# ANALYSIS OF THE STRUCTURE OF HOSPITALIZATION FOR GYNECOLOGICAL DISEASE IN ALMATY CITY

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### Abstract

**Introduction**. Preserving and promoting women's health is a priority issue for health care leaders. As a woman ages, the prevalence of gynecological and somatic diseases increases. The gynecologic care delivery model revealed age-related differences in women's use of gynecologic care across different care settings.

**The aim** is to study the structure of the reasons for hospitalization of women with gynecological pathologies in hospitals in Almaty.

**Materials and methods.** We analyzed hospitalized cases associated with gynecological diseases in Almaty city from 2013 to 2023. Data were taken from the National Scientific Center for Health Development. In addition, statistical analysis was performed using the SPSS 13.0 program. To obtain more reliable results, statistical analysis was performed based on the monthly totals of each final variable. Linear regression was used to estimate the trajectories of the resulting variables over time. This analysis was used to estimate the change in the number of diseases compared to the change over time, by 5 years. Values of p less than 0.05 are considered statistically significant.

**Results.** The top of hospitalized cases with gynecological disease included uterine leiomyoma (D25) and female infertility (N97). Moreover, an increase in hospitalization is observed in female genital prolapse (N81) from 4.7% to 11.9%; benign ovarian neoplasm from 3.4% to 6.4% (D27). Forecast for the next five year shows that among women aged 18-39, uterine leiomyoma is likely to increase. Female infertility is expected to growth among young women, as well as an increase in female genital prolapse and benign ovarian tumors in all groups.

**Conclusion**: Globally the prevalence of gynecological pathologies is increasing over time, particularly in young reproductive women. Primary health care in Kazakhstan needs to strengthen efforts to prevent gynecological diseases and their risk factors throughout increasing of the health literacy among females as well as implementing young specific programs.

*Keywords: gynecology, women's health, medical care.*

**Абстракт**

# АНАЛИЗ СТРУКТУРЫ ГОСПИТАЛИЗАЦИИ ПО ПОВОДУ ГИНЕКОЛОГИЧЕСКОЙ ПАТОЛОГИИ В СТАЦИОНАРАХ ГОРОДА АЛМАТЫ

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**Введение**. Сохранение и укрепление здоровья женщин является приоритетной задачей для руководителей здравоохранения. С возрастом женщины увеличивается распространенность гинекологических и соматических заболеваний. Модель оказания гинекологической помощи выявила возрастные различия в использовании женщинами гинекологической помощи в различных медицинских учреждениях.

**Целью исследования** является изучение структуры причин госпитализации женщин с гинекологической патологией в стационары г. Алматы.

**Материалы и методы.** Мы проанализировали госпитализированные случаи, связанные с гинекологическими заболеваниями, в городе Алматы с 2013 по 2023 год. Данные были взяты из Национального научного центра развития здравоохранения. Кроме того, статистический анализ был проведен с использованием программы SPSS 13.0. Для получения более надежных результатов был проведен статистический анализ на основе ежемесячных итоговых значений каждой конечной переменной. Линейная регрессия использовалась для оценки траекторий результирующих переменных с течением времени. Этот анализ был использован для оценки изменения числа заболеваний по сравнению с изменением во времени на 5 лет. Значения p менее 0,05 считаются статистически значимыми.

**Результаты.** В топ госпитализированных случаев с гинекологическими заболеваниями входили лейомиома матки (D25) и женское бесплодие (N97). Кроме того, наблюдается увеличение числа госпитализаций при выпадении женских половых органов (N81) с 4,7% до 11,9%; доброкачественном новообразовании яичников с 3,4% до 6,4% (D27). Прогноз на следующие пять лет показывает, что среди женщин в возрасте 18-39 лет лейомиома матки, вероятно, увеличится. Ожидается рост женского бесплодия среди молодых женщин, а также увеличение выпадения женских половых органов и доброкачественных опухолей яичников во всех группах.

**Вывод.** Во всем мире распространенность гинекологических патологий со временем растет, особенно среди молодых женщин репродуктивного возраста. Первичной медико-санитарной помощи в Казахстане необходимо активизировать усилия по профилактике гинекологических заболеваний и связанных с ними факторов риска посредством повышения медицинской грамотности среди женщин, а также реализации программ, ориентированных на молодежь.

*Ключевые слова: гинекология, женское здоровье, медицинская помощь.*

**Түйіндеме**

## АЛМАТЫ ҚАЛАСЫНЫҢ СТАЦИОНАРЛАРЫНДА ГИНЕКОЛОГИЯЛЫҚ ПАТОЛОГИЯҒА БАЙЛАНЫСТЫ ЕМДЕУГЕ ЖАТҚЫЗУ ҚҰРЫЛЫМЫН ТАЛДАУ

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**Кіріспе**. Әйелдердің денсаулығын сақтау және нығайту денсаулық сақтау басшылары үшін басымдық болып табылады. Әйелдерде жасы ұлғайған сайын гинекологиялық және соматикалық аурулардың таралуы артады. Гинекологиялық көмек моделі әйелдердің әртүрлі медициналық мекемелерде гинекологиялық көмек көрсетудегі жас айырмашылықтарын анықтады.

**Зерттеудің мақсаты** гинекологиялық патологиясы бар әйелдерді Алматы қаласындағы стационарларға жатқызу себептерінің құрылымын зерделеу болып табылады.

**Материалдар мен әдістер.** 2013 жылдан 2023 жылға дейін Алматы қаласында гинекологиялық ауруларға байланысты ауруханаға жатқызылған жағдайлар талданды. Деректер денсаулық сақтауды дамытудың Ұлттық ғылыми орталығынан алынды. Сонымен қатар, статистикалық талдау SPSS 13.0 бағдарламасының көмегімен жүргізілді. Неғұрлым сенімді нәтижелерге қол жеткізу үшін әрбір соңғы айнымалының ай сайынғы қорытынды мәндері негізінде статистикалық талдау жүргізілді. Уақыт өте келе алынған айнымалылардың траекториясын бағалау үшін сызықтық регрессия қолданылды.  Бұл талдау 5 жылдық уақыт өзгерісімен салыстырғанда аурулар санының өзгеруін бағалау үшін пайдаланылды. 0,05-тен төмен p мәндері статистикалық маңызды болып саналады.

**Нәтижелер.** Гинекологиялық аурулармен ауруханаға жатқызылған жағдайлардың қатарына жатырдың лейомиомасы (D25) және әйелдердің бедеулігі (N97)кірді. Сонымен қатар, әйел жыныс мүшелерінің пролапсы (N81) кезінде ауруханаға жатқызу санының 4,7% - дан 11,9% - ға дейін өсуі байқалады; аналық бездердің қатерсіз ісігі 3,4% - дан 6,4% - ға дейін (D27). Алдағы бес жылға арналған болжам 18-39 жас аралығындағы әйелдер арасында жатыр лейомиомасының жоғарылауы мүмкін екенін көрсетеді. Жас әйелдер арасында әйелдер бедеулігінің өсуі, сондай-ақ барлық топтарда әйел жыныс мүшелерінің пролапсы мен аналық бездің қатерсіз ісіктерінің жоғарылауы күтілуде.

**Қорытынды.** Бүкіл әлемде уақыт өте келе гинекологиялық патологиялардың таралуы, әсіресе репродуктивті жастағы жас әйелдер арасында артып келеді. Қазақстанда алғашқы медициналық-санитарлық көмек әйелдер арасында медициналық сауаттылықты арттыру, сондай-ақ жастарға бағытталған бағдарламаларды іске асыру арқылы гинекологиялық аурулардың және соған байланысты қауіп факторларының алдын алу бойынша күш-жігерді жандандыру қажет.

*Түйінді сөздер: гинекология, әйелдер денсаулығы, медициналық көмек.*

**Introduction**

Preserving and promoting women's health is a priority issue for health care leaders, particularly in countries where there is an increase in gynecological morbidity and maternal mortality. Advances in the field of medical science have made it possible to improve diagnosis and provide timely medical care, including to women with gynecological diseases. However, researchers have noted an increase in some gynecological diseases in women around the world, particularly those associated with leiomyoma or uterine fibroids, infertility in women and others [6,18,26]. Therefore, there is a need for an in-depth study of the causes of diseases associated with these diseases. For example, The World Health Organization seeks to promote and support the adoption of effective policies and interventions to combat endometriosis worldwide, to this end it collaborates with numerous stakeholders, including academic institutions, non-governmental actors, and other organizations that are actively involved in research to identify effective models of prevention, diagnosis, treatment, and care for endometriosis [27]. Gynecological diseases, as pelvic inflammatory disease, lower genital tract infections, including sexually transmitted diseases, and menstrual disorders are a common cause of hospitalization in women [13,25]. Severe complications from gynecological emergencies can be life-threatening, affect fertility, or cause residual impairment.

The International Guidelines for the evaluation or treatment of gynecological disorders provide clinicians with clear recommendations for clinical practice based on the best available evidence, interdisciplinary expert opinion [17,24,29]. The gynecologic care delivery model revealed age-related differences in women's use of gynecologic care across different care settings [5]. Due to gynecological diseases are common among women, it is important for primary care physicians to pay attention to diseases that are frequently encountered depending on the age of women to ensure that care, including prevention, is provided in a timely manner.

In the Republic of Kazakhstan, the priority area is maternal and child health, within which the equipment of medical organizations has been re-equipped and quality indicators have been included, including indicators of women's health [7,16]. Screening programs have also been introduced to identify diseases at an early stage [15]. To achieve the goal of sustainable development, as well as the implementation of the tasks envisaged within the framework of the Astana Declaration in Kazakhstan, primary health care is actively developing [1,28]. Analysis of the structure of hospitalized cases in city hospitals can help to

understand what measures need to be strengthened in primary care and hospitals.

The goal is to study the structure of the reasons for hospitalization of women with gynecological pathologies in hospitals in Almaty and analyze their future forecasts.

**Materials and methods.** Data were taken from the Almaty branch of the National Scientific Center for Health Development as well as from the Bureau of National Statistics Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. We studied the hospitalized cases associated with gynecological diseases. All hospitalized cases were collected in accordance with the ICD for gynecological disease which presented in table 1. Received information was analyzed for the period from 2013 to 2023.

Age period 18 and older and name of disease included in analysis. The number of registered women over 18 years of age in Almaty increased from 652852 to 858314 from 2013 to 2023. Also, for deeper learning in which time females affected to different types of disease we divided three age groups: 18-39, 40-64 and 65 up.

Statistical analysis was performed using the SPSS 13.0 program. To obtain more reliable results, statistical analysis was performed based on the monthly totals of each final variable. Linear regression was used to estimate the trajectories of the resulting variables over time. We used linear regression to predict variables for next five years. This analysis was used to estimate the change in the number of diseases compared to the change over time, by 5 years.

*Table 1.*

**Gynecological diseases, included in the analysis.**

| ICD - 10 | Name of nosology |
|---|---|
| N70 | Salpingitis and oophoritis |
| N71 | Inflammatory disease of uterus, except cervix |
| N72 | Inflammatory disease of cervix uteri |
| N73 | Other female pelvic inflammatory diseases |
| N75 | Diseases of Bartholin's gland |
| N76 | Other inflammation of vagina and vulva |
| N80 | Endometriosis |
| N81 | Female genital prolapse |
| N82 | Fistulae involving female genital tract |
| N83 | Noninflammatory disorders of ovary, fallopian tube and broad ligament |
| N84 | Polyp of female genital tract |
| N85 | Other noninflammatory disorders of uterus, except cervix |
| N86 | Erosion and ectropion of cervix uteri |
| N87 | Dysplasia of cervix uteri |
| N88 | Other noninflammatory disorders of cervix uteri |
| N89 | Other noninflammatory disorders of vagina |
| N90 | Other noninflammatory disorders of vulva and perineum |
| N91 | Absent, scanty and rare menstruation |
| N92 | Excessive, frequent and irregular menstruation |
| N93 | Other abnormal uterine and vaginal bleeding |
| N94 | Pain and other conditions associated with female genital organs and menstrual cycle |
| N95 | Menopausal and other perimenopausal disorders |
| N96 | Recurrent pregnancy loss |
| N97 | Female infertility |
| N98 | Complications associated with artificial fertilization |
| N99 | Intraoperative and postprocedural complications and disorders of genitourinary system, not elsewhere classified |
| D25 | Leiomyoma of uterus |
| D26 | Other benign neoplasms of uterus |
| D27 | Benign neoplasm of ovary |
| D28 | Benign neoplasm of other and unspecified female genital organs |

**Results**

Ranking of hospitalized cases with gynecological pathology in hospitals of Almaty from 2013 to 2023 showed changes in the structure of hospitalized cases (table 2). From 2013-2014, the number of hospitalizations decreased from 4996 to 4291, after which there was an increase to 9970 by 2023.

Over the given period, the first and second leading causes of hospitalization were uterine leiomyoma (D25) and female infertility (N97). From all treated cases related to gynecological pathology during the studied years, it is worth

noting that hospitalization associated with female infertility increased from 14.8% to 38.2% whereas leiomyoma decreased from 22.8% to 11.9%.

Of the top ten causes of hospitalization, an increase in hospitalization is observed in female genital prolapse (N81) from 4.7% to 11.9%; benign ovarian neoplasm from 3.4% to 6.4% (D27). While the decrease observed in following gynecological pathologies: non-inflammatory lesions of the ovary, fallopian tube and broad ligament of the uterus (N83) from 10.1% to 6.2%; salpingitis and oophoritis (N70) from 9.5% to 2.1%; female genital polyp (N84) 8.6% to 1.2%;

inflammatory diseases of the uterus, except the cervix (N71) 5.0% to 0.4%; other non-inflammatory diseases of the uterus, with the exception of the cervix (N85) from 4.1% to 2.4% (Table 1).

Hospitalized cases associated with endometriosis (N80) increased more than twice in absolute values (from 90 to 228). A similar picture appears for other benign neoplasms of the uterus (D26), where the rate increased from 1.2% to 2.3%, and other inflammatory diseases of the female pelvic organs (N73) from 1.2% to 3.0% (Table 2).

*Table 2.*

**Ranking of hospitalized cases with gynecological diseases.**

| ICD - 10 | Names of diseases | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D25 | Leiomyoma of uterus | 1141 (22,8%) | 1035 (24,1%) | 945 (20,6%) | 1467 (22,9%) | 1300 (20,0%) | 1258 (19,8%) | 1267 (21,8%) | 1312 (21,8%) | 1181 (12,7%) | 1074 (11,3%) | 1187 (11,9%) |
| N97 | Female infertility | 738 (14,8%) | 625 (14,6%) | 828 (18,0%) | 1003 (15,6%) | 1168 (18,0%) | 1238 (19,4%) | 881 (15,1%) | 1502 (25,0%) | 4386 (47,3%) | 3901 (41,1%) | 3806 (38,2%) |
| N83 | Noninflammatory disorders of ovary, fallopian tube and broad ligament | 507 (10,1%) | 395 (9,2%) | 413 (9,0%) | 518 (8,1%) | 505 (7,8%) | 516 (8,1%) | 463 (8,0%) | 389 (6,5%) | 427 (4,6%) | 459 (4,8%) | 619 (6,2%) |
| N93 | Other abnormal uterine and vaginal bleeding | 478 (9,6%) | 405 (9,4%) | 437 (9,5%) | 375 (5,9%) | 440 (6,8%) | 394 (6,2%) | 376 (6,5%) | 335 (5,6%) | 501 (5,4%) | 648 (6,8%) | 873 (8,8%) |
| N70 | Salpingitis and oophoritis | 475 (9,5%) | 402 (9,4%) | 419 (9,1%) | 434 (6,8%) | 373 (5,7%) | 277 (4,3%) | 211 (3,6%) | 134 (2,2%) | 126 (1,4%) | 183 (1,9%) | 212 (2,1%) |
| N84 | Polyp of female genital tract | 428 (8,6%) | 312 (7,3%) | 306 (6,7%) | 490 (7,6%) | 492 (7,6%) | 588 (9,2%) | 342 (5,9%) | 184 (3,1%) | 79 (,9%) | 84 (,9%) | 121 (1,2%) |
| N71 | Inflammatory disease of uterus, except cervix | 250 (5,0%) | 199 (4,6%) | 122 (2,7%) | 100 (1,6%) | 121 (1,9%) | 72 (1,1%) | 30 (,5%) | 29 (,5%) | 16 (,2%) | 28 (,3%) | 37 (,4%) |
| N81 | Female genital prolapse | 234 (4,7%) | 197 (4,6%) | 265 (5,8%) | 574 (9,0%) | 631 (9,7%) | 547 (8,6%) | 569 (9,8%) | 583 (9,7%) | 584 (6,3%) | 888 (9,4%) | 1190 (11,9%) |
| N85 | Other noninflammatory disorders of uterus, except cervix | 206 (4,1%) | 129 (3,0%) | 197 (4,3%) | 384 (6,0%) | 424 (6,5%) | 431 (6,8%) | 399 (6,9%) | 148 (2,5%) | 170 (1,8%) | 304 (3,2%) | 241 (2,4%) |
| D27 | Benign neoplasm of ovary | 171 (3,4%) | 183 (4,3%) | 199 (4,3%) | 341 (5,3%) | 377 (5,8%) | 408 (6,4%) | 523 (9,0%) | 570 (9,5%) | 619 (6,7%) | 782 (8,2%) | 638 (6,4%) |
| N80 | Endometriosis | 90 (1,8%) | 123 (2,9%) | 131 (2,9%) | 144 (2,2%) | 110 (1,7%) | 166 (2,6%) | 134 (2,3%) | 82 (1,4%) | 125 (1,3%) | 237 (2,5%) | 232 (2,3%) |
| D26 | Other benign neoplasms of uterus | 60 (1,2%) | 57 (1,3%) | 55 (1,2%) | 163 (2,5%) | 171 (2,6%) | 49 (,8%) | 109 (1,9%) | 177 (2,9%) | 153 (1,6%) | 115 (1,2%) | 228 (2,3%) |
| N73 | Other female pelvic inflammatory diseases | 61 (1,2%) | 52 (1,2%) | 107 (2,3%) | 154 (2,4%) | 101 (1,6%) | 149 (2,3%) | 217 (3,7%) | 334 (5,6%) | 653 (7,0%) | 446 (4,7%) | 296 (3,0%) |
| | Other nosologies (N92, N75, N82, N88, N94, N95, D28 N89, N90, N96, N86, N76, N99, N72, N98, N87, N91) | 157 (3,1%) | 177 (4,1%) | 167 (3,6%) | 263 (4,1%) | 278 (4,3%) | 275 (4,3%) | 295 (5,1%) | 232 (3,9%) | 260 (2,8%) | 343 (3,6%) | 290 (2,9%) |
| | Total | 4996 (100,0%) | 4291 (100,0%) | 4591 (100,0%) | 6410 (100,0%) | 6491 (100,0%) | 6368 (100,0%) | 5816 (100,0%) | 6011 (100,0%) | 9280 (100,0%) | 9492 (100,0%) | 9970 (100,0%) |

Forecast for the next five year in six nosologies made based on hospitalization data from 2013 to 2023 (figure 1). These six nosologies were among the top ten reasons for hospitalization. Among women aged 18-39, uterine leiomyoma, which decreased markedly from 2020 to 2023, is likely to increase in next years, while among the age group 40-64 years old, it will decrease from 2024 onwards compared to 2023, where its growth peak was observed.
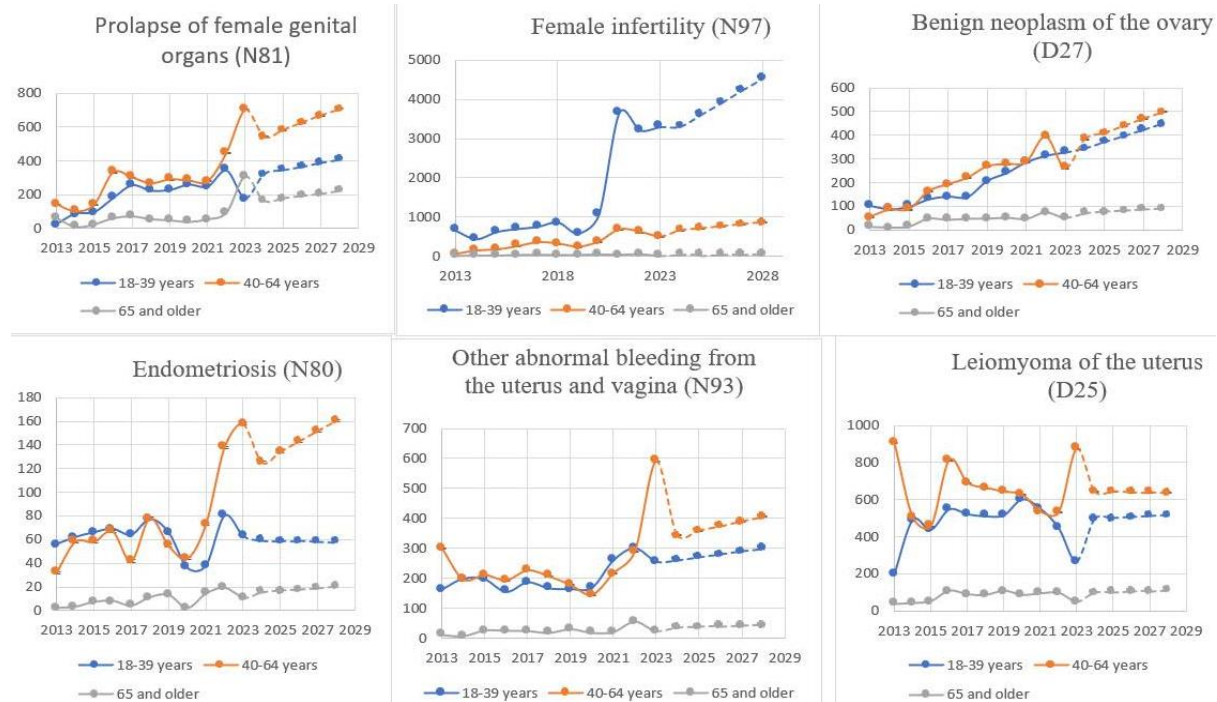


**Figure 1. Forecast for the main disease, where the reasons for hospitalization were high.**

The worst situation is observed in female infertility, where an increase is expected among young women, as well as an increase in female genital prolapse and benign ovarian tumors in all groups. Endometriosis may increase in the age group 40-64 years, while in other groups it will be stable.

**Discussion**

Our study observed an increase in leiomyomas in the coming years, a finding consistent with other studies. For example, in Korea, leiomyomas increased from 0.96% to 2.43% from 2002 to 2013, while in the United States, the prevalence ranged between 4.5–68.6% [11, 20]. Similar to our study, younger women experienced a higher growth rate of the leiomyomas [11, 12].

A significant increase in female infertility among young women in Kazakhstan shows an urgent need to develop separate programs, since this indicator affects the future development of the country. An increase in female infertility has been identified in a number of studies, for example, a meta-analysis showed the cumulative prevalence of infertility and primary infertility among women was 45.85% and 51.5% respectively, another study revealed primary infertility of 3.5%, while secondary infertility was 18.4% [4, 22].

Endometriosis may also cause an increase in hospital admissions in the future, similar to the worldwide incidence of 10–15% of all women of reproductive age and 70% of women with chronic pelvic pain [27]. The difficulty of identifying and preventing this disease is due to the fact that its etiology is still unknown. Literature data indicate that endometriosis is found in 0.1–53% of women operated on laparoscopically or laparotomically, of which 12–32% occur in women after diagnostic laparoscopy [9, 10]. In addition, the authors previously determined that the number of women with pelvic organ prolapse will increase by 46%, to 4.9 million by 2050 [30]. We also determined in our research the possibility of growth of this disease in all age groups.

The importance of prioritizing gynecological diseases and implementing interventions to reduce it, related with its economic burden. For example, the cost of treating endometriosis attributable to hospital care and per patient per year in the US, total direct medical costs ranged from US$1,459 to US$20,239 (2022), while indirect costs were between US$4,572 to US$14,079 (2022). This means that the average annual total adjusted direct costs per patient with endometriosis during the 12-month post-index period were more than three times higher than for the group without endometriosis $16,573 versus $4,733; p <0.005 [19]. In Australia in 2017, the per person cost of endometriosis was $20,898 (95% CI 18,999 to 23,213) and lost productivity accounted for 83.6% of total costs in women with endometriosis and 75% of total costs in women with chronic pelvic pain [2]. Also, prolapse surgery is performed twice as often as incontinence surgery, and its prevalence varies widely from 6 to 18% [2, 3, 14, 23, 31]. Therefore, this nosology also carries a greater economic burden compared to other diseases.

The prevalence of gynecological pathologies is increasing over time, and the rate of increase in incidence is higher in young reproductive women. Despite the prioritization of the primary health care, our data on hospitalized cases shows its growth over the study period. There is significant variation in the prevalence of gynecological pathologies, indicating the need for additional research in this area. Also, public health departments and medical professionals should focus and prioritize the allocation of resources for an in-depth study of the causes of the high prevalence of gynecological pathologies, especially those having a subsequent impact on the development of infertility, and social well-being, and the protection of women's reproductive health. Primary health care services need to strengthen efforts to prevent gynecological diseases and risk factors. In particular, it is important to work with manageable risk factors such as a high body mass index, which affects the development of female genital prolapse and other gynecological diseases. A number of activities are being carried out in Kazakhstan to reduce infertility, however, it is important to take into account the increased awareness of the population on this issue, as well as to continue financing and implementing tasks in this area [8]. Authors have noted that the epidemiology of gynecological diseases has been underinvested because most societies devalue women's pain, time, and well-being [6]. It is important for Kazakhstan to study the direct and indirect costs associated with gynecologic disease, particularly endometriosis and female infertility in order to understand what burden it will face in the future.

**Conclusion:** Female infertility is most often detected in women aged 18-39 years, while uterine leiomyoma, endometriosis, and other benign neoplasms of the uterus among women aged 40-64 years. Women over 65 years of age most often suffered from female genital prolapse. Primary health care services need to strengthen efforts to prevent gynecological diseases and risk factors throughout increasing of the health literacy among females.

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