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Research Article

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One year of the full-scale war in Ukraine and kidney replacement therapy: Where do we stand now? A brief report of the Ukrainian Renal Disaster Relief Committee of the Ukrainian Association of Nephrologists and Kidney Transplant Specialists

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Abstract. *The war in Ukraine is now entering its ninth year, and a year has passed since the Russian army invaded Ukraine on a large scale. A few months ago, the Ukrainian Renal Disaster Relief Committee of the Ukrainian Association of Nephrologists and Kidney Transplant Specialists was established and began its work to provide immediate support to kidney patients during the war. In this brief report, we present the first data collected on the number of patients receiving kidney replacement therapy, the possibility of enrolling new patients, and the availability of an autonomous electricity and water supply in all regions of Ukraine accessible for communication. In addition, we provide a brief analysis of the dynamics of the regional distribution of patients treated with kidney replacement therapy in the war year.*

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Рік повномасштабної війни в Україні та ниркова замісна терапія: де ми зараз?

Коротка доповідь Комітету з надзвичайних ситуацій Української асоціації нефрологів і фахівців з трансплантації нирки

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Резюме. Війна в Україні триває вже дев'ятий рік, і минув рік після широкомасштабного вторгнення російської армії в Україну. Декілька місяців тому, для надання невідкладної допомоги хворим нефрологічного профілю під час війни, був заснований та розпочав свою роботу Комітет з надзвичайних ситуацій Української асоціації нефрологів і фахівців з трансплантації нирки. У цьому короткому звіті ми наводимо перші зібрані дані щодо кількості пацієнтів, які лікуються нирковою замісною терапією, можливості лікування нових пацієнтів, наявності автономного електро- та водопостачання в усіх доступних для комунікації регіонах України. Крім того, представлено короткий аналіз динаміки регіонального розподілу хворих, які лікувались нирковою замісною терапією, протягом цього жахливого року війни.

Ключові слова: Україна, війна, хворі, які лікуються нирковою замісною терапією, Комітет з надзвичайних ситуацій Української асоціації нефрологів і фахівців з трансплантації нирки.

The war in Ukraine is now entering its ninth year, and a year has passed since the Russian army invaded Ukraine on a large scale.

The war unleashed by the Russian Federation has caused significant damage to the Ukrainian healthcare system. The destruction of medical infrastructure, the inability to meet prevention and treatment standards, the shortage of medical personnel in frontline regions, and the disruption of logistical links prevent timely and complete medical care for the population.

According to the Ukrainian Ministry of Health, 1,218 health facilities have already been damaged. In particular, 540 hospitals were partially destroyed, and 173 were completely destroyed [1]. Experts from the World Bank and the World Health Organization estimate the damage to the Ukrainian health system to be tens of billions of dollars. It should be noted that access to healthcare and the state of the healthcare system can vary widely within the country, depending on a number of factors, such as the region's distance from hostilities,

the state of the region's energy supply, economic status, and access to resources.

Analyzing this terrible war year in the context of the support system for kidney patients, the following periods and events can be highlighted.

The first period. In the early days, confusion and fear of the next day reigned among staff and patients:

- ❑ A mass exodus of medical personnel and patients from the occupied areas and from the country
- ❑ The need for rapid training of new personnel (doctors, nurses, technicians)
- ❑ The readiness to receive a large number of patients from the occupied territories (often together with their families) in dialysis centres in relatively safe regions, which are not designed for such a number of patients.

The second period. The period of adaptation and awareness:

- ❑ The return of part of the patients from European countries
- ❑ Establishment of the Ukrainian Kidney Disaster Relief Committee of the Ukrainian Association of Nephrologists and Kidney Transplant Specialists
- ❑ Issuance of the Recommendations for medical care of patients with kidney diseases during the war [2],
- ❑ Establishment of a reporting system and additional facilities for the treatment of patients displaced during the war in individual regions.

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The positive aspects of this period are the rapid training of medical and technical staff, the absence of refusals and impossibilities in the provision of medical assistance, the treatment of patients in 24-hour operations (4 dialysis sessions per day with a minimum of required personnel), the activation of private dialysis centers and their relocation to the western regions of Ukraine. However, this phase of stabilization was unfortunately a phase of imaginary stabilization.

The third period. The period of tension and terror for the civilian population:

- ❑ The bombing of infrastructure in all regions of Ukraine
- ❑ Power outages, shutdown of the power grid, and water supply, which prevented
- ❑ the operation of dialysis centres
- ❑ Rapid restoration of electricity and water supplies by local authorities
- ❑ Equipping dialysis centres with autonomous electricity and water supply sources.

Before the war, Ukraine had a well-developed system of kidney care, including dialysis and transplantation services [3, 4]. However, the war has led to the destruction of many dialysis centers, the widespread displacement of patients, and shortages of personnel and dialysis supplies. Although the Ukrainian Kidney Disaster Relief Committee of the Ukrainian Association of Nephrologists and Kidney Transplant Specialists (Committee) has worked closely with local healthcare providers, dialysis centers, and government agencies to gather firsthand information, it is difficult to assess the specific impact of the ongoing war on kidney care in the country.

According to our preliminary data, the number of hemodialysis (HD) patients has decreased by more than 2 thousand (8717 vs 6507), the number of peritoneal dialysis (PD) patients has almost halved (931 vs 501), and there are 120 fewer kidney transplant recipients (1533 vs 1413) (Fig. 1).

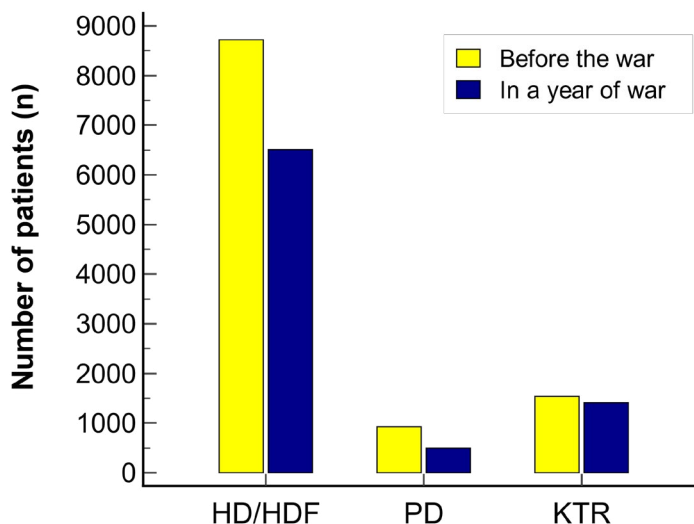


Fig. 1. An absolute number of patients treated with kidney replacement therapy on January 1, 2021, and February 1, 2023.

Abbreviations: HD, hemodialysis; HDF, hemodiafiltration; KTR, kidney transplant recipients; PD, peritoneal dialysis.

It should be noted that the National Registry of Patients with Chronic Kidney Disease and Patients with Acute Kidney Injury for 2021 had not yet been completed due to the start of the war in early 2022, and thus, the data presented were compared with those of 2020 [5]. The year 2021 in Ukraine was characterised by a significant increase in kidney transplants and the establishment of private dialysis centres in various regions of Ukraine. Therefore, the data immediately before the war may differ significantly from those

used in the comparative analysis. In addition, we do not consider the current data meaningful because they do not include patients in occupied areas and data from several dialysis centers that could not be contacted.

The data we were able to collect on the number of patients receiving kidney replacement therapy, the possibility of enrolling new patients, and the availability of autonomous electricity and water supplies in all regions of Ukraine are shown in Table 1.

Table 1

Number of patients treated with kidney replacement therapy and the possibility of enrolling new patients according to the Ukraine regions (as of February 1, 2023)

Regions	Patients on kidney replacement therapy			Can be enrolled additionally (n)			Autonomous supplies	
	HD/HDF	PD	KTR	HD/HDF	PD	KTR	Electricity	Water
Ukraine	6507	501	1413	2053	79	217		
Crimea	-	-	-	-	-	-		
Cherkasy	392	17	-	134	10		+	+
Chernihiv	199	15	27	208*	10		+	+
Chernivtsi	97	-	63	15				
Dnipropetrovsk	132	56	-	20				
Donetsk	-	-	-	-	-	-		
Ivano-Frankivsk	365	9	74	30	3		+	+
Kharkiv	128	30	-	20*				
Kherson	13							
Khmelnitsk	252	35	58	49				
Kirovohrad	241	-	42	26				
Kyiv region	314	11	92	60			+	+
Luhansk	-	-	-	-	-	-		
Lviv	577	12	119	241*			+	+
Mykolaiv	206	-	-	50				
Odesa	708	99	101	32			+	-
Poltava	154	47	46	20	10	5	+	-
Rivne	112	4	57	27	3	2		
Sumy	274	15	31	25			+	-
Ternopil	224	2	53	6				
Vinnitsia	250	30	54	15				
Volyn	217	2	64	84	3	60	+	+
Zakarpattia	183	26	54	57*				
Zaporizhzhia	503	10	85	170			+	+
Zhytomyr	208	13	68	20				
Kyiv city	758	68	325	744	40	150	+	+
Sevastopol city	-	-	-	-				

Abbreviation: HD, hemodialysis; HDF, hemodiafiltration; KTR, kidney transplant recipients; PD, peritoneal dialysis.

* Patients can only be admitted if consumables are provided.

As presented in Table 1, most patients were treated with kidney replacement therapy in the city of Kyiv and the regions of Odesa, Lviv, and Zaporizhzhia. About half of the Ukrainian dialysis centers (45.8%) have an autonomous power supply, and only a third (33.3%) have an autonomous water supply.

During this year of the war, the number of patients decreased in almost all regions of Ukraine, with the exception of Zaporizhzhia and Odesa. A significant increase in the number of patients in these regions is due to their internal migration from the Donetsk, Luhansk, and Kherson regions (Fig. 2).

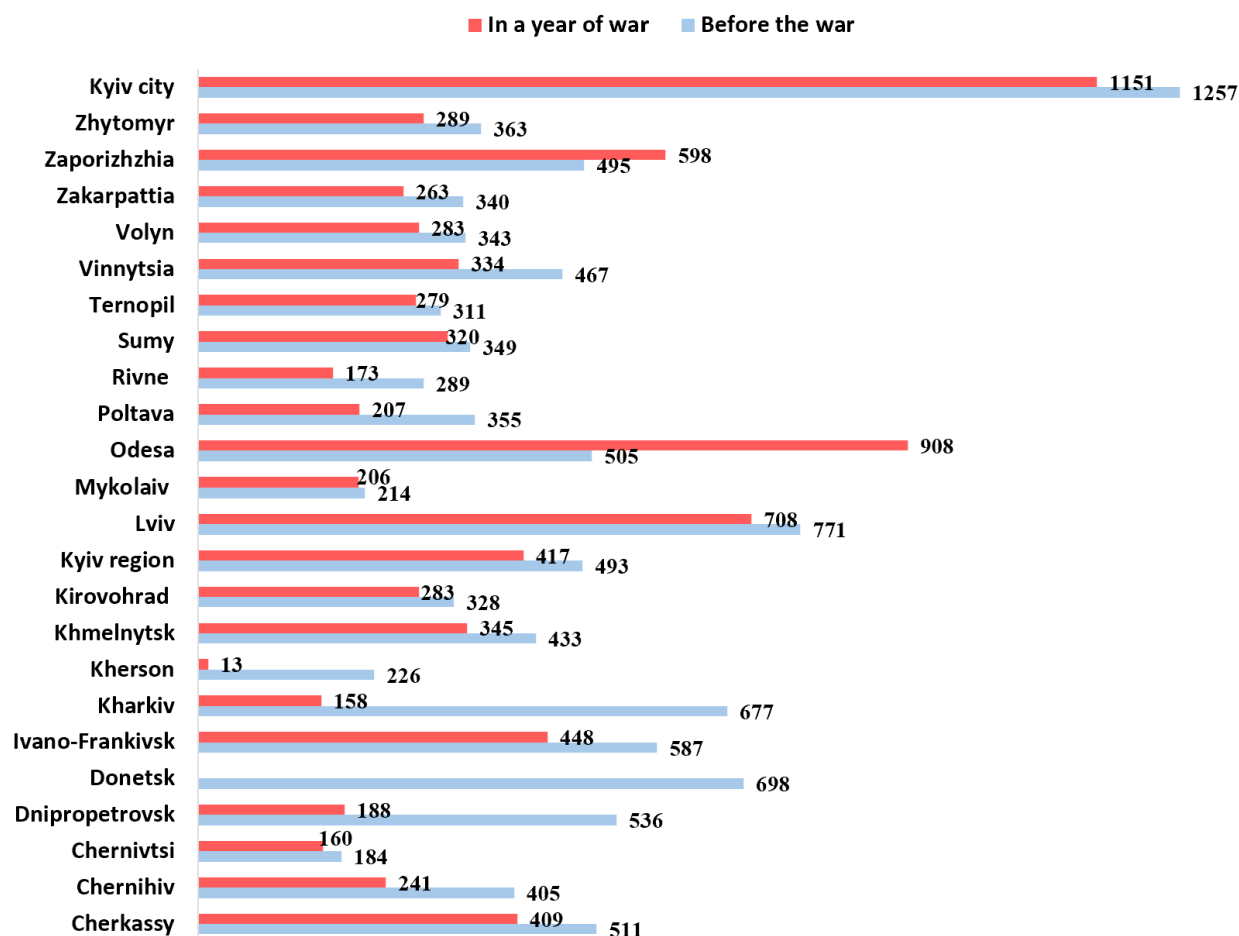


Fig. 2. The dynamics of regional distribution of patients treated with kidney replacement therapy before and during the war year.

It is worth noting that the war has not affected all regions of Ukraine equally and that its impact has been felt most acutely in the affected regions in the east of the country. For example, before the war, Kharkiv and Dnipropetrovsk regions had a well-developed healthcare system for kidney patients and were leaders among other regions in the number of kidney patients, especially PD and kidney transplant recipients. Currently, the number of patients in these regions has decreased by 77% and 65%, respectively, due to constant bombardment and proximity to the front line.

The Committee continues its work in close collaboration with the ERA Renal Disaster Relief Task Force, and we are immensely grateful to all our foreign colleagues for the assistance provided since the first days of the war. The Committee also thanks the heads of dialysis centers for their cooperation and all nephrologists who have worked in Ukraine and continue their work today because it is their commitment to the cause that saves the lives of our patients.

Unfortunately, the information presented above is far from complete, and much remains to be done to save our patients and expand our understanding of the damage that war has done to the Ukrainian healthcare system in general and to kidney care in particular.

From the foregoing, we can conclude that this year of war has had disastrous effects on our patients and our healthcare system. And the only thing that can be added is that as we enter the second year of the war, we are passing through the next period, **the period of further escalation of russian aggression**. This is a time when all Ukrainians live with the question of when and whether the conflict will escalate further and hope for a quick and successful resolution of the situation. We also hope, perhaps prematurely...

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The authors' contributions:

M. Kolesnyk: Committee leadership, manuscript editing;

I. Dudar: Committee leadership, manuscript writing, and editing;

N. Stepanova: Data analysis and interpretation, manuscript writing;

O. Loboda, I. Shifris, Y. Honchar, E. Krasyuk, V. Novakivskyy, S. Fomina, N. Kozliuk, O. Razvazhaeva: Data collection.

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