

მელიც საშუალებას იძლევა მომავალში მეტოდიკა გამოყენებული იყოს პაციენტებში. ინფრაწითელი სხივის განჭოლვადობის მართვა შესაძლებელია შესრულდეს გამომსხივებელი წყაროს გამოსხივების ინ-

ტენსიობის რეგულირებით. განჭოლვის დამოკიდებულება ქსოვილის სისქისაგან წრფივია ჯანმრთელი ქსოვილისათვის და მკვეთრად არაწრფივი - სიმსივნური ქსოვილისათვის.

TRACKING PREGNANCY OUTCOMES: DATA FROM BIRTH REGISTER OF GEORGIA

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Reliable and high quality data are critical to identify issues related to maternal health and factors affecting the reproductive health as well as to measure progress towards the Sustainable Development Goals [1-3].

In high-income countries there is a practice of comprehensive national vital statistics and health register systems [4-6]. While demands for reliable and timely data are growing, information systems in most low- and middle-income countries (LMICs) are currently not adequate to the task [7,8]. They couldn't provide countries with reliable and timely data on all factors, affecting fertility and reproductive health needed for assessing the impact of some health programs for female population.

In LMICs nationwide surveys have been the main source for reproductive health policies and planning. Three rounds of nationwide Reproductive Health Surveys (RHS), developed by the U.S. Centers for Disease Control and Prevention (CDC) and financed by UN, were conducted in Georgia, the last one in 2010. Set within the context of overall social and economic development in Georgia, the aim of the 2010 survey was to obtain the national and regional estimates of basic demographic and reproductive health indicators. Since 2010, there was a lack comprehensive information on reproductive health status and utilization of reproductive and maternal health care [9].

In 2016, an electronic case-based system for antenatal and obstetric services, so called "Georgian Birth Registry" (GBR), which provides continuous monitoring of pregnant women from the first antenatal visit until childbirth, was introduced throughout the country. GBR was established in collaboration with Norwegian partner (The Arctic University of Norway) having a rich experience of working on registry systems. DIKU founded Project „Georgian-Norwegian Collaborative in Public Health” aimed to enhance the knowledge transfer in register-based epidemiology for using large database of BR as an evidence for identification of emerging issues of maternal and child health in the antenatal and perinatal phases and for improving maternal and child health in the country [10]. It was an innovative approach and important step forward, as it gave the possibility to describe maternal and child health, as well as reproductive health issues in correlation with different social factors, which influenced the fertility and pregnancy outcomes [11].

The correlation between women's education and reproductive health is strongly observed across the regions and time, but differs by countries [12,13]. There is also a growing literature on the relationship between female employment and fertility. Some studies ar-

gue that the causal effect travels from female labor participation to fertility and other studies argue the opposite [14]. It would be useful for policymakers in Georgia to understand the mechanisms through which female education or socioeconomic factors such as an employment status and place of residence affect fertility in the contexts in which these outcomes are observed. In Georgia there is a lack of study addressing pregnancy outcomes. The aim of the research is to study influence of education, employment status and place of residence on pregnancy outcomes among women in Georgia.

Material and methods. Georgian Birth Registry (GBR) data from 2018 has been used for this study. The majority of variables of the database contain empty values for some records. Thus, only valid values were taken for the analysis (empty values were skipped).

Results and discussion. The total number of all pregnancies with the outcome (delivery or abortive outcome) in 2018 was 73726, among them the share of deliveries was 68%, abortions - 31%. More than half (52%) of all pregnancies with the outcome in 2018 were indicated as unplanned. Higher percent of unplanned pregnancies was indicated among rural women (51%), less educated (67%) and temporally unemployed (87%) women.

The total number of deliveries in Georgia significantly decreased from 61928 in 2010 to 50468 in 2018. Lower share of deliveries revealed in employed women. 38% of deliveries with the outcome in 2018 were indicated as unplanned, among them 58% was indicated in women with low educational level, 83% - in temporally unemployed and 57% in urban women.

Eight antenatal visits are financed by the government of Georgia in the frame of state program (Ministry of Labor, Health and Social Care of Georgia 2017). Out of the total number of deliveries, deliveries with the timely initiated first visit (<12 weeks) was 73%. Timely initiation of first visit was more common in urban areas than in rural areas (76% vs. 71%), among women with university education (79%) and employed women (82%).

The share of all caesarean section out of total number of deliveries has been carried out by 42% in Georgia. Since 2000, the number of caesarean sections has been increased almost 5 times and the rate of C-Sections in Georgia is one of the highest among all countries of WHO European Region (15). The share of C-Sections performed without indication in all age groups didn't exceed 14%, although it was the much higher in the age group under 20 years - 25%. Share of C-Sections performed without indication was more common in less educated (52%) and temporally unemployed women (79%), in urban areas (60%).

Table 1. Deliveries, Georgia, 2018*

Variables	Deliveries		Deliveries with the first visit <12 weeks		C-Sections, without indication	
	Number	%	Number	%	Number	%
Education	N 44761		N 33256		N 2717	
Preschool	322	0.7%	227	70.5%	12	0.4%
Secondary	23665	52.9%	16487	69.7%	1410	51.9%
Technical/Professional	2765	6.2%	2253	81.5%	184	6.8%
University	18009	40.2%	14289	79.3%	1111	40.9%
Place of residence	N 50468		N 37037		N 3030	
Urban	25152	49.8%	19055	75.8%	1828	60.3%
Rural	25316	50.2%	17982	71.0%	1202	39.7%
Workplace	N 34080		N 25231		N 2070	
Temporarily unemployed	27543	80.8%	19840	72.0%	1641	79.3%
Employed	6537	19.2%	5391	82.5%	429	20.7%

* Data do not contain empty values

Table 2. Distribution of cases by place of residence, <20 age group, Georgia, 2018

Variables	Place of residence	
	Urban	Rural
Pregnancies		
Number of pregnancies	1120	1534
Share of pregnancies	42.3%	57.7%
Number of unplanned pregnancies	532	805
Share of unplanned pregnancies	47.5%	52.5%
Deliveries		
Number of Deliveries	689	1640
Share of deliveries	29.6	70.4%
Share of deliveries with the timely first visit <12 weeks	69%	69%
Number of C-Sections	201	433
Number of C-Sections without indication	74	86
Share of C-Sections without indication	36.8%	19.9%
Abortions		
Number of Abortions	226	285
Share of Abortions	44.2%	55.8%
Number of Induced Abortions	92	157
Share of Induced Abortions	40.7%	55.1%

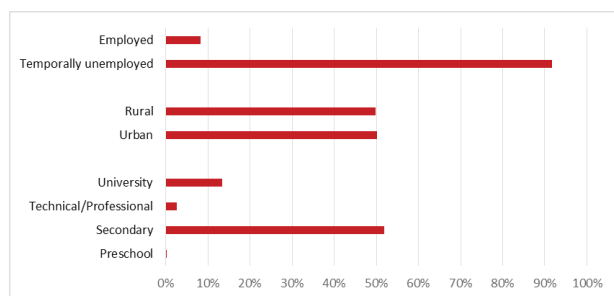


Fig. 1. Distribution (%) of Induced abortions, all age groups, Georgia, 2018

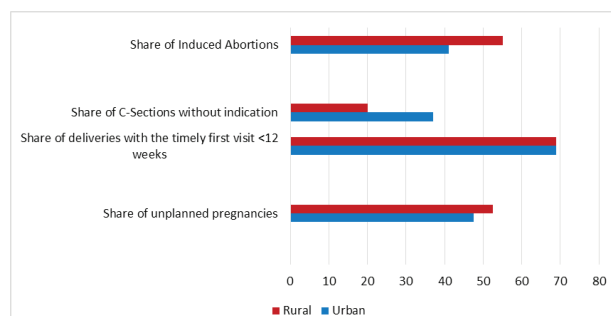


Fig. 2. Distribution of cases by place of residence, <20 age group, Georgia, 2018

Despite the decreasing tendency, induced abortion ratio per 1000 live births in Georgia is one of the highest among all countries of WHO European Region. In 2018, 22733 abortions were registered (487.6 per 1000 live births), of which, induced abortions constituted 62%. The share of abortions was distributed equally in urban and rural areas and it was significantly high in temporally unemployed (92%) women with low educational level (52%), Fig. 1.

Adolescent pregnancy is a global problem that occurs in high, middle, and low income countries. Around the world, adolescent pregnancies are commonly driven by poverty and lack of education and employment opportunities (UNFPA 2015; WHO 2018). Adolescent's pregnancy in Georgia had a decreasing tendency during recent years (NCDC 2016).

The total number of pregnancies with the outcome in 2018 in the age group <20 years was 2654 (4% of all pregnancies), among them 58% were registered in women living in rural areas.

47% of all pregnancies in the age group <20 were indicated as unplanned; the share of unplanned pregnancies was higher in urban women (53%). Deliveries in the age group <20 constituted 5% of all deliveries, among them 70% were registered in women living in rural areas.

Share of deliveries with the timely first visit (<12 weeks) in the age group under 20 was distributed equally in urban and rural areas (Fig. 2). The share of C-Sections, performed without indication in this age group (25%), which is likely to mean that all further deliveries in this age group will be performed by C-Section, was higher in women, living in urban areas. The share of abortions in women aged under 20 equals 2% of the total number of abortions. More than 55% of all abortions, including induced abortions in this age group was registered in rural women.

Conclusions. The study revealed some differences in data according to several aspects, such as education, employment or place of residence of women. This is a first study of the influence of education, employment status and place of residence on pregnancy outcomes among women in Georgia based on Georgian Birth Registry data. The most important overall findings are: pros – high percent of timely initiation of first visit (from 70% to 80% and more) for all observed women, cons - the high rates of unplanned pregnancies, particularly in adolescents, high rates of abortions, high percent of C-Sections, without indication in adolescents. Distribution of cases according to educational levels revealed, that better-educated women are more likely to have lower share of unplanned pregnancies and lower rates of induced abortions and caesarean sections without indication. Distribution of cases according to employment status revealed more significant differences: unemployed women had very high rates almost in all observed options: unplanned pregnancies, abortions and C-Sections (from 83% to 92%). Differences in urban and rural women has been mostly revealed in the age group under 20 years: share of pregnancies, including unplanned pregnancies, 70% of deliveries and more than half abortions were registered in young women living in rural areas.

We conclude that tracking pregnancies and their outcomes through GBR, which is an innovative approach for LMICs, gives an opportunity to correlate some social-economic and behavioral characteristics in female population that can help in determining the preventive interventions aimed to reduce maternal and perinatal morbidity and mortality in LMICs.

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SUMMARY

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Reliable and high quality data are critical to identify issues related to maternal health and factors affecting the reproductive health as well as to measure progress towards the Sustainable Development Goals. In 2016, an electronic case-based system for antenatal and obstetric services, so called “Georgian Birth Registry” (GBR), which provides continuous monitoring of pregnant women from the first antenatal visit until childbirth, was introduced in Georgia. GBR gave the possibility to describe maternal and child health, as well as reproductive health issues in correlation with different social factors, which influenced the fertility and pregnancy outcomes. In Georgia there is a lack of study addressing pregnancy outcomes.

The aim of the research is to study influence of education, employment status and place of residence on pregnancy outcomes among women in Georgia. Methods. GBR data from 2018 has been used for this study. Results. The most important overall findings are: pros – high percent of timely initiation of first visit (from 70% to 80% and more) for all observed women, cons – the high rates of unplanned pregnancies (52%), particularly in adolescents (47%), high rates of abortions (31%), high percent of C-Sections, without indication in adolescents (25%).

Tracking pregnancies and their outcomes through registry system is an innovative approach for LMICs, which gives an opportunity to correlate some social-economic and behavioral characteristics in female population that can help in determining the preventive interventions aimed to reduce maternal and perinatal morbidity and mortality in LMICs.

Keywords: Maternal Health, Birth Registry, pregnancy outcomes, Adolescent pregnancy, LMICs.

РЕЗЮМЕ

ОТСЛЕЖИВАНИЕ РЕЗУЛЬТАТОВ БЕРЕМЕННОСТИ: ДАННЫЕ ГРУЗИНСКОГО РЕГИСТРА РОЖДЕНИЙ

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Надежные и высококачественные данные имеют решающее значение для выявления проблем, связанных со здоровьем матери, и факторов, влияющих на репродуктивное здоровье, а также для измерения прогресса в достижении Целей Устойчивого Развития. В 2016 году в Грузии внедрена электронная система дородовых и акушерских услуг по каждому конкретному случаю, называемая Грузинским регистром рождений (GBR), которая обеспечивает непрерывный мониторинг беременных женщин с первого дородового

визита до родов. GBR дает возможность описать здоровье матери и ребенка, а также вопросы репродуктивного здоровья во взаимосвязи с различными социальными факторами, которые влияют на фертильность и исходы беременности.

Целью исследования является определение влияния образования, занятости и места жительства на исходы беременности у женщин в Грузии. Для этого исследования использовались данные GBR за 2018 год.

Наиболее значимые общие выводы: высокий процент своевременного начала первого посещения (от 70% до 80% и более) для всех наблюдаемых женщин, высокий уровень незапланированных беременностей (52%), особенно у подростков (47%), высокий процент аборт (31%), высокий процент кесарева сечения без показаний у подростков (25%).

Отслеживание беременностей и их результатов с помощью системы регистрации является инновационным подходом для стран с низким и средним доходом, который дает возможность сопоставить некоторые социально-экономические и поведенческие характеристики женского населения, позволяющие определить профилактические меры, направленные на снижение материнской и перинатальной заболеваемости и смертности в странах с низким и средним доходом.

რეზიუმე

ორსულობის შედეგების მეთვალყურეობა: მონაცემები საქართველოს დაბადების რეგისტრიდან

ე.გოქსაძე, ნ.ფიცხელაური, ნ.ჩიხლაძე, მ.კერესელიძე

ივ. ჯავახიშვილის სახ. თბილისის სახელმწიფო უნივერსიტეტი, მედიცინის ფაკულტეტი; დაავადებათა კონტროლისა და საზოგადოებრივი ჯანმრთელობის ეროვნული ცენტრი, საქართველო

სანდო და მაღალი ხარისხის მონაცემები გადამწყვეტია დედის ჯანმრთელობასთან დაკავშირებული საკითხების და რეპროდუქციულ ჯანმრთელობაზე მოქმედი ფაქტორების იდენტიფიცირებისთვის, ასევე მდგრადი განვითარების მიზნებისკენ მიმავალი პროგრესის შესაფასებლად. 2016 წელს საქართველოში დაინერგა ანტენატალური და სამეანო მომსახურების ელექტრონული სისტემა, ე.წ. „საქართველოს დაბადების რეგისტრი“ (GBR), რომელიც უზრუნველყოფს ორსულთა მუდმივ მონიტორინგს პირველი ანტენატალური ვიზიტიდან მშობიარობამდე. დაბადების რეგისტრი საშუალებას იძლევა შევისწავლოთ დედათა და ბავშვთა ჯანმრთელობის, ასევე რეპროდუქციული ჯანმრთელობის საკითხების კორელაციური დამოკიდებულებები სხვადასხვა სოციალურ ფაქტორებთან, რომლებიც გავლენას ახდენდნენ ნაყოფიერებაზე და ორსულობის შედეგებზე.

კვლევის მიზანს წარმოადგენდა საქართველოში ქალების განათლების, დასაქმების სტატუსისა და საცხოვრებელი ადგილის გავლენის შესწავლა ორსულობის შედეგებზე. ამ კვლევისთვის გამოყენებულია 2018 წლის GBR მონაცემები.

ყველაზე მნიშვნელოვანი საერთო დასკვნებია: დაბადებით - პირველი ვიზიტის დროული დაწყების მაღალი პროცენტი (70%-დან 80%-მდე და მეტი) ყველა ქალისთვის; უარყოფითი - დაუბეგბავი ორსუ-

ლობის მაღალი მაჩვენებლები (52%), განსაკუთრებით მოზარდებში (47%), აბორტების მაღალი მაჩვენებელი (31%), ჩვენების გარეშე საკეისრო კვეთების მაღალი პროცენტი მოზარდებში (25%).

ორსულობაზე და ორსულობის შედეგებზე ზედამხედველობა რეგისტრის ტიპის სისტემების მეშვეობით არის ინოვაციური მიდგომა დაბალი და საშუალო შემოსავლის მქონე ქვეყნებისათვის, რაც იძლევა

საშუალებას ქალთა პოპულაციაში გამოავლინოს ზოგიერთი სოციალურ-ეკონომიკური და ქცევითი მახასიათებლების გავლენა დედათა და ბავშვთა ჯანმრთელობაზე. მონაცემებზე დაფუძნებით შესაძლებელია პრევენციული ინტერვენციების დაგეგმვა, რომლებიც მიზნად დაისახავს დაბალი და საშუალო შემოსავლის მქონე ქვეყნებში დედის და პერინატალური ავადობისა და სიკვდილიანობის შემცირებას.

THE INFLUENCE OF CHRONIC HYPERHOMOCYSTEINEMIA ON PHAGOCYTTIC AND METABOLIC ACTIVITY OF PERIPHERAL BLOOD NEUTROPHILS IN CASE OF LIPOPOLYSACCHARIDE-INDUCED PERIODONTITIS

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Periodontal disease, which is usually defined as an inflammatory disorder, which involves both soft and hard periodontal structures (ie, gingivitis and periodontitis), is the second most common oral health problem after caries and has serious health and economic consequences, which significantly impairs quality of life for those affected [18,27]. It should be noted that the prevalence of periodontal disease differs in both developed and developing countries [8]. So, in Europe severe periodontal disease is found in 5-20% of 35-44 years adults, and up to 40% of older people [20]. At the same time in Ukraine, the prevalence of periodontal disease among the population over the age of 35 reaches 85-95% [24].

In the pathogenesis of periodontitis, as well as any other inflammatory processes that accompany tissue damage, an important role belongs to cellular defense mechanisms and especially phagocytic cells – neutrophils and macrophages. The first to enter the site of inflammation are neutrophils, which participate in the neutralization of pathogens, absorbing them through phagocytosis (although less effective as monocytes/macrophages) [28] and releasing a large number of free radicals (respiratory burst), which have a pronounced bactericidal effect [9]. Moreover, neutrophilic granules contain a spectrum of substances intended to destroy the bacterial cell wall (lysozyme, lactoferrin) and hydrolytic enzymes (proteases, peptidases, oxidases, deoxyribonucleases and lipases) [25]. In recent years, a new antibacterial defense mechanism has been discovered – formation of neutrophil extracellular traps, which main function appears to be evacuation of dental plaque pathogen-associated molecular patterns [29]. According to Andryukov B.H. and co-authors neutrophils are not only modulators of inflammation, but also active effectors of immune responses [3]. At the same time excessive activation of neutrophils and hyperproduction of reactive oxygen species (ROS) in response to periodontal pathogens can induce tissue damage and lead to periodontitis persistence [13]. So, determining the functional state of neutrophils is important in understanding the periodontitis pathogenesis.

It should be noted that the progression of destructive phenomena in periodontal tissues depends on a number of adverse exogenous and endogenous factors, one of which may be high level of homocysteine (Hcys) – hyperhomocysteinemia (HHcy).

Therefore, the aim of our study was to investigate the phagocytic and metabolic activity of peripheral blood neutrophils in rats with lipopolysaccharide-induced periodontitis combined with chronic thiolactone HHcy.

Material and methods. The study included mature inbred white male rats (n=48) with a body weight of 180-200 g. During the period of the experiment, animals were kept in controlled-temperature (22±2°C) room with an adjustable light cycle (12/12) and unrestricted access to water and food at the animal facility of I. Horbachevsky Ternopil National Medical University, Ternopil. Animal treatment and all experimental procedures were performed in compliance with the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (European convention for the protection of vertebrate animals used for experimental and other scientific purposes 1986). The Bioethics Commission of I. Horbachevsky Ternopil National Medical University, Ternopil, Ukraine approved the protocol of the experiment.

The animals were randomly divided into the following groups: group 1: control (n=12); group 2: animals with a model of periodontitis (n=12). For two weeks, the rats in this group were injected 40 µL (1 mg/mL) of E. coli lipopolysaccharide (LPS) (manufactured by Sigma-Aldrich, USA) into gingival tissues every other day [25]; group 3 – rats with chronic thiolactone HHcy (n=12). Homocysteine thiolactone was administered intragastrically (100 mg/kg of body weight in 1 % solution of starch) once a day for 42 days [26]; group 4 – animals with a model of periodontitis combined with HHcy (n=12). In animals of this group chronic thiolactone HHcy was caused as described above. From the 29th day after the start of HHcy induction, animals were injected into the gum tissue with LPS for 14 days in parallel with thiolactone homocysteine in accordance to the above scheme.