medical or surgery treatment, however, in our study there were no adverse events. Nong Thi Hong Le *et al.* (2021) [10] showed that there was one case of hematoma at trocar insertion (1.06%).

Duration for treatment was  $3.95 \pm 1.43$  days (2 – 10 days) in our study. Compared to a report of Dao Nguyen Hung *et al.* (2022) [16], nearly half of the cases (46.85%) were hospitalized for < 4 days. No complications during treatment contribute to shortened hospital stay.

#### LIMITATION

- 1) Retrospective design and collecting information through available medical records are limitations in this study. If this were a prospective study, we could interview the patients directly to analyze more information and related factors.
- 2) Sample size is small, so it is not highly representative.
- 3) Loss of follow-up in natural monitoring or medical treatment cases because patients did not return to the hospital for examination and  $\beta$ -hCG test.

#### CONCLUSION

In this study, there were 59 patients, the outcome rate of EP in adolescent girls was 1.31%. Late adolescents accounted



for 91.5%, middle adolescents accounted for 8.5%, and no cases were reported in the early group. Of that proportion, worker occupation accounted for 30.5%, age of menstruation was  $13.07 \pm 1.127$  (10 – 15), most of the patients were single (74.6%) with a mean age at marriage was  $17.27 \pm 1.22$  (15 – 19), the rate of history of abortion and miscarriage was 22%, abdominal pain was the major reason for admission (42.4%), nearly 62.7% patients had para-uterine mass, vaginal bleeding via speculum insertion was 61%, about 23.7% EP mass was ruptured, the EP mass was in the Fallopian tube in most cases (96%), about 42.4% patients need Laparoscopy and the blood loss more than 1,000ml after surgical treatment in only one patient (4%).

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### CONFLICTS OF INTEREST

None of the authors have conflicts of interest to declare.

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