

The Insight into Obstetric Care near the Front Line in Kharkiv

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Abstract. Objectives: The invasion of Russian troops into independent Ukraine has changed the humanitarian situation in the Kharkiv region. The paper is focused on the peculiarities and issues of the management of labor and delivery near the front line.

Materials and methods: Totally 2030 patients were enrolled in the study. 1410 women who delivered in the second half of 2021 were enrolled in Group I. 620 women who delivered in the first half of 2022 were observed in Group II. Some patients from Group II were used for the investigation of the comparative situation during first months of 2022. 85 women who delivered in January were included in Subgroup IIA. 94 women who have completed their pregnancies and delivered in February were observed in Subgroup IIB. 67 case histories of deliveries which occurred during March were united in Subgroup IIC.

Results: The level of anemia, uterine contractile activity in labor abnormalities, and episiotomies were surprisingly lower during wartime in March. The obtained results showed an almost similar level of obstetric complications, maternal comorbidities, and interventions during labor and delivery in all groups. The stressed environment was a possible reason for the elevation of cardiovascular disease and endocrine disorders.

Conclusion: The study did not reveal any significant changes in the structure of maternal pathologies and obstetric complications during the first months of wartime near the front line. But later the levels of cardiovascular disease and endocrine disorders were found to be elevated.

Keywords: pregnancy, obstetric care, military medicine.

Apie akušerinę priežiūrą netoli fronto linijos Charkive

Santrauka. Tikslai: Rusijos kariuomenės įsiveržimas į nepriklausomą Ukrainą pakeitė humanitarinę situaciją Charkivo srityje. Šiame straipsnyje nagrinėjama gimdymo ypatybės pafrontės teritorijose ir kylančios problemos.

Medžiaga ir metodai: Tyrime dalyvavo 2 030 pacienčių. 1 410 moterų, gimdusių antrojoje 2021 metų pusėje, sudarė pirmą tyrimo grupę (G I), 320 moterų, kurios gimdė pirmojoje 2022 metų pusėje, priskirtos antrai grupei (G II). Kai kurios pacientės iš antros grupės taip pat buvo įtrauktos į lyginamąjį situacijos per pirmuosius 2022 metų mėnesius tyrimą. 2022 metų sausį gimdžiusios 85 moterys buvo įtrauktos į pogrupį IIA. 94 moterys, kurių nėštumo laikotarpis baigėsi ir kurios gimdė 2022 metų vasarį, pateko į pogrupį IIB. 67 gimdymo atvejai 2022 metų kovą priskirti pogrupiui IIC.

Rezultatai: Stebėtina, tačiau ryški anemija, gimdos susitraukimo veikla sudėtingais gimdymo atvejais ir epiziotomijos atvejai karo laikotarpiu kovo mėnesį buvo retesni. Gauti rezultatai atskleidžia labai panašų visų

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tiriamųjų grupių akušerinių komplikacijų, gimdyvėms pasireiškiančių sunkių gretutinių ligų ir chirurginių gimdymo intervencijų kiekį. Tikėtina, kad didesnę širdies ir kraujagyslių ligų bei endokrininių sutrikimų kiekį lėmė stresinė aplinka.

Išvados: Tyrimas neatskleidė jokių esminių motinystės patologijų ar akušerinių komplikacijų struktūros pokyčių per pirmuosius mėnesius nuo karo pradžios netoli fronto linijos esančiose teritorijose. Tačiau vėliau buvo nustatytas padidėjęs širdies ir kraujagyslių ligų bei endokrininių sutrikimų lygis.

Raktažodžiai: nėštumas, akušerija, karinė medicina.

Introduction

The invasion of Russian troops into independent Ukraine has changed the humanitarian situation in the Kharkiv region. Thus, all branches of the health care system have been modified in order to provide the population near the front line a qualified and highly-specialized medicine. The female reproductive system has been created by nature itself for a safe birth. The spontaneous onset of labor is a culmination of healthy pregnancy [1]. The mental stress and a continual threat of physical damage have a negative effect on maternal health [2-4].

Two options are known for the population of the regions located close to the area of the armed conflict. Some people ought to leave their homes becoming refugees. The problem of obstetric care in refugees is well known [5]. Several studies have shown an increased level of maternal and perinatal complications in such people [6]. But some pregnant women persist to stay in their native cities. They want to have a safe birth in their local maternal clinics under bombardment despite the continual sound of explosions [7, 8]. Kharkiv municipal perinatal center is located in Saltivka near the border of the city. The staff of the maternal clinic had made significant efforts to follow all current findings and clinical protocols for obstetric care during the war [9-11]. The paper is focused on the peculiarities and issues of the management of labor and delivery near the front line.

Materials and Methods

A retrospective observational study was performed. The report of delivery unit activity and case histories of deliveries for the six months of the year 2022 and the previous six months of the year 2021 were analyzed. Totally 2030 patients were enrolled in the study. The inclusion criteria were pregnant women who delivered during this period. The exclusion criteria were all case of spontaneous or artificial pregnancy termination before 22 week of gestation. All patients who met the inclusion criteria gave informed consent to participate in the investigation. All ladies were divided into two groups. 1410 women who delivered in the second half of 2021 were enrolled in Group I. 620 women who delivered in the first half of 2022 were observed in Group II. Some patients from Group II were used for the investigation of the comparative situation during first months of 2022. 85 women who delivered in January were included in Subgroup IIA. 94 women who have completed their pregnancies and delivered in February were observed in Subgroup IIB. 67 case histories of deliveries which occurred during March were united in Subgroup IIC.

The study was done by examining the patient records of pregnant women in a hospital computer automation system. All available data including anamnesis, biometry, the variables of births, the level of maternal medical complications and obstetric interventions in labor and delivery were analyzed. We have followed the recommendations for the care of pregnant women in disaster setting [12]. The ACOG criteria for pre-eclampsia, anemia, gestational diabetes mellitus, and poor progress of labor were used [13-18].

Statistical analysis was performed with the Statistical Package for the Social Sciences (SPSS for Windows, Version 25.0, Chicago, IL, USA) program. The Chi-square test or Fischer's exact test (for

2x2 tables only) was used as a test of significance for qualitative data. A p-value of less than 0.05 was accepted as statistically significant.

Results

The variables of age were not significantly different in Group I and Group II: 25.3 ± 4.1 years and 25.0 ± 4.6 years ($p > 0.05$). The body mass index was 25.9 ± 4.4 in Group I and 26.1 ± 5.0 in Group II ($p > 0.05$). The average age of the study population was not different in all subgroups: 24.6 ± 4.1 years, 25.1 ± 4.8 years, and 24.9 ± 3.9 years, respectively, in Subgroup IIA, Subgroup IIB, and Subgroup IIC ($p > 0.05$). The parity indices were in these subgroups, respectively: 1.5 ± 0.4 and 1.6 ± 0.5 ($p > 0.05$). The variables of the body mass index were almost similar in Subgroup IIA, Subgroup IIB, and Subgroup IIC: 26.2 ± 4.3 , 25.9 ± 3.2 , and 26.4 ± 5.6 ($p > 0.05$). The indices of parity in the same subgroups were, respectively: 1.3 ± 0.2 , 1.4 ± 0.3 , and 1.3 ± 0.3 ($p > 0.05$). Thus, the homogeneity of the study population accordingly to their ages, anthropometric variables, and parity were detected.

The total quantity of deliveries was found to be decreased from the beginning of the war (Table 1). The minimal number of births was registered in March. There were several multiple pregnancies over three months' period. The level of normal deliveries was not different in all study groups. The level of presence of partners during labor was almost stable with an insignificant reduction in March. The only stillbirth occurred in February. The rate of Cesarean sections was similar in all groups. The number of breech births was not different amongst all study groups. Interestingly, 2 cases of breech delivery in February and 2 cases in March were found to be appropriate for vaginal birth.

Table 1. The variables of births in the study population

Variables	Subgroup IIA (January)	Subgroup IIB (February)	P ₁	Subgroup IIC (March)	P ₁ ; P ₂	Totally for 3 months
Number of births	85	94		67		246
Preterm birth (%)	10 (11.8 %)	6 (6.3 %)	$p_1=0.3018$	2 (2.9 %)	$p_1=0.0749$; $p_2=0.4742$	18 (7.3 %)
Multiple birth (%)	1 (1.2 %)	-		1 (1.5 %)		2 (0.8 %)
Normal deliveries (%)	47 (55.3 %)	61 (64.9 %)	$p_1=0.5425$	38 (56.7 %)	$p_1=1.0000$; $p_2=0.6963$	146 (59.3 %)
Partnership in labor (%)	50 (58.8 %)	63 (67.0 %)	$p_1=0.6306$	27 (40.3 %)	$p_1=0.2035$; $p_2=0.0777$	140 (56.9 %)
Livebirths	86	93		68		247
Stillbirths (%)	-	1 (1.1 %)		-		1 (0.4 %)
Cesarean sections (%)	32 (37.6 %)	33 (35.1 %)	$p_1=0.8850$	29 (43.2 %)	$p_1=0.6513$; $p_2=0.5467$	94 (38.2 %)
Breech births (%)	3 (3.5 %)	6 (6.4 %)	$p_1=0.5054$	2 (3.0 %)	$p_1=1.000$; $p_2=0.4742$	11 (4,5 %)
Breech births via Cesarean sections (%)	3 (100 %)	4 (66.7 %)	$p_1=1.000$	-		7 (63.6 %)

p_1 – the difference compared to Subgroup IIA according to χ^2 ;

p_2 – the difference compared to Subgroup IIB according to χ^2 .

The incidence of preterm placental abruption was not significant (Table 2). Such cases were not registered in March. The maximal level of pre-eclampsia was found in February. The insignificant reduction of pre-eclampsia was registered in March. The manifestation of urinary tract infection was not different during peace and wartime. The findings of the insignificantly decreased incidence of anemia in Group II and Group III were not logical. The most disseminated medical problems during pregnancy (cardiovascular disease and endocrine disorders) were found to have similar levels of manifestation in all study groups. The highest statistically significant rate of abnormal uterine contractile activity in labor was detected in February. A slight insignificant reduction of poor progress of labor was found in Group III. The only case of obstetrical hemorrhage occurred in January. The hysterectomy procedure was performed due to placental invasion in the area of the uterine scar. The statistically insignificant tendency to the reduction of episiotomies rate during wartime was detected. Two cases of the manual uterine revision due to retained placental tissue were registered in Group II and Group III. The soft vacuum for fetal extraction was used once in each study group.

The variable of birth did not change even during six months (Table 3). The only significantly different index was partnership in labor. The number of birth was decreased. But the level of livebirth and Cesarean delivery was similar.

Table 2. The level of maternal medical complications and obstetric interventions in labor and delivery

Variables	Subgroup IIA (January) N=85	Subgroup IIB (February) N=94	P ₁	Subgroup IIC (March) N=67	P ₁ ; P ₂	Totally for 3 months N=246
Preterm placental abruption (%)	3 (3.5 %)	2 (2.1 %)	p ₁ = 0.6713	-		5 (2.0 %)
Pre-eclampsia (%)	2 (2.4 %)	8 (8.5 %)	p ₁ = 0.1112	1 (1.5 %)	p ₁ = 1.0000; p ₂ = 0.0873	11 (4.5 %)
Gestational pyelonephritis (%)	2 (2.4 %)	6 (6.4 %)	p ₁ = 0.28811	1 (1.5 %)	p ₁ = 1.0000; p ₂ = 0.2432	9 (3.7 %)
Anemia (%)	10 (11.8 %)	6 (6.4 %)	p ₁ = 0.3018	3 (4.5 %)	p ₁ = 0.2413; p ₂ = 0.7380	19 (7.7 %)
Cardiovascular disease (%)	2 (2.4 %)	6 (6.4 %)	p ₁ = 0.2881	-		8 (3.3 %)
Endocrine disorders (%)	8 (9.4 %)	5 (5.3 %)	p ₁ = 0.3958	5 (7.5 %)	p ₁ = 0.2413; p ₂ = 0.7772	18 (7.3 %)
Poor progress of labor (%)	1 (1.2 %)	10 (10.6 %)	p ₁ = 0.0132	5 (7.5 %)	p ₁ = 0.0932; p ₂ = 0.5944	16 (6.5 %)
Hemorrhage (%)	1 (1.2 %)	-		-		1 (0.4 %)
Hysterectomy (%)	1 (1.2 %)	-		-		1 (0.4 %)
Episiotomy (%)	11 (13.0 %)	10 (10.6 %)	p ₁ = 0.8181	2 (3.0 %)	p ₁ = 0.0753; p ₂ = 0.0736	23 (9.3 %)
Manual uterine revision (%)	-	1 (1.1 %)		1 (1.5 %)		2 (0.8 %)
Soft vacuum for fetal extraction (%)	1 (1.2 %)	1 (1.1 %)		1 (1.5 %)		3 (1.2 %)

p₁ – the difference compared to Subgroup IIA according to χ^2 ;

p₂ – the difference compared to Subgroup IIB according to χ^2 .

Table 3. The variables of births in the study population during 6 months of 2021 and 2022

Variables	Group I (6 months of 2021)	Group II (6 months of 2022)	p
Number of births	1410	620	
Preterm birth (%)	113 (8.0 %)	43 (6.9 %)	p=0.4704
Multiple birth (%)	34 (2.4 %)	14 (2.3 %)	p=1.0000
Normal deliveries (%)	773 (54.8 %)	356 (57.4 %)	p=0.5739
Partnership in labor (%)	931 (66.0 %)	311 (50.2 %)	p=0.0007*
Livebirths	1434	631	
Stillbirths (%)	11 (0.8 %)	3 (0.5 %)	p=0.5710
Cesarean sections (%)	513 (36.4 %)	233 (37.6 %)	p=0.7454
Breech births (%)	63 (4.5 %)	30 (4.8 %)	p=0.7307
Breech births via Cesarean sections (%)	49 (77.8 %)	22 (73.3 %)	p=1.0000

p – the difference compared to Group I according to χ^2 ;

* – the difference is statistically significant (p<0.05).

Table 4. The level of maternal medical complications and obstetric interventions in labor and delivery during 6 months of 2021 and 2022

Variables	Group I (6 months of 2021) N=1410	Group II (6 months of 2022) N=620	p
Preterm placental abruption (%)	37 (2.6 %)	11 (1.8 %)	p= 0.3402
Pre-eclampsia (%)	82 (5.8 %)	24 (3.9 %)	p= 0.1028
Gestational pyelonephritis (%)	41 (2.9 %)	16 (2.6 %)	p= 0.7715
Anemia (%)	100 (7.1 %)	42 (6.8 %)	p= 0.8508
Cardiovascular disease (%)	15 (1.1 %)	15 (2.4 %)	p= 0.0279*
Endocrine disorders (%)	69 (4.9 %)	49 (7.9 %)	p= 0.0141*
Poor progress of labor (%)	95 (6.7 %)	43 (6.9 %)	p= 0.9240
Hemorrhage (%)	21 (1.5 %)	8 (1.3 %)	p= 0.8407
Hysterectomy (%)	3 (0.2 %)	1 (0.2 %)	p= 1.0000
Episiotomy (%)	163 (11.6 %)	62 (10.0 %)	p= 0.4001
Manual uterine revision (%)	17 (1.2 %)	9 (1.5 %)	p= 0.6707
Soft vacuum for fetal extraction (%)	10 (0.7 %)	4 (0.6 %)	p= 1.0000

p – the difference compared to Group I according to χ^2 ;

* – the difference is statistically significant (p<0.05).

The variables of cardiovascular disease and endocrine disorders were higher in Group II (Table 4). All other indices of gestational pathologies, complications in labor or postpartum, and obstetric interventions were not different. Therefore, the obstetric care in Kharkiv was stable.

The obtained results showed an almost similar level of obstetric complications, maternal comorbidities, and interventions during labor and delivery in all groups. Therefore, the obvious border between peace and wartime in their projection on maternal health and obstetric complication was not detected either within the first months or even later.

Discussion

The main issue in the conflict area is the feeling of being in an unsafe environment and unprotected [19]. Our pregnant women demonstrated courage and a brave spirit. They stayed home and delivered babies in their local perinatal center. They were aware of all risks of delivery under bombardment. Kharkiv municipal perinatal center was damaged at the beginning of the war (Figure 1). Despite the danger, some pregnant ladies from Kharkiv took a chance and managed.

The psychological disorders during wartime could disturb female reproductive health or complicate the current of gestation. The disorders of the female reproductive system are known both in civilian and military women [20-25]. The increased level of mental disorders is involved in abnormal fetal neurodevelopment [26]. The hypothesis of fetal programming was based on the negative impact of fetal growth restriction on its health in the future lifetime [27]. The increased incidence of gestational, obstetric, and perinatal complications is typical for the female population in the area of armed conflict and for refugees [28-35]. But the variables of obstetric care during peace and wartime were almost similar in this study. The level of anemia, uterine contractile activity in labor abnormalities, and episiotomies were surprisingly lower during wartime in March.

The level of partnership in labor was lower for the first half a year. The husbands left their families to defend Ukraine from the enemy. The stressed environment was a possible reason for the elevation of cardiovascular disease and endocrine disorders amongst pregnant ladies near front line [12].

Following the evidence-based clinical protocols was the main rule that contributed to beneficial maternal and perinatal outcomes. The use of modern perinatal technologies captured the significant professional level of the staff. The absence of obstetric aggression and the stable level of normal delivery were based on the current approaches to labor induction [36, 37]. Active management was a measure for the prevention of prolonged stay in the clinic. It was not possible to collect patients in the department of feto-maternal medicine. The delayed stay in the clinic was associated with an increased risk of damage. Thus, early discharge was a measure for the reduction of traumatic injuries.



Figure 1. A view through the damaged window from the operative theatre



Figure 2. A humanitarian aid from “Doctors without borders”

Undoubtedly, modern obstetric care requires substantial support in medicines and medical devices. Kharkiv municipal perinatal center received humanitarian aid from “Doctors without borders”. This noble action contributed enormously to the support of safe birth in Saltivka near the frontline. Our clinic was provided with all necessary medications for urgent care in a disaster setting [12].

The findings of the study could be the repercussions of the strong traditions and reserves of the obstetric community in Kharkiv. Possibly, the changes in the humanitarian situation will contribute to the shift in maternal pathologies and obstetric complications (Figure 2). Thus, further investigations are to be continued.

The paper highlighted the portrait of maternal diseases and obstetric pathology in the area of armed conflict.

The limitations of this study are a restricted period of observation and the different sizes of the study groups.

Conclusion

The study did not reveal any significant changes in the structure of maternal pathologies and obstetric complications during the first months of wartime near the front line. But later the levels of cardiovascular disease and endocrine disorders were found to be elevated.

Conflicting interests

The author declares that he has no conflict of interest.

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Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

Ethical approval

The ethics committee of Kharkiv Medical Academy of Postgraduate Education approved this study (REC number: 05.042022).

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