

**Summary:** Forced human migration has affected many populations in the past few decades, the worst has been from Syria, Afghanistan, Kosovo and Venezuela. Neighbouring countries such as Lebanon, Turkey, Jordan, Iran, Macedonia, Albania and Colombia have struggled to provide care to refugees with end-stage kidney disease (ESKD). This review describes and assesses the impact of forced human migration on host countries and the challenges they face when managing refugees with ESKD. Many lessons are learned, most importantly, the urging necessity of establishing health care systems ready to handle an unexpected influx of refugees with ESKD through collaborative national, regional and international efforts.

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Forced human migration resulting from wars and armed conflicts has always existed historically but refugees' access to dialysis is an emerging topic given the fact that dialysis has only become available in the past few decades.<sup>1</sup> There are many examples around the world about countries hosting refugees with end-stage kidney disease (ESKD).<sup>2</sup> This problem came to surface with the emerging and long-lasting turmoil in the Middle East, where people fled to neighboring countries, Europe, Australia, or the Americas, seeking safe shelter. Although high-income countries suffered from cultural and ethical challenges,<sup>2–4</sup> middle- and low-income countries were more prone to financial difficulties and limited resources.

Lebanon, Turkey, Jordan, Iran, Macedonia, Albania, and Colombia are upper-middle-income countries<sup>5</sup> that have faced the burden of refugees with ESKD coming from neighboring territories. These nations established hemodialysis (HD) units for their citizens between 1965 and 1985 (Table 1). The influx of Afghan refugees into Iran started in 1974,<sup>6</sup> of Kosovo people into Albania and Macedonia in 1998,<sup>7,8</sup> of Syrians into Lebanon, Jordan, and Turkey in 2011,<sup>9–11</sup> and of Venezuelans into Colombia at the end of 2016.<sup>12</sup> Therefore, the impact of migration on ESKD management is variable across host countries and depends mainly on the timing of the conflict, the readiness of the infrastructure, the geopolitical context, the socioeconomic status of both parties, and their contextualized ethical dilemmas.

This review highlights the experience of all the earlier-mentioned countries, with special emphasis on Syrian refugees in Lebanon. We discuss the general characteristics of forced human migration from Syria to Lebanon, Jordan, and Turkey; from Afghanistan to Iran; from Kosovo to Albania and Macedonia; and from Venezuela to Colombia (Table 1); the challenges faced by host countries when managing ESKD patients (Table 2); and the lessons learned based on each experience (Table 3).

## THE LEBANESE EXPERIENCE WITH SYRIAN REFUGEES

### Background

Since 2011, Lebanon has embarked on a long journey with refugees crossing the borders from Syria. The Lebanese management of the Syrian refugee crisis cannot be fully understood without looking at the demographic, political, and socioeconomic aspects of the two countries and their historical relations.

Lebanon is one of the smallest countries worldwide, located on the Eastern shore of the Mediterranean Sea, with a surface area of 10,452 km<sup>2</sup> and a population estimated at 4.5 million Lebanese inhabitants.<sup>5,13</sup> It is a developing middle-income country with only 3% of its national budget allocated to health.<sup>13,14</sup> Its unemployment rate has been estimated officially at 6.5%, but lately may have reached 25% based on some experts. Lebanon is surrounded by Syria in the north and east and Palestine and the State of Israel in the south (Fig. 1). Because of its geographic location, many religious sects ended by settling in this country across the centuries, with each of them being linked to a regional or global ethnic or political force. Lebanon has emerged as an independent nation after the end of the French mandate in 1943. It has received Palestinian refugees from the southern borders since 1948, and was invaded by the Syrian military forces in 1976. The Syrian occupation lasted almost 3 decades, until their troops' retreat from Lebanon in April 2005.<sup>14,15</sup>

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**Table 1.** Differences in the Characteristics of Hosting Countries and Their Refugees Requiring Dialysis

Hosting Country	Lebanon	Turkey	Jordan	Iran	Albania	Macedonia	Colombia
Refugee nationality	Syrian	Syrian	Syrian	Afghan	Kosovan	Kosovan	Venezuelan
Years of migration	2011–2020 (still ongoing)	2011–2020 (still ongoing)	2011–2020 (still ongoing)	1979–2002	1998–1999	1998–1999	2017–2020 (still ongoing)
Year of chronic HD launch in the host country	1970	1965	1969	1974	1985	1971	1967
Refugees/host country population, n	2 million/4.5 million	3 million/77 million	650,000 registered/6.6 million	2.6 million/56 million	435,000/3 million	360,000/2 million	1.3 million/48 million
HD refugees/HD local patients, n	250/~3,500	340/~74,000	119/4,690	179 or 2,106/587–10,000*	75/20	70/N/A	N/A
Socioeconomic status of hosting country/refugees' country (World Bank 2019)	Upper middle income/lower middle income	Upper middle income/lower middle income	Upper middle income/lower middle income	Upper middle income/low income	Upper middle income/lower middle income	Upper middle income/lower middle income	Upper middle income/upper middle income
Access to transplantation	No	Yes	Yes (3 patients)	Yes (103 patients)	Yes (2 patients)	N/A	N/A
Main organizations providing help, coordination and/or funds	UNHCR NORWAC Lebanese government Local NGOs	Turkish government Turkish Disaster and Emergency Management Authority	UNHCR Syrian diaspora organizations Local NGOs	UNHCR Iranian government Health Insurance Scheme (ongoing since 2012)	UNHCR International Organization of Migration French Embassy	UNHCR European Renal Disaster Task Force Dialysis companies	UNHCR International Rescue Committee Médecins Sans Frontières Colombian Red Cross

Abbreviations: HD, hemodialysis; N/A, not available; NORWAC, Norwegian Aid Committee; UNHCR, United Nations High Commissioner for Refugee.

\*The number of Iranian HD patients varied between 587 at the beginning of the war in 1979 and 10,000 at the end of the war; 179 is the number of Afghan HD refugees reported in 2004 and 2,106 was the number reported between 2005 and 2015.

**Table 2.** Challenges Faced by ESKD Refugees and Their Hosting Countries

	Lebanon	Turkey	Jordan	Iran	Albania	Macedonia	Colombia
Cultural differences: language, religion	Similar language (Arabic) Mixed Christians/Muslims in Lebanon with a majority of Muslim Syrian patients	Language barrier (Turkish versus Arabic) Same religion (majority of Muslims)	Similar language (Arabic) Same religion (majority of Muslims)	Language barrier for some Same religion (majority of Muslims)	Similar language (Albanian) Same religion (majority of Muslims)	Language (Macedonian versus Albanian) Majority of Christians in Macedonia and Muslims from Kosovo	Similar language (Spanish) Same religion (majority of Catholics)
Historical geopolitical tension between the two populations	Yes	Yes	Yes	Yes	No	Yes	Yes
HIS	Poor	Developed (transplantation dialysis follow-up system)	Poor	Poor: data are collected at Ministry of Health	Poor	Poor	Poor
Financial/funding	UNHCR and NORWAC in governmental hospitals Out-of-pocket in private hospitals	Fully covered by the Turkish government	UNHCR Out-of-pocket for nonregistered patients	UNHCR Iranian government	Patients transferred	Patients transferred	Data not available (out-of-pocket for nonregistered refugees)
Human resources	Deficient	Sufficient	Deficient	Sufficient	Deficient	Deficient	Deficient
Health care providers' acceptance of refugees	Fair	Acceptable	Fair	Acceptable	Acceptable	Fair	N/A
Treating emergency cases	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equipment availability	Yes (some shortage at the beginning of the crisis)	Yes	Yes	Yes	Deficient	Deficient	Yes
Social living conditions (living in bad conditions, thus affecting their outcome)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Undocumented refugees with ESKD receiving only emergency dialysis or no treatment	Yes	Yes	Yes	Yes	N/A	N/A	Yes
National policy	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Abbreviations: ESKD, end-stage kidney disease; HIS, health information system; N/A, not available; NORWAC, Norwegian Aid Committee; UNHCR, United Nations High Commissioner for Refugee.

**Table 3.** Lessons Learned and Examples From Host Countries

Lessons learned	Examples
Strengthening of the HIS	This is the main difference between the Lebanese and Turkish systems. In Turkey, all patients were registered electronically and tracked. In contrast, the HIS was lacking in Lebanon and it made it very difficult for the government to identify the number and distribution of Syrian refugees on dialysis.
Early mobilization of funds	This was highlighted in Jordan where apparently many Syrian diaspora organizations may have covered the dialysis of refugees, but there was a failure in addressing these funders in an organized manner and at the right time.
National policy targeting immediate and long-term crisis management	This is a lesson from all countries. Governments probably now are more aware of the necessity to have a pre-established strategy to deal with an influx of refugees needing health care services.
Ethics encouraging acceptance of refugees and taking into account the needs of the host country's health care providers	Lebanon is living proof of a nation that dealt with Syrian refugees with humanity and ethics. Nephrologists in public hospitals treated dialysis patients for free for 2 years; health care providers took in these patients despite the history of Syrian military occupation of Lebanon.
Enhancing awareness about health services among refugees and the importance of registration	This is a lesson from all countries. Undocumented and nonregistered refugees usually avoid asking for health care services and very often are denied services unless they pay out-of-pocket or are in an emergency state (thus the moral obligation to treat them).
Active involvement of stakeholders	The Albanian experience was more difficult than the Macedonian one because of the lack of involvement of effective organizations such as the European Task Force.
Finding alternative cheaper treatment/rationing of scarce resources	This is a proposal from the Jordanian experience: performing thorough research on cheaper supplies for dialysis, less-frequent sessions, peritoneal dialysis, choice-restricted conservative care.
Preventing ESKD by managing CKD patients at an earlier stage	This is a lesson from the Iranian experience: treating noncommunicable diseases would prevent the high incidence and burden of end-stage renal disease in the long term.
Fair geographic distribution of patients	Full social integration can help a fair distribution of dialysis patients as seen in Turkey.
Repatriation of dialysis patients in a proper way	This is an example of the Afghan refugees who were on dialysis or received a kidney transplant. They were kept in Iran because they would not access treatment in their country once they leave Iran.

Abbreviations: CKD, chronic kidney disease; ESKD, end-stage kidney disease; HIS, health information system.

When the Syrian Civil War started in 2011, Syria had 20 million inhabitants.<sup>5</sup> Given the close proximity of the two countries, many Syrians were forced to migrate to Lebanon. This migratory movement escalated in 2013 when Syrian refugees began to flee abundantly inside Lebanon across the borders of the North and Beqaa Valley. Almost 2 million Syrian refugees (including Palestinians residing in Syria) entered Lebanon, some officially and others clandestinely. This number led to the highest ratio of refugees per capita in history. The Syrian influx into Lebanon was unexpected, tremendous, and undesirable for both parties. These three characteristics shaped the way Lebanese citizens, government, and nongovernmental organizations (NGOs) dealt with the Syrian refugee crisis. This crisis affected all aspects of daily life and human rights of individuals, from basic needs such as water and sanitation, going through the health sector and well-being, and reaching the employment and security of both citizens and refugees.

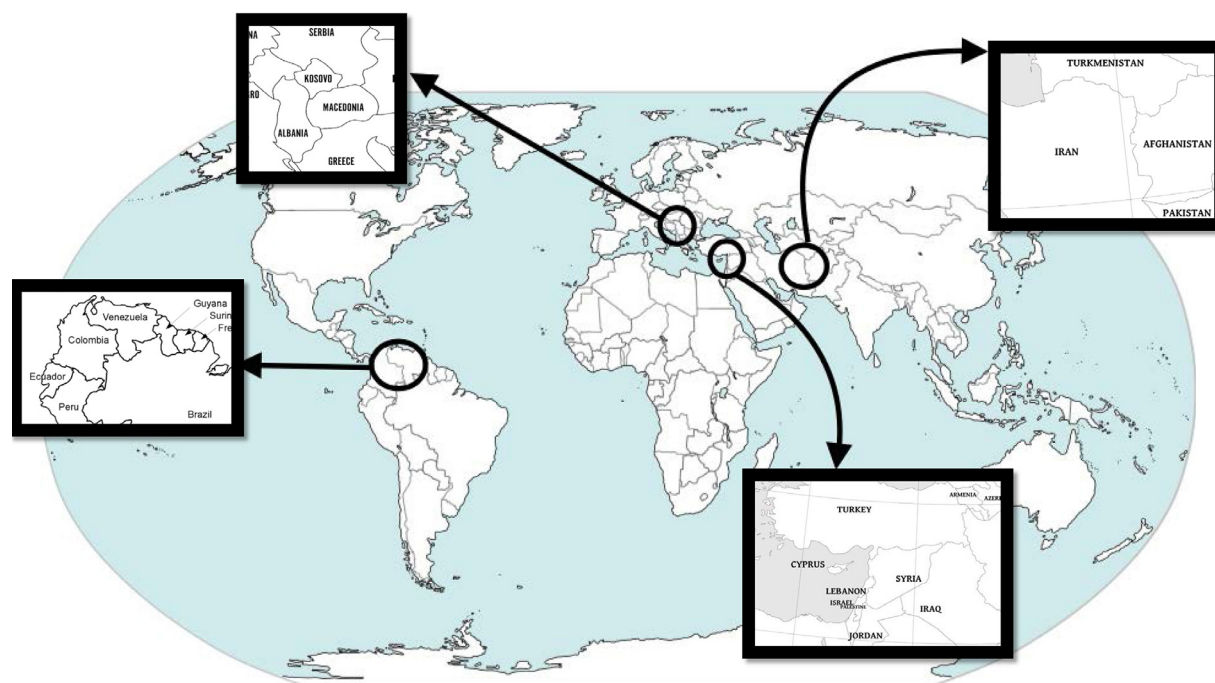
## The Management of Syrian ESKD Patients in Lebanon

### ESKD in Syria and Lebanon before the War

Management of chronic noncommunicable diseases that require continuity of care constitutes a high financial

burden on governments.<sup>15,16</sup> Lebanon's health care system is a public–private mixture in which the majority of the health care services are provided by the private sector. Public hospitals constitute less than 15% of the total number of hospitals and are completely covered by the government. The Lebanese Ministry of Public Health (MOPH) also reimburses some services in private hospitals for patients who do not benefit from social insurance, such as the National Social Security Fund, the Army, the Internal Security Forces, or the Mutual Funds.<sup>13,14</sup> These services include free-of-charge chemotherapy, open heart surgeries, and HD. The total number of Lebanese patients on dialysis was estimated at 3,500 in 2015, with the vast majority on HD.<sup>16,17</sup> The number of patients covered by MOPH was 1,600 to 1,800 between 2012 and 2015, distributed across 65 to 70 Lebanese dialysis units. No Lebanese ESKD patient needing dialysis is left behind without treatment. Lebanon also has Palestinian refugees undergoing HD and peritoneal dialysis. These patients are covered by the United Nations Relief and Works Agency for Palestine refugees and, with a few exceptions, by the Lebanese Government.<sup>17,18</sup>

In Syria, the story was different. Before the war, HD was not available to all ESKD patients, especially poor patients residing in rural areas, so many would die without receiving dialysis.<sup>18–20</sup> During the war in Syria, health infrastructure and basic health supplies were destroyed; thus, patients with ESKD undergoing dialysis



**Figure 1.** A world map illustrating the main countries that have dealt with refugees on dialysis.

suffered a shortage of treatment and the number of patients with ESKD who did not benefit from dialysis increased in number.<sup>19,20</sup>

### The Experience of the Syrian Refugees with ESKD in Lebanon

Between 2011 and 2018, approximately 250 Syrian patients needing dialysis treatment were recorded in Lebanon.<sup>11,17,18</sup> In the first months of Syrian migration, dialysis patients were randomly heading to the Lebanese dialysis units located close to their shelter. Many of these patients had to pay out-of-pocket to cover their dialysis in private hospitals. Some of these private hospitals could not receive refugees because of a shortage of filters. The Syrian patients, who could not undergo dialysis in private hospitals, were redirected by MOPH to public hospitals. There is uncertainty whether all patients followed the instructions and went to public hospitals or some chose to stay and die at home. Many patients chose to go once or twice per week. There was only one public hospital offering dialysis in the capital of Beirut, the Rafic Hariri Governmental Hospital, and few others in the Beqaa, the South, and the North Governorates. Unfortunately, the MOPH dialysis office, because of a shortage of human resources (two employees at that time), did not register the names of patients who came to ask for help and information but rather gathered the names of patients sent from each dialysis unit treating Syrians refugees. The number of patients coming from Syria and who needed dialysis as reported by the Lebanese MOPH Bulletin<sup>17,18</sup> were as follows: 42 Syrians, 35

Palestinians, and 8 from other nationalities in 2012; 134 Syrians, 35 Palestinians, and 7 others in 2013; 142 Syrians, 57 Palestinians, and 2 others in 2014; 91 Syrians, 54 Palestinians, and 5 others in 2015. Private patients who paid for their dialysis were not recorded. The Lebanese MOPH added these yearly numbers to assess the total cost of sessions, but many patients on chronic dialysis overlapped over the years. Therefore, the true total number of Syrian refugees undergoing dialysis in Lebanon did not exceed 250 patients.

Between 2011 and 2014, the majority of Syrian refugees with ESKD underwent dialysis for free in the public hospitals. At first, the Lebanese government was not able to reimburse the dialysis units and nephrologists taking care of these patients. Progressively, the dialysis fees were paid by one of several organizations that got involved in helping refugees. The United Nations High Commissioner for Refugees (UNHCR) was the first to cover the expenses of Syrian patients on dialysis in public hospitals until there was a shortage in funds in 2017.<sup>11,20,21</sup> In the North, a Syrian humanitarian organization called Al-Bashaer sponsored 34 patients in 2015 and offered each patient one or two sessions per week. It was an independent dialysis unit not affiliated with a hospital. This individual unit bought its own machines, hired its own Syrian staff, and probably was supervised by a Syrian physician. It functioned for 3 years and closed in March 2018 because of a lack of funds. As a result, the remaining 27 patients were redirected to the Dinnieh Governmental Hospital's dialysis unit (personal communication). At this point in time, the Norwegian Aid Committee launched a program to support Syrian

refugees in Lebanon.<sup>15,16</sup> This committee started to look into the 206 Syrian dialysis patients (and 12 Palestinians) who were still in the country and took care of the fees of 114 patients. The Syrian American Medical Society, the Kuwait Red Crescent Society, and Caritas Lebanon helped cover the cost of the remaining patients. Fifty-nine percent of these patients were males, 25% in the North of the country, 26% in Mount Lebanon and the capital of Beirut, 35% in Beqaa, and 14% in the South.<sup>11</sup> Lebanon had 70 dialysis units at that time,<sup>16,17</sup> but only 27 units were treating Syrian refugees.<sup>11</sup> The Norwegian Aid Committee launched an excellent program<sup>11</sup> to cover the fees of all dialysis sessions of 114 patients in the country and they followed the local guidelines of three sessions per week.<sup>16,17</sup> They paid the hospitals \$100 US per session, a fee that is less than the fee reimbursed by Lebanese MOPH (\$124 US), but is enough to cover the physicians' fees, the dialysis disposables, the laboratory tests, and erythropoiesis-stimulating agents. However, funds had started to diminish lately and thus some social events for fundraising were organized.

Unfortunately, no data regarding accurate demographics, medication intake, or adequacy of dialysis were available for the Syrian dialysis patients; but this also applies to the Lebanese patients knowing that Lebanon lacks a health information system (HIS) that connects the MOPH with different dialysis units.

### Challenges of the Migration of Syrian ESKD Patients into Lebanon

One of the most important challenges in Lebanon has been the big number of refugees entering the country. The registered refugees reached 21% of the total population in 2014, but this percentage would go up to 40% if the nonregistered refugees were included.<sup>21,22</sup> The percentage of refugees on dialysis among the whole Lebanese dialysis population exceeded 7% in 2014. Furthermore, their concentration in a few centers adversely affected the quality of care for both Lebanese and Syrian patients in these units. Some units had to extend their working shifts to cover the treatment of refugees and some sessions had to be shortened.

Consequently, this overload of patients exceeded the available material, human, and financial resources. First, Lebanese private units had to refuse to treat a patient if they did not have enough disposables, unless she/he paid for the session immediately. Second, although Lebanese nephrologists were sufficient in number, the number of nurses was insufficient. The majority of units were not following the MOPH recommendations of one nurse for four patients. Therefore, overwhelmed nurses could not take care of a larger number of patients. Third, the lack of funds, the very low economic status of Syrian refugees, and the lack of universal health coverage in Lebanon all were financial obstacles that may have led to

interruption in treatment in some patients and to the poor general health status of refugees, thus increasing their burden on the health system.<sup>11</sup> The financial challenge left Lebanese dialysis health care providers perplexed when receiving a refugee needing chronic dialysis without the means to pay or a reimbursement plan.

An additional challenge in Lebanon was the lack of a HIS, connecting dialysis units to the MOPH. This issue had a negative impact on the distribution and tracking of patients and on data gathering regarding the treatment adequacy and the living conditions.

Another significant barrier that mitigated access to care during this massive migration was the high number of refugees not registered with the UNHCR and without official documents. A study on elderly refugees in Lebanon found that more than 40% of them were not registered.<sup>22,23</sup> These patients could not easily get health care services and information about their health status, and outcome was limited.

On top of all these obstacles, the acceptance of Lebanese health care providers to treat refugees is an important ethical challenge to be taken into account. Unquestionably, health care providers are ethically obliged to provide care to any patient in need. This moral obligation is essential during emergencies. When Syrian refugees started to show up at the door of Lebanese dialysis units between 2011 and 2012, without any advanced notice, the majority of health care providers took them in for urgent dialysis sessions. Many of these patients did not follow a regular schedule for dialysis and kept appearing on an urgent basis for many reasons, mainly financial constraints or continuous mobility. Nephrologists, nurses, and hospital directors faced a difficult moral quandary because the uptake of these patients was disturbing the daily schedule of dialysis staff, increasing the burden on overloaded and understaffed dialysis units.<sup>23,24</sup> Some units had to refuse Syrian refugees at the beginning of the migration crisis because they had a limited number of filters reserved for Lebanese patients. This inequity in care provision by prioritizing their own citizens remains a major moral issue. The ethical dilemma was even larger in public dialysis units that provided dialysis to these patients free of charge for 2 years; nephrologists were never reimbursed by the government for their services while feeling obliged to follow up with these patients. Moreover, the urgent aspect of dialysis need in this particular situation made nephrologists and nurses hesitant and reluctant to take dialysis patients without any medical report on their hepatitis and tuberculosis status. However, they had to put these urgent patients among all other pre-existent ones (leishmaniasis and scabies are also the most reported communicable diseases among Syrian refugees<sup>24,25</sup>). The dilemma was between saving one life and jeopardizing the health of many others. In addition, although

there was no language barrier between Syrian and Lebanese people, religious intolerance may have played a role in some areas.

Finally, it goes without saying that the unpreparedness of the Lebanese health care system led to a disorganized management of dialysis patients; the MOPH was not ready for a prompt coordination with different hospitals and made a late decision to manage refugees only in public hospitals. On top of that, the lack of awareness of refugees about available services pushed them to keep coming on an urgent basis, which did not help in improving the process of care.

### Lessons Learned from the Crisis

The Lebanese experience and its challenges can be very useful in establishing a national response plan that could be helpful in similar situations.

Management of such a crisis should be divided into two stages: an immediate phase one stage covering the first 3 months of the migration, and a long-term phase two stage in case of prolonged conflicts. A national policy has to be developed and a focus committee (at the MOPH) has to be assigned to deal with refugees with ESKD. The policy should engage all stakeholders in the country. Nephrologists, hospital syndicates, nurses, dialysis companies, NGOs, and MOPH, including its dialysis office, all should be involved in drafting the policy. A thorough economic evaluation is necessary, especially in a developing country with limited resources. An assessment of the sociodemographic context is important, with careful evaluation of the number of patients that Lebanon can support during a conflict to ensure fair distribution and an adequate number of sessions per week. Evidence about the use of less-frequent HD or continuous ambulatory peritoneal dialysis, implementation of choice-restricted conservative care, or encouragement of a transplant program for refugees also should be taken into account.

The focus committee should be reachable and knowledgeable to guarantee the registration of each refugee entering the country and needing dialysis. This committee should ensure the appropriate distribution of refugees to centers next to their residential address, document their hepatitis and tuberculosis status or any other communicable disease, manage the follow-up evaluation of these patients, and prevent a discontinuity of care that could be fatal in this subset of patients. They should develop a procedure to inform refugees at a very early stage about the available dialysis units in the host country. This can be performed at the border upon entry to the country and at their registration by the UNHCR.

A strong health information system can make the management of dialysis patients easier, more accurate, and more organized. Lack of organization could have been prevented in Lebanon if an online network was

established between the MOPH and different dialysis units. The distribution of patients also would have been equitable and no unit would have been overloaded with refugees. An online registry for refugees should be developed and supervised by the local government in collaboration with NGOs and public and private hospitals.

Obviously, a host country, already dealing with a health economic shortage, cannot provide adequate coverage of dialysis for refugees. Therefore, the United Nations should establish a fund reserved for refugees from conflict zones. This fund can be used in the immediate first 3 months, and meanwhile another strategy for financing should be ready for the long term. Fundraising activities should be sustained to help with the long-term financial coverage of adequate dialysis for refugees with ESKD. On top of donations, earmarked taxes can be suggested, for instance, taxes on the airline tickets of mobile refugees or on residency renewal fees. Funds also can be used to strengthen the health information system between MOPH, NGOs, and hospitals.

Ethics should be reinforced by laws that ensure that no patient in need of dialysis is left behind, whether a Lebanese citizen or a refugee. The same ethical and legal issues that were raised in Europe<sup>3</sup> also should be addressed in Lebanon, which has faced the highest ratio of refugees to own citizens. The country also has moral obligations to its citizens. The compassion fatigue that has been highlighted in a survey on Lebanese nurses point to the necessity of addressing the issue of a nursing shortage and overload so they can deal with a refugee crisis when it occurs.<sup>23,24</sup> An undocumented or nonregistered refugee needing dialysis is also an international humanitarian challenge<sup>25,26</sup> and advocacy is needed globally by lobbying governments and mobilizing renal associations to ensure these vulnerable patients are getting dialysis.

## THE TURKISH EXPERIENCE WITH SYRIAN REFUGEES

### Background

Turkey is a transcontinental country with a surface area of 785,350 km<sup>2</sup>, located in Asia and Europe, and bordered by Greece, Bulgaria, Georgia, Armenia, Iran, Iraq, and Syria (Fig. 1). Turkey is an upper-middle-income country and is considered a developed industrialized country by the United Nations. The Turkish population is estimated at 82 million inhabitants,<sup>5</sup> with a vast majority of Muslims. Refugees constitute 2.5% of the total population. Turkey, Lebanon, and Jordan are the three countries that have received the highest number of Syrian refugees since April 2011.<sup>9</sup> The historical relationship between Turkey and Syria has been full of tension since the 1930s when Hatay province joined Turkey

instead of Syria. Since the start of the Syrian civil war, their political tension worsened with explosions and shootings at the border. However, despite all this tension, the number of Syrian refugees in Turkey was estimated at 2.8 million in 2017.

### The Management of Syrian ESKD Patients in Turkey

Turkey has a comprehensive health care system available for free to all of its registered residents. At the end of 2016, the estimated number of Syrian patients on dialysis in Turkey was 345 of 3 million refugees.<sup>10</sup> The Turkish government covered the cost of dialysis of these patients who were mostly well dialyzed. It covered their treatment in private, public, primary, secondary, and tertiary centers. They were under the supervision of the Turkish Disaster and Emergency Management Authority.

In Turkey, the HIS is well developed. They have a program called Transplantation Dialysis Follow-up System, which is run by the Ministry of Health. Through this system, dialysis units report all dialysis orders, treatments, and parameters (but not the etiology of ESKD or predialysis care) on a monthly basis. The Syrian refugees needing dialysis were distributed mostly between the Southeast Anatolian and Mediterranean regions, the closest to Syria. A total of 51.6% were males and 67.3% were treated in public hospitals. Two percent of the refugees had hepatitis B and 6.7% had hepatitis C. Ninety-two percent had dialysis three times per week, with each session lasting 4 hours. Despite the sudden influx of refugees and the unpreparedness of the host country, they performed an excellent job in providing standard treatment to the refugees, better than their country of origin (only 13% were dialyzed three times a week in 2009 in Syria).<sup>18,19</sup>

Through its advanced HIS, Turkey was able to compare the data of Turkish dialysis patients with Syrian refugees. The dialysis session's parameters were very similar between the two groups. High-flux dialyzers were mostly used and blood flow rates ranged between 300 and 400 mL/min. However, a Kt/V greater than 1.2 was achieved in 90.2% of Turkish patients versus 77.7% of Syrian refugees, and serum albumin and hemoglobin levels were significantly lower in Syrian patients. This points mainly to the probable malnutrition of refugees. It is noteworthy that Syrian dialysis patients had a lower mortality rate compared with Turkish dialysis patients. Only 20 of 345 patients died in 2016. This lower mortality rate might be related to their younger age because 75% were younger than age 65 years.<sup>10</sup>

The big challenge in Turkey resides in the follow-up evaluation of the refugees outside of the dialysis units. Low serum albumin level reflects their poor nutrition, thus comprehensive care including assessment of living conditions and access to food may need to be implemented. To enhance the outcome of these patients and ensure equity

between them and the Turkish citizens, social evaluation and support seem to be the next challenge.

We learned from the Turkish experience that good financial coverage of treatment, health system emergency preparedness, and a well-developed HIS are strong assets to improve the care and survival of dialysis patients in the host country. Turkey is also a good example of integration of refugees and treating them similarly to their Turkish counterparts. However, this cannot be achieved in countries with a health system that does not offer universal health coverage to its own citizens.

## THE JORDANIAN EXPERIENCE WITH SYRIAN REFUGEES

### Background

Jordan, or the Hashemite Kingdom of Jordan, is an Arab country, with a surface area reported at 89,320 km<sup>2</sup>, located in Western Asia and bordered by Saudi Arabia, Iraq, Syria, Palestine, and the State of Israel (Fig. 1). The Jordanian population was estimated recently at 10 million, and Jordan is considered an upper-middle-income country.<sup>5</sup> Historically, both Jordan and Syria were part of Great Syria under the French mandate. However, tensions between the two countries have evolved throughout the years. The early stages of the Syrian war witnessed a military conflict between the two countries along the borders. In addition, the Syrian ambassador was expelled from Jordan in 2014. Despite all of these political and military clashes, 650,000 Syrian refugees were reported by UNHCR in 2015 in Jordan.<sup>9,26,27</sup> The influx of Syrian refugees into Jordan heavily affected the environment and infrastructure of the country, increased the cost of water and electricity, and aggravated the tension between the two nations.<sup>28</sup>

### The Management of Syrian ESKD Patients in Jordan

The majority of Syrian refugees in Jordan were living in camps. They were not allowed to work and they were not considered refugees but rather as "visitors."<sup>9</sup> Their access to health care was restricted to aid from humanitarian organizations. Syrian refugees residing outside allocated camps paid out-of-pocket for their health services. The unavailability of medications and the cost of transportation to get treatment were two significant financial burdens facing the Syrian refugees in Jordan.<sup>29</sup> There are no published data about dialysis of ESKD refugees in Jordan between 2011 and 2015. In March 2015, 119 Syrian dialysis patients were identified in Jordan through NGOs and UNHCR.<sup>27</sup> Of these patients, only 99 were still in Jordan in September 2015, 3 had received a transplant, 4 had died, and 13 had left the country. Among the 99 remaining patients, 68 received three dialysis sessions per week, 30 underwent dialysis twice per

week, and 1 patient underwent dialysis once per week. A total of 54% of these patients started receiving dialysis in Jordan and 46% already were receiving dialysis in Syria. The majority of dialysis fees were covered by the Syrian diaspora organizations.

The challenges in Jordan are numerous.<sup>27</sup> The most important one is the lack of funding and the weak mobilization of funds, causing treatment interruption in some patients. Another challenge was finding a dialysis unit ready to accept the patients, because some patients had to travel to another city to get dialysis. It is not clear whether the reason was financial or because of acceptance issues. The health cost was enormous and the majority of patients could not afford to buy medication or pay for transportation to access health services.<sup>29</sup> A total of 14% of the dialysis patients had hepatitis C and one may wonder whether this was a reason for being rejected by some units.

The Jordanian experience reminds us that covering dialysis fees for refugees is always possible through lobbying and approaching regional and international organizations. It also points to the importance of discussing cost-effective ways to manage dialysis refugees and open the road for future research regarding cheap and safe alternative methods for HD during a migration crisis. It also highlights the geopolitical impact on host countries when dealing with refugees seeking health care services. This can be resolved only by strong international health organizations supporting the vulnerable migrant populations in need.

## THE ALBANIAN AND MACEDONIAN EXPERIENCE WITH KOSOVO REFUGEES

### Background

In 1999, Albania had a population that was estimated at 3.5 million people and the Republic of Macedonia had 2 million inhabitants.<sup>5</sup> Macedonia is located to the East of Albania and both countries lie to the South of Kosovo (Fig. 1). Kosovo is a partially recognized state with a recent population estimate of 1.8 million and a small surface area of 10,887 km<sup>2</sup>. The Kosovo war was fought between the Federal Republic of Yugoslavia forces and the Kosovo Albanian group from February 1998 to June 1999. During the Kosovo war, Albania hosted half a million refugees and Macedonia hosted 250,000 refugees.<sup>7,8</sup>

### The Management of Kosovo ESKD Patients in Albania and Macedonia

Among the 250,000 refugees that Macedonia hosted from Kosovo, 70 patients were on chronic HD.<sup>8</sup> The Nephrology Department of the University of Skopje worked on distributing these patients to four centers: the majority to Struga, Tetovo, Debar, and Gostivar. They had a shortage of filters and other disposables, the number of dialysis patients exceeded their capacity, and they

asked for help from UNHCR and other European countries. Eight patients were transferred to Belgium, 6 to The Netherlands, and 20 patients to Germany. Donations from healthcare industry helped ease the shortage; for example, Fresenius Medical Care (Sankt Wendel, Germany) donated dialysis machines and filters, Baxter International (Deerfield, IL) donated peritoneal dialysis bags, and Gambro (Lund, Sweden) donated HD filters. The European Renal Disaster Relief Task Force made a lot of effort to ensure that all patients received dialysis in a center in Europe.<sup>8,30</sup>

In Albania, the incidence of ESKD patients needing dialysis was estimated at 400 per year, but a large number was not receiving dialysis because of the poor health care infrastructure. There was only one center in the country that provided dialysis for a total of 20 patients.<sup>7</sup> Patients who were older than age 50, diabetic, and with other comorbidities were not offered dialysis. Albanian nephrologists were treating mainly chronic kidney disease (CKD) patients to delay their need for dialysis, and when dialysis was needed, they managed them conservatively in the majority of cases. When the Kosovan refugees entered Albania, the dialysis center made a lot of effort to extend the working schedule to cover the dialysis of 75 refugees and respond to the urgent influx of patients. They offered them twice-weekly dialysis but they could not ensure the sustainability of their services because of the lack of equipment and human resources. With the help of the UNHCR, they transferred half of these patients to other European countries such as Italy and Austria. For the remaining patients, they received donations and human resources from France to maintain their HD treatments, a few patients received peritoneal dialysis, and a couple of patients received a kidney transplant. The European Renal Disaster Task Force that supported refugees in Macedonia was not present in Albania.

The challenges were mainly the poor infrastructure and limited human and material resources in an era during which dialysis was not largely developed or provided. Financial challenges, stakeholder engagement, and political influence were probably more predominant in Albania than Macedonia.

The main lesson learned from these two countries is the importance of engaging a regional and powerful organization that can offer materials and human resources when managing refugees. Early involvement and emergency planning and preparedness of these organizations can save lives.

## THE IRANIAN EXPERIENCE WITH AFGHAN REFUGEES

### Background

Iran is a developing country in the Middle East with a surface area of 1,648,000 km<sup>2</sup> and a population that

increased from 56 million inhabitants in 1990 to 82 million in 2018.<sup>5</sup> Afghanistan, on the other hand, is a least developed country, with a surface area of 652,237 km<sup>2</sup> and a population estimate of 12 million during the war (1979–2002), reaching 35 million recently. It lies along the eastern border of Iran (Fig. 1). The war in Afghanistan lasted 23 years, during which time millions were killed and displaced and 5 million escaped to seek refuge in other countries. Between 1980 and 1989, during the occupation of Afghanistan by the Soviet army, Afghan refugees entered Iran and reached a peak of 3 million in 1991.<sup>31</sup> Afghanistan had its health infrastructure devastated during the 3 decades of conflict and renal replacement therapy was almost inexistent. Forty percent of the Afghan refugees entered Iran. They were not concentrated in camps and lived in the eastern provinces and cities. Among the 3 million Afghan refugees in Iran, only 1 million were registered. Those refugees had the chance to integrate, work, and receive equal access to health care as native Iranians.<sup>32</sup> The other refugees were living in very vulnerable conditions.<sup>6</sup>

### The Management of Afghan ESKD Patients in Iran

The HD program in Iran was launched in 1974. The number of dialysis units increased from 60 to 270 between the first influx of Afghan refugees until the end of the war in Afghanistan in 2002.<sup>33</sup> The number of HD patients increased from 587 in 1991 to 12,500 in 2006.

Data on the total number of Afghan refugees who received HD in Iran during the 23 years of war in Afghanistan are not available in the literature. In 2004, 241 Afghan refugees with ESKD were reported in Iran: 179 were on HD and 62 received a kidney transplant.<sup>32</sup> These numbers were reported by the ESKD Office of the Iranian Ministry of Health. A large number of Afghan patients underwent kidney transplantation in Iran. This number was estimated at 103 between 1991 and 2006.<sup>31</sup> Otoukesh et al<sup>34</sup> reported 2,106 Afghan refugees with ESKD in Iran between 2005 and 2010, 57% of them were of Hazara ethnicity. It was unclear in their report whether this number took into consideration that a dialysis patient is a chronic patient and can appear repetitively every year. They concluded that ESKD prevalence was higher in the Afghan refugees living in Iran than in the Iranian population.<sup>33,34</sup>

The major challenge faced by the Afghani refugees in Iran resides in the long-term burden of managing refugees' health in prolonged conflicts. The late uptake of CKD refugees at the stage of dialysis highlights the important lesson of managing CKD early on to delay disease progression to ESKD. Indeed, the incidence of ESKD among Afghani refugees in Iran exceeded that of Iranians in Iran. This is the result of the prolonged conflict, poor management of noncommunicable diseases, and lack of health programs targeting kidney disease. The Health Insurance Scheme

covered Afghan refugees with CKD very late after the end of the war, starting in 2012 to 2013.<sup>6</sup>

Another challenge is the ethical dilemma to return refugees on dialysis or who received a kidney transplant to their country of origin where treatment is not provided or secured and thus jeopardizing their life.<sup>26</sup> The Transplantation Society in Iran and the World Health Organization tried to work with the UNHCR to prevent the death of these patients and keep them in Iran if needed.<sup>26</sup>

## THE COLOMBIAN EXPERIENCE WITH VENEZUELAN REFUGEES

### Background

The Colombian experience is the most recent one. Colombia is an upper-middle-income country situated in the northern area of South America and is bordered by Venezuela to the east (Fig. 1). Its population in 2019 was estimated at 48 million inhabitants. It has a surface area of 1,100,000 km<sup>2</sup> and is known to be a very powerful nation in South America.<sup>5</sup>

On the other hand, Venezuela is an upper-middle-income country with a surface area of 916,445 km<sup>2</sup> with approximately 29 million inhabitants.<sup>5</sup> The political crisis in Venezuela started at the end of 2015 after a failed military coup against the president Nicolas Maduro. In 2019, 4 million people already had fled Venezuela after the beginning of the crisis because of violence, hyperinflation, and a shortage of medications. A total of 1.3 million entered Colombia, which shares the longest border with Venezuela (Fig. 1).

### The Management of Venezuelan ESKD Patients in Colombia

The health system in Colombia is very similar to the one in the United States: the government covers the most vulnerable part of the population and the remaining part needs to obtain insurance. Chronic HD was launched in Colombia in 1967. Colombia had 100 dialysis centers in 2004, with 8,447 patients on HD and 4,900 on peritoneal dialysis.<sup>35</sup> Unfortunately, no further recent data are available in the literature. The Dialysis Outcomes in a Colombian study reported three different regimens for ESKD coverage in 2005.<sup>36</sup>

In Venezuela, before 2015, all ESKD patients had free access to dialysis in 136 governmental dialysis units, distributed across the country. When Maduro became president, the economy crashed in Venezuela, and the 1,600 dialysis machines were not maintained and no new equipment entered the country.<sup>37</sup> There have been water and electricity power cuts, jeopardizing the treatment and the survival of the 11,000 dialysis patients in Venezuela.<sup>37</sup> It is unclear how many dialysis patients entered Colombia. Many anecdotal reports have been found in

the grey literature, especially in the media. In Colombia, a Venezuelan cannot get access to health care without being registered with the UNHCR or becoming employed.<sup>12</sup> The Colombian Red Cross is helping people at the border obtain medical aid and get registered. Colombia is trying to provide free health care services for unregistered emergency cases. Venezuelan refugees who suffer from nonurgent health problems need to use their insurance or pay out-of-pocket for the service.<sup>38</sup>

The challenges in Colombia are numerous. They include organizing the chaotic influx of refugees, good orientation of people to health services, mobilizing local and international funds, finding human resources to respond to locals and refugees, and responding to emergency dialysis for unregistered patients.<sup>12</sup> Only 21% of the United Nations' 2019 response plan for Venezuelan refugees' migration has been funded.

It still may be too early to learn anything from the Colombian experience. Nonetheless, it highlights the important role of NGOs and calls for emergency preparedness of International Societies. More lessons are yet to come and more data need to be gathered regarding Venezuelans' ESKD management in Colombia.

## CONCLUSIONS

The impact of forced human migration on the management of ESKD patients carries a lot of similarities among the different host countries described. However, some challenges are more prominent in one country than another. Indeed, Lebanon had to deal with the highest ratio of dialysis refugees over dialysis patients of the host country and the lack of funds forcing some nephrologists to provide free services for 2 years. The Turkish experience emphasizes the necessity of an organized approach and a strong HIS as well as the importance of universal health care coverage in the host country; this can make the acceptance of citizens and health care providers much easier and ensure the financial coverage of dialysis sessions for refugees. Jordan did not have the resources and funds to cover all refugees with end-stage renal disease and their experience urges researchers to find cost-effective alternatives to HD three times per week. Thirty years ago, Albania and Macedonia suffered from the lack of availability of dialysis and the shortage of trained health care providers. Iran's experience, which is the longest one, highlights the importance of taking care of refugees at earlier stages to delay the progression of CKD and thus avoid the high burden of reaching ESKD. Colombia is challenged with a high number of nonregistered refugees who cannot access health care. In all cases, we witnessed tremendous humanitarian efforts to provide dialysis to refugees despite the political tension between neighboring countries. It goes without saying that there is an urgent need for strong powerful global advocates against armed conflict and violence in

the world. Meanwhile, the nephrology community, physicians, and nurses should be acknowledged for their dedication in their mission to serve all people relentlessly without discrimination, even without any financial support. Finally, local and international organizations should be supported in their fundraising and governments should exert a great effort to establish strong national/regional policies for management of dialysis refugees in need.

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