

October 2022

HEALTH CARE SYSTEM IN LEBANON: A REVIEW ADDRESSING HEALTH INEQUALITIES AND ETHICAL DILEMMAS OF FRONTLINE WORKERS DURING COVID-19 PANDEMIC

Georges Hatem

Lebanese University, University of Porto, Lebanon, georges.r.hatem@gmail.com

Mathijs Goossens

Program Manager of Flemish Breast Cancer Screening Program, Brussels, Belgium, mathieu.goossens@uzbrussel.be

Follow this and additional works at: <https://digitalcommons.bau.edu.lb/hwbjournal>



Part of the [Life Sciences Commons](#), and the [Medicine and Health Sciences Commons](#)

Recommended Citation

Hatem, Georges and Goossens, Mathijs (2022) "HEALTH CARE SYSTEM IN LEBANON: A REVIEW ADDRESSING HEALTH INEQUALITIES AND ETHICAL DILEMMAS OF FRONTLINE WORKERS DURING COVID-19 PANDEMIC," *BAU Journal - Health and Wellbeing*. Vol. 5: Iss. 1, Article 4.

DOI: <https://www.doi.org/10.54729/YVAA4887>

Available at: <https://digitalcommons.bau.edu.lb/hwbjournal/vol5/iss1/4>

This Article is brought to you for free and open access by Digital Commons @ BAU. It has been accepted for inclusion in BAU Journal - Health and Wellbeing by an authorized editor of Digital Commons @ BAU. For more information, please contact ibtihal@bau.edu.lb.

HEALTH CARE SYSTEM IN LEBANON: A REVIEW ADDRESSING HEALTH INEQUALITIES AND ETHICAL DILEMMAS OF FRONTLINE WORKERS DURING COVID-19 PANDEMIC

Abstract

Lebanon is facing many problems that can cause several long-term threats to the overall public health such as an increasing poverty rate, and an economic crisis induced by the devaluation of the Lebanese currency. The healthcare system is affected in terms of quality and availability of services in addition due to the pandemic, a lot of public health campaigns were paused. Consequently, Lebanon is losing its frontline healthcare workers coupled with the fact that the government budget for healthcare has dwindled. This report addresses the evolution of some health indicators in Lebanon throughout the years and presents the rights and ethical considerations and dilemmas faced by the frontline healthcare professionals during the COVID-19 outbreak. The findings of this report showed that the average life expectancy at birth was almost 80 years for both sexes in 2020. The infant mortality rate has positively been reduced to 9.2 cases per 1000 live births and despite its position compared to some Arab countries mostly adjoining Lebanon, this rate in 2019 is considered three times higher compared to some European countries. A decrease in the food and waterborne diseases rate in Lebanon was noted, however, a higher rate is presented in Bekaa. A sustainable health system is required in Lebanon focusing on people and based on public health evidence. Many ethical challenges are faced particularly in the degree of freedom and medical choices. Nevertheless, most notably the long-term impact of these measures will preserve the well-being of society.

Keywords

Healthcare System, Frontline Worker, Health Inequalities, Pandemic, Economic Crisis

1. INTRODUCTION

1.1. Healthcare in Lebanon

Lebanon is located in the Mediterranean basin covering an area of 10,452 square kilometers. The Lebanese population totals around 6.8 million with a median age of 29.6 years (Worldometer, 2021). Geographically, Lebanon is divided into eight Governorates or regions: Beirut (the capital), Akkar, Baalbeck-Hermel, Bekaa, Mount Lebanon, North Lebanon, Nabatiyeh, and South Lebanon. It is characterized by a well-established healthcare system. According to the Global Competitiveness Index, Lebanon was ranked 32nd over 137 countries in health with a score of 6.8 over 7 (Forum, 2019). This is exemplified by the fact that Lebanon has attracted many foreign patients seeking high-quality treatments, particularly from the adjoining Arab countries. As a result, medical tourism represents 10% of tourism (Hassan, 2015).

Curative care is the primary care provided and 5% of the resources are allocated to preventive care (Hemadeh *et al.*, 2019). The curative healthcare system in Lebanon relies mostly on the private sector: 80% of hospitals are private and 68% of the primary health centers are owned by private entities. However, public and private coverage is available in both public and private hospitals providing broader access to more citizens to health services. The main differences are the fact that in the private system patients' costs are higher for services and medication, and patients using the private healthcare system are also expected to pay a certain extra amount further adding to the initial costs. Health expenditure is high in Lebanon accounting for 8.4% of the total gross domestic product (GDP) with an annual increase of expenditure per capita of 4.7% (atlas, 2021). Table 1 describes the healthcare insurance systems in Lebanon: three governmental coverage schemes (47.6% of total healthcare expenditure); four private coverage schemes (16%); out-of-pocket individual payments for health services (36.4%) (Hallit *et al.*, 2020; Kronfol, 2006). Treatment in public hospitals is free of charge for Lebanese citizens aged above 64 years old and emergency treatment is provided in those hospitals at a low cost for low-income citizens or citizens without any type of medical coverage.

Table 1. Distribution of the healthcare coverage in Lebanon

Type	Scheme	Beneficiaries	Coverage	Percentage of the total expenditure
Public	National Social Security Fund (NSSF)	-Employees in the private sector; permanent employees in agriculture, teachers; taxi drivers; and university students	-90% hospitalization -80% of medical consultations Excluding dental care	47.6%
	Security forces coverage	-Military; internal security forces and their family	-100% hospitalization and medical expenses -75% of spouses and children -50% parents	
	Cooperative of the civil servants	-Employees of the public sector	-90% hospitalization -75% of consultations including dental care	
Private	Insurance companies	-Unemployed; employees of big firms (banks)	-fill in the difference between the NSSF and the total medical bill	16%

Type	Scheme	Beneficiaries	Coverage	Percentage of the total expenditure
	Mutual funds	-Syndicate and associations member	-100% hospitalization and medical consultations	
	Donor assistance	-Most patients with specific diseases or for immunization	-20-50% of medical cost	
	Local and foreign NGOs	-Patients within the scope of the organization	-Small part of the medical bill	
Individual	Out-of-pocket	Middle and high-income Individuals	-100% hospitalization and medical consultations	36.4%

Lebanon faces many problems that can pose a long-term threat to the healthcare system in terms of quality and availability of services: political corruption and instability have plagued the country for many years, and the economic crisis increased an already substantial poverty rate from 28% in 2019 to 55% in 2020, since 2019 the Lebanese currency lost more than 90% of its value since the start of the economic crisis, high unemployment, ((WESP), 2020; Corporation, 2020; Devi, 2020). Moreover, Lebanon has been losing its frontline healthcare workers because a lot of the healthcare professionals are leaving the country to seek a better future abroad: 7% of doctors, 40% of the emergency staff, and 50% of nurses have left since (Shallal *et al.*, 2021).

1.2. The Effect of COVID-19 on Health(care) in Lebanon

On February 21st, the first case of Coronavirus disease 2019 (COVID-19) was diagnosed in Lebanon. The many pre-existing challenges facing Lebanon that are described above were brought to a breaking point by the consecutive waves of COVID-19.

A full-scale lockdown was enforced during various periods with strict measurements to contain the outbreak (Noureddine *et al.*, 2021). The timetable and different lockdown measures applied in the country during the COVID19 pandemic are represented in Figure 1. During the lockdowns, people were quarantined in their houses and only essential trips were allowed (such as going to supermarkets, and pharmacies) for which prior requests needed to be made online. These measures were enforced by security forces and the police (Zaazaa, 2021). This strategy succeeded in reducing the number of new cases, which allowed the limited medical resources to be used in the most optimal way (Alfano & Ercolano, 2020; Chakkour *et al.*, 2022; Noureddine *et al.*, 2021).

Despite the lockdown's benefits in decreasing the number of new cases, it also placed a large burden on people's lives: many citizens lost their jobs, there was a shortage in essential goods in supermarkets and pharmacies, and purchasing power decreased (Fawaz *et al.*, 2021). Many people also suffered from mental conditions, triggered or exacerbated by fear, loss of income, isolation, increased level of alcohol and drug abuse, in addition to a high level of insomnia and stress (Adams-Prassl *et al.*, 2020). Many conflicts resulted as well from this measure where on the individual level, people were feeling deprived trying to adapt to the new unpredicted state in addition to the lack of advanced means of communication, especially in schools and the inefficiency of online schooling where students were not able to access fair and equally to education. Furthermore, healthcare providers were facing many conflicts with patients due to the modification of the admission criteria and prioritization strategies, while

professionals working in the COVID-19 sections faced mental stress due to the workload and being isolated from other staff members (Robert *et al.*, 2020). Physicians, pharmacists, and nurses accepted a primary ethical duty to prioritize their patients' health over their welfare (Redmann *et al.*, 2020). For example, the code of ethics of the American Medical Association states that during an emergency, the "obligation holds even when facing greater than usual risks to physicians' safety, health or life" (Orentlicher, 2018).

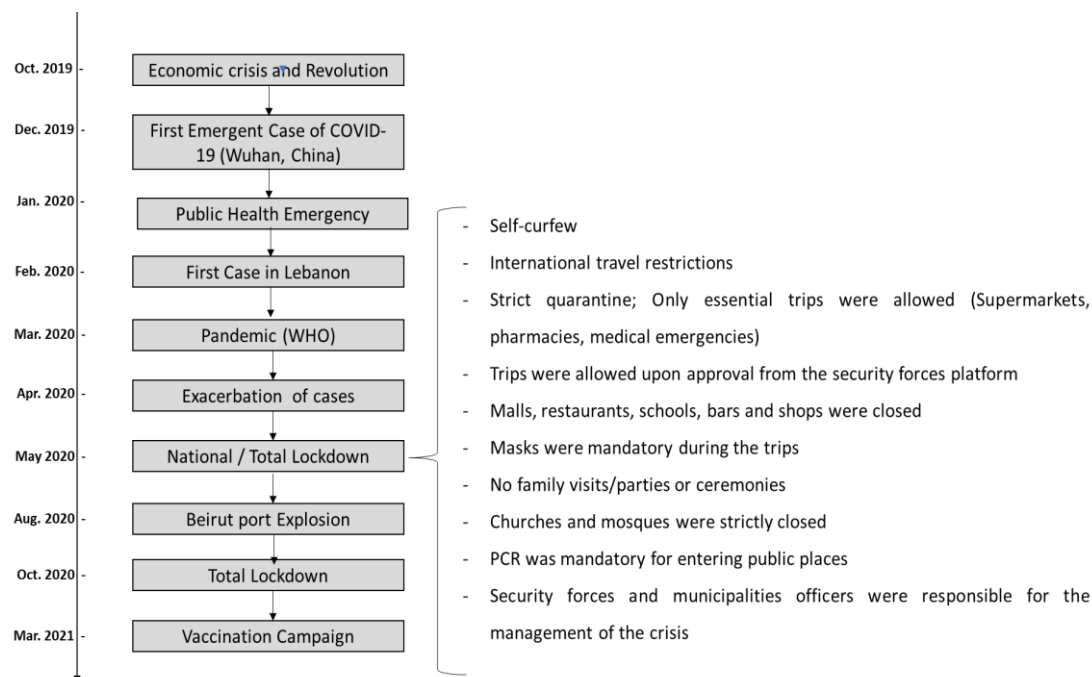


Fig.1: COVID-19 outbreak timetable and different lockdown measures in Lebanon

1.3. Aims

All the challenges mentioned above make it crucial to evaluate on a regular basis the state of health in Lebanon. The aims of this report are to (i) evaluate the evolution of a selection of health indicators in Lebanon emphasizing health inequalities and (ii) evaluate the rights and ethical considerations and dilemmas faced by the frontline healthcare professionals during the COVID-19 outbreak.

2. METHODS

A literature review was performed in December 2021 by searching for the keywords 'Lebanon' and 'Health care system' or 'Inequalities' or 'health indicator' on Google Scholar and PubMed Central by two authors independently. Conflicts were discussed and resolved at each step of the review. The search results included primary case reports and qualitative reviews.

Statistical analyses were extracted from the Ministry Of Public Health statistical bulletins from the year 2012 till 2019, World Bank and Worldometer (Ministry of Public Health, (2012-2019)). Rates for health indicators were calculated by dividing frequencies and a total population per region then was estimated per 10000. Syrian refugees and Palestinian camps data were excluded from the study. Three health indicators were evaluated: life expectancy at birth, infant mortality rate, and mortality from food and waterborne disease. Inequalities were analyzed by stratifying for gender, by comparing with other Arab countries (Iraq, Jordan, Egypt, and Syria) and European countries (Netherlands, France, Belgium, Italy, Portugal), and by stratifying by governorates (Beirut, Mount Lebanon, North, and Bekaa).

3. RESULTS

3.1. Evolution of Health Indicators and Inequalities in Health

Figure 2 illustrates the evolution of the life expectancy at birth in Lebanon from the years 2000 to 2100. An overall upward trend was noted with an increase of almost four years between 2000 and 2020 for both males and females reaching 77.5 and 81.2 years respectively. Moreover, when extrapolating data to the year 2100, a higher life expectancy was highlighted reaching almost 84 years for the average of both genders.

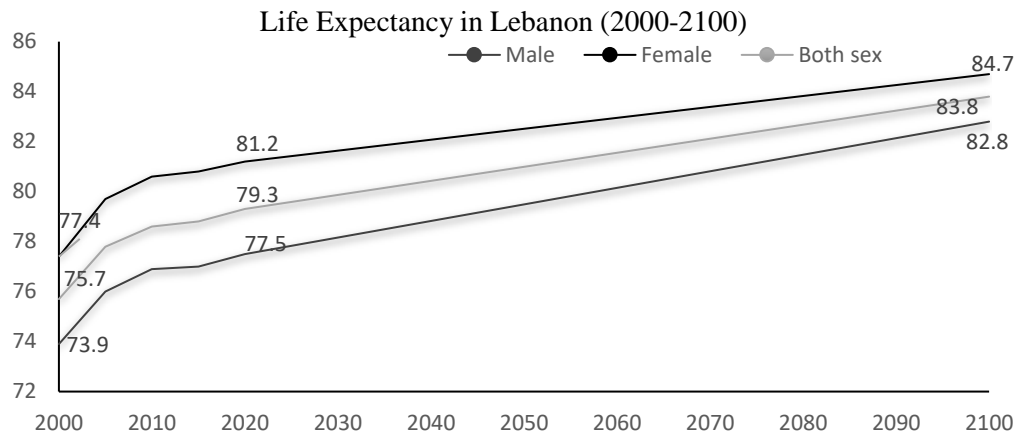


Fig.2: Life expectancy in Lebanon between males and females (2000-2100)

Figure 3 represents the rate of infant mortality in Lebanon. A downward trend was observed showing a decreasing rate of mortality for both under-5 and under-1 from more than 30 deaths per 1000 in 1990 to an average of 7.4 per 1000 in 2019.

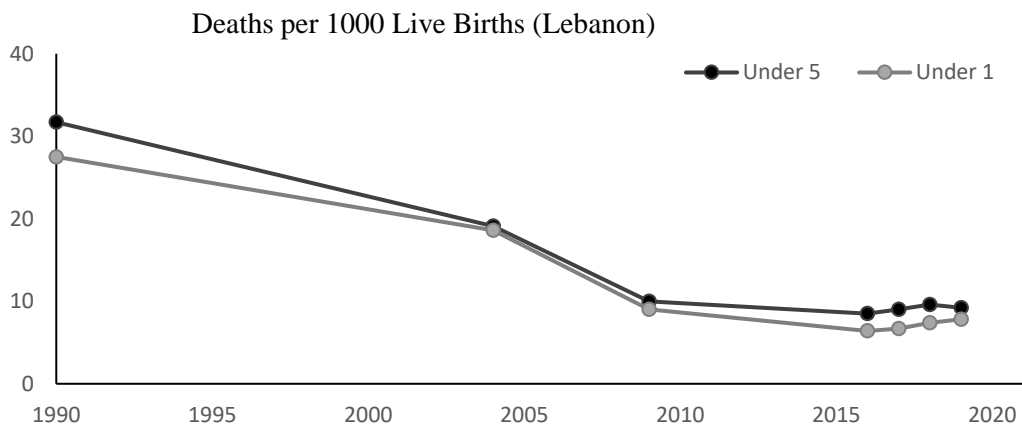


Fig.3: The infant mortality rate in Lebanon (1990-2019)

The comparison between the infant mortality rate in Lebanon and some of the Arab countries mostly close to Lebanon on one side and the average for the middle east region on the other side in 2019 shows a lower rate of under-5 mortality in Lebanon of 9.2 deaths per 1000 live births. However, when comparing this result to some of the European countries a much higher rate is noticed for Lebanon.

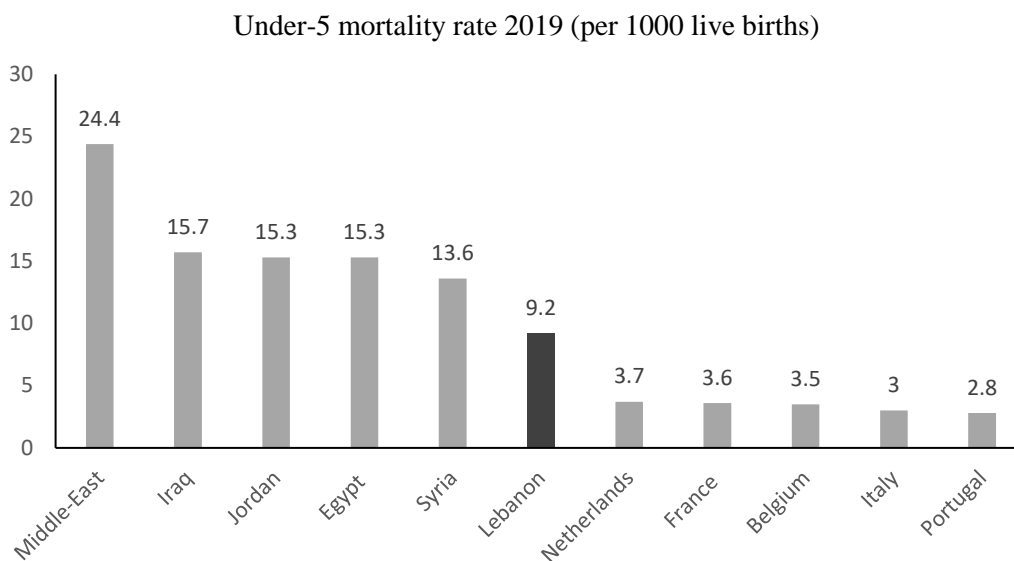


Fig.4: Comparison between the Under-5 mortality rate in Lebanon in 2019 and some Arab countries and European countries

In addition, the low birth weight percentage was estimated between the years 2012 and 2019 (Figure 5. A). The lowest percentage was noted in 2012-2013 reaching a peak of 9.5% in 2017 and then remaining stable to almost 9% in the next few years. However, Figure 5. B illustrates an increase in the total number of low birth weight cases per year to reach almost 12000 in 2017. Interestingly, it is expected that this number will almost double in 2024 to reach almost 23000 low birth weight cases.

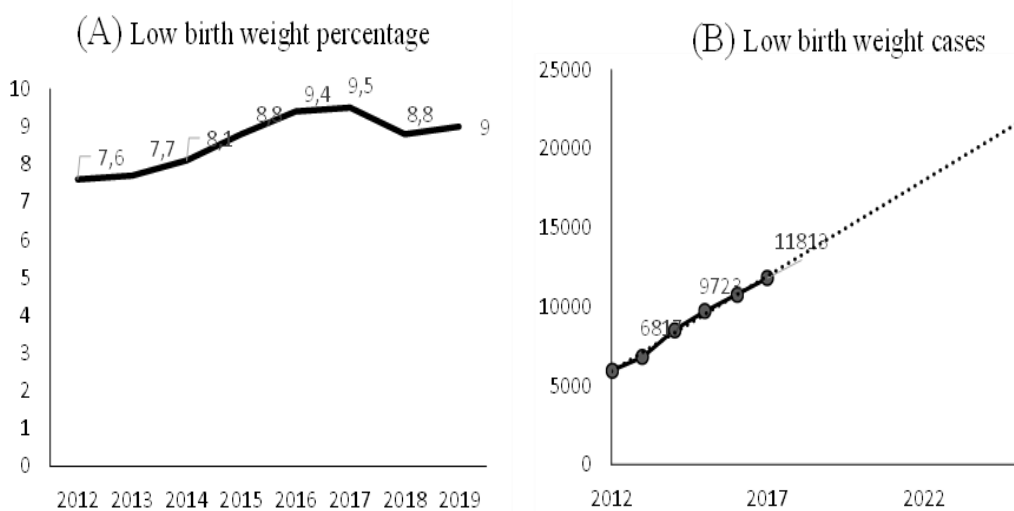


Fig.5: Evolution of the percentage of low birth weight (A) and the number of low birth weight cases (B) in Lebanon

Figure 6 represents the rate of food and waterborne diseases across Lebanon from 2013 to 2021. A downward trend is noted where the higher rate was in 2014 (9.35 cases per 10000) decreasing to reach 1.94 in 2021.

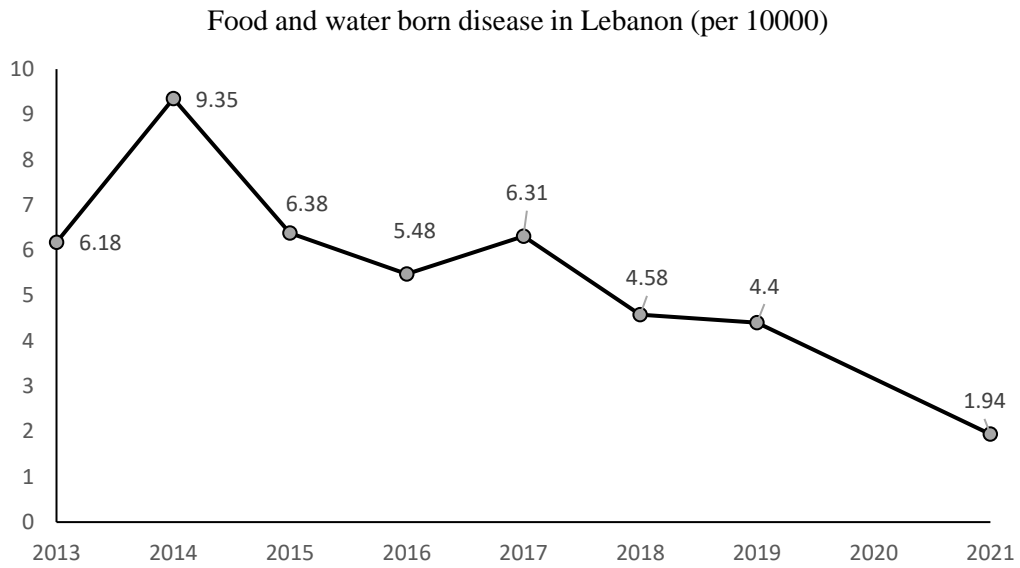


Fig.6: Distribution of food and waterborne diseases rates in Lebanon (cases per 10000)

Furthermore, a higher food and waterborne diseases rate is found in Bekaa reaching 35 cases per 10000 in 2014 and decreasing to 6.5 in 2021 compared to a more stable rate in Beirut, Mount Lebanon, and North governorates (Figure 7).

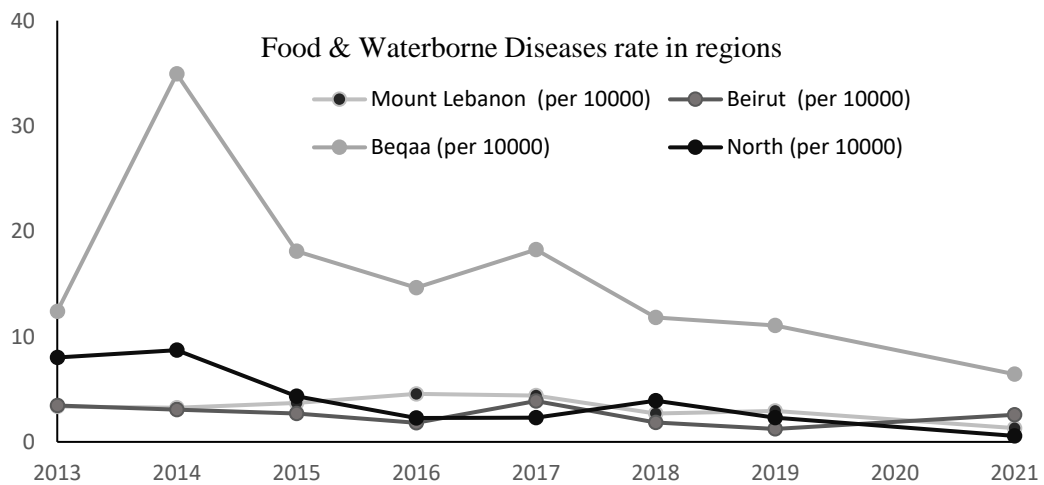


Fig.7: Comparison of the distribution of food and waterborne diseases between the governorates (2013-2021)

Rights and ethical considerations faced by the frontline healthcare professionals during the COVID-19 outbreak

Table 2 presents different dilemmas about the basic ethical rules including non-maleficence, beneficence, justice, and respect for autonomy (Arora & Arora, 2020; Steenkamp, 2021). These dilemmas cover both physicians/patients relationship and physicians' rights (Brown *et al.*, 2021).

Table 2. Different ethical dilemmas during the COVID-19 pandemic in Lebanon

	Dilemmas
Non-maleficence	<ul style="list-style-type: none"> -To not cause harm for patients versus the risk of being infected -Trying new off-label treatment versus aggravation of COVID-19 cases -Right to work in a non-risky environment versus the global pandemic -Right to be protected versus limited protection means (masks, gloves...)
Beneficence	<ul style="list-style-type: none"> -Intent to prescribe the best treatment versus lack of options -Increasing medical resources versus the right of remuneration -High work pressure versus physicians' mental health
Justice	<ul style="list-style-type: none"> -Shortage of medication versus prioritization of treatment -Insufficient beds and ventilators versus hospitalization of moderate cases -Emergency, family doctors, and neurologists are at a higher risk versus treating emergency cases not related to COVID-19
Respect of autonomy	<ul style="list-style-type: none"> -Right to decline tests versus asymptomatic carriers (20%) -Right for medical confidentiality versus being at risk of infecting others

4. DISCUSSION

Many inequalities in access to health services exist in many Arab countries and particularly in Lebanon. Health inequalities include rural-urban unequal access to health mostly due to the high risk of poverty and social exclusion in rural areas, health beliefs delaying their consultations, and the difficulty to access specialized health services that are mostly located in urban areas (Boutayeb & Helmert, 2011; Boutayeb & Serghini, 2006). Many other cultural barriers limit their access including gender, ethnicity, and race, nationality, and religion (Ben Romdhane & Grenier, 2009; Kronfol, 2012). The Lebanese health system is mostly privatized relying on the resources of private hospitals and private primary health centers. Out-of-pocket expenditure is high in Lebanon (36%) compared to many other Arab countries (Oman, Qatar, Saudi Arabia, Kuwait, Bahrain, Iraq, Jordan, and Tunisia) (Abdullatif, 2008). However, the private funding of health care may negatively affect the quality of the services needed where informal payments are required including co-payment to cover part of the cost of services and medications and informal rewards to health care professionals. Therefore, providing universal health coverage is important to enhance access to services and decrease different inequalities. Person-centered care can be achieved by empowering patient engagement, support, acceptance, confidence, and information to have health services meet their expectations (Lutz & Bowers, 2000). In addition, despite the economic crisis that Lebanon is facing since 2019 and the devaluation of its currency, it should maintain the quality of the health services provided. This can be achieved through health care reforms and policies targeting vulnerable citizens and addressing a patient-based health system addressing the health inequalities.

The findings of this report showed that the average life expectancy at birth was almost 80 years for both sexes in 2020. This average is higher than the one of the world (72.7 years) and the Middle East and North Africa region (74 years) (Murray *et al.*, 2020; Vollset *et al.*, 2020). The high life expectancy in Lebanon can be explained by the adaptation of the Mediterranean diet which has a preventive action against various chronic non-communicable diseases including cardiovascular diseases and some types of cancer in addition to the high quality of the health care system (Merra *et al.*, 2020). Supporting smoking cessation campaigns in Lebanon while providing adequate substitution by promoting physical activity and addressing the economic boundaries would have a positive impact on prolonging life expectancy in Lebanon. Moreover, assuring the safety of the roads and spreading awareness towards safe driving, and banning the use of weapons

is crucial since road accidents and deaths due to chaotic weapon use are negatively affecting the lifespan of the Lebanese population.

Although the infant mortality rate has positively been reduced to 9.2 cases per 1000 live births and despite its position compared to some Arab countries mostly adjoining Lebanon, this rate in 2019 is considered three times higher compared to some European countries (Metrics & Evaluation, 2019). Mostly, infant mortality is related to low birth weight. The distribution of the percentage of low birth weight illustrates somehow a stable trend in the last years of almost 9%. However, the number of low birth cases is actively increasing and is expected to double only in the next few years. Therefore, focusing on policies and spreading awareness towards averting harmful substances including smoking cessation, passive smoking, alcohol, and drugs should be one of the public health priorities to reduce infant mortality in Lebanon. Addressing neural tube defects' consequences and monitoring the intake of folic acid before conceiving and during pregnancy is essential. Moreover, improving prenatal care and assuring its availability mostly in the poor regions in Lebanon, encouraging mom-to-be communities, and providing newborn screening at an affordable price will help detect hidden conditions that might affect the health of newborns.

Most recently, WHO published a report highlighting the increased incidence of diarrheal diseases in the eastern Mediterranean region and increased incidence of waterborne diseases, including leptospirosis, schistosomiasis and cholera (World Health Organization, 2022). Even though a downward trend line shows a decrease in the food and waterborne diseases rate in Lebanon, a higher rate is presented in Bekaa. These results are in contrast with the fact that Bekaa is the governorate with the highest poverty rate in Lebanon reaching 38% of its residents in 2019 and according to the latest ESCWA report, it is expected to double in 2021 (Allen et al., 2019; Habib, 2019). In 2014, the incidence of food and waterborne diseases reached its peak in Bekaa possibly due to the fact that after the civil war in Syria, the Bekaa valley hosted the highest number of refugees per capita which induced several food safety challenges due to overcrowding, poor sanitation and lack of clean water (Garsow et al., 2021; Jaafar & Ahmad, 2020). Providing the access to affordable drinking water, periodic testing for microorganisms, and ensuring the isolation of drinking water from sanitation could have a positive impact on the rate of waterborne disease in Lebanon. Educational campaigns should take place, especially in Bekaa promoting hand hygiene and supporting the role of non-governmental associations by allocating a bigger amount of their resources to poorer areas. Moreover, awareness of the early symptoms of food and waterborne disease should be provided in correlation with the availability of treatments in local centers. On the other side, bad food storage is reported due to the lack of electricity and the increase in the temperature in Lebanon. Therefore, educational sessions on substitutable storage options must take place including freezing, dehydrating, salt preserving, and Vacuuming.

Throughout the pandemic, many inquiries have arisen around tackling the balance between health providers' duty to provide care to patients and their responsibility to protect their family and their right to secure their health (Bakewell *et al.*, 2020). In a recent cross-sectional in Lebanon, 90% of physicians considered that treating COVID-19 patients was an obligation rather than an option. Moreover, family, infectious diseases physicians, and pneumologists considered themselves at a higher risk when dealing especially with asymptomatic carriers (20%) (Gebara *et al.*, 2020).

In addition, physicians faced many challenges in terms of getting to their site of work. In a public experiment during the pandemic, taxi drivers and people were refusing to share a cab with any healthcare provider, more particularly any person wearing "the white coat". Given this stigmatization, many healthcare professionals were not able to reach hospitals or pharmacies to serve their patients. In response to that, many private initiatives took place where three companies offered free rental cars to healthcare professionals. In addition, volunteers from different governorates raised the campaign "Baytna Baytak" which means "Our house is your home" intending to provide housing to health providers free of charge near their workplace (Naoufal, 2020).

Although this report is illustrative of the potential inequities in access to health care services in Lebanon, it is important to investigate other potential health indicators including cancer rates, communicable and non-communicable diseases rates, and other indicators reflecting inequalities in health. In addition, the lack of statistical analysis provided in the statistical bulletins of the ministry of public health makes it more difficult to interpret data. Many recommendations and strategies could help reduce unnecessary risks for people during the outbreak. For example, to limit the risk of loss in medical professionals and due to the importance of all healthcare providers' contribution, it is suggested that caregivers above 50 years old would have less direct contact with suspected cases and provide more supervisory support. In addition, self-antigen tests should be available in pharmacies at an affordable price to facilitate screening and increase early detection. Moreover, the mental health of physicians, nurses, and pharmacists deteriorates. Therefore, both remuneration and holidays could help support them morally while free of charge incentives including housing, transportation, communication, and access to information would promote their efficiency. More awareness campaigns targeting mostly the younger generation which are more susceptible to asymptotically carrying the virus and infecting others should be elaborated through young platforms (Instagram, Facebook, influencers, and TV programs).

5. CONCLUSION

A sustainable health system is required in Lebanon, focusing on people and based on findings from public health research. The economic crisis and the pandemic in Lebanon highlighted the insufficient investment in addressing many social determinants of health including poverty and unhealthy lifestyle habits. Health inequalities are present in Lebanon and need to be addressed by focusing on primary and secondary prevention, particularly among vulnerable citizens. Addressing those inequalities and promoting a healthy lifestyle would have a positive impact on maximizing the health outcome and would be visualized through better health indicators. Moreover, even though lockdowns are mandatory to cope with the fast infectivity and mutations of the virus, expanding people's understandings of their health responsibilities and providing access to essentials including food, protection, health, and education remain indispensable but not easy to reach. Many ethical challenges are faced particularly in the degree of freedom and medical choices. Nevertheless, most notably the long-term impact of these measures will preserve the well-being of society.

REFERENCES

- Abdullatif, A. A. (2008). Aspiring to build health services and systems led by primary health care in the Eastern Mediterranean Region. *EMHJ-Eastern Mediterranean Health Journal*, 14 (Supp.), S23-S41, 2008.
- Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020). The impact of the coronavirus lockdown on mental health: evidence from the US.
- Alfano, V., & Ercolano, S. (2020). The efficacy of lockdown against COVID-19: a cross-country panel analysis. *Applied health economics and health policy*, 18(4), 509-517.
- Allen, W., Chadha, J., & Turner, P. Acharya, VV, and others (2019). Whatever It Takes: The Real Effects of Unconventional Monetary Policy. *The Review of Financial Studies* 32 (9): 3366–3411. *Policy*, 32(9), 3366-3411.
- Arora, A., & Arora, A. (2020). Ethics in the age of COVID-19. *Internal and emergency medicine*, 15(5), 889-890.
- Atlas, W. d. (2021). Available at: <https://knoema.com/atlas/Lebanon>
- Bakewell, F., Pauls, M. A., & Migneault, D. (2020). Ethical considerations of the duty to care and physician safety in the COVID-19 pandemic. *Canadian Journal of Emergency Medicine*, 22(4), 407-410.
- Ben Romdhane, H., & Grenier, F. R. (2009). Social determinants of health in Tunisia: the case-analysis of Ariana. *International Journal for Equity in Health*, 8(1), 1-8.

- Boutayeb, A., & Helmert, U. (2011). Social inequalities, regional disparities and health inequity in North African countries. *International Journal for Equity in Health*, 10(1), 1-9.
- Boutayeb, A., & Serghini, M. (2006). Health indicators and human development in the Arab region. *International journal of health geographics*, 5(1), 1-13.
- Brown, N. J., Wilson, B., Szabadi, S., Quon, C., Ong, V., Himstead, A., Shlobin, N. A., Yang, C. Y., Lien, B. V., & Shahrestani, S. (2021). Ethical considerations and patient safety concerns for cancelling non-urgent surgeries during the COVID-19 pandemic: a review. *Patient Safety in Surgery*, 15(1), 1-9.
- Chakkour, M., Salami, A., Olleik, D., Kamal, I., Nouredine, F. Y., El Roz, A., & Ghssein, G. (2022). Risk Markers of COVID-19, a Study from South-Lebanon. *COVID*, 2(7), 867-876.
- Corporation, B. B. (2020). In “*Lebanon: Why the country is in crisis*”.
- Devi, S. (2020). Lebanon faces humanitarian emergency after blast. *Lancet (London, England)*, 396(10249), 456.
- Fawaz, M., Harb, M., Nammour, K., Salka, F., Lancione, M., & Vilenica, A. (2021). How the COVID-19 pandemic has shaped housing struggles in Lebanon. *Radical Housing Journal*, 3(May), 61-74.
- Forum, W. E. (2019). “*Global Competitiveness Index 2017-2018* “.
- Garsow, A. V., Campbell, E., Closs, G., & Kowalczyk, B. B. (2021). Food Safety Challenges in Refugee Camps: What Do We Know? *Journal of Food Protection*, 84(5), 876-884.
- Gebara, N., Dabar, G., Eid, R., Haddad, F. G., Kourie, H. R., & Kattan, J. (2020). Lebanese Doctors Facing the SARS-CoV-2 Pandemic: Practical and Ethical Issues.
- Habib, R. R. (2019). Survey on Child Labour in Agriculture in the Bekaa Valley of Lebanon: The Case of Syrian Refugees.
- Hallit, S., Selwan, C. A., & Salameh, P. (2020). Primary health care policy and vision for community pharmacy and pharmacists in Lebanon. *Pharmacy Practice (Granada)*, 18(2).
- Hassan, V. (2015). Medical tourism in Lebanon: An analysis of tourism flows. *Athens Journal of Tourism*, 2(3), 153-166.
- Hemadeh, R., Hammoud, R., Kdouh, O., Jaber, T., & Ammar, L. (2019). Patient satisfaction with primary healthcare services in Lebanon. *The international journal of health planning and management*, 34(1), e423-e435.
- Jaafar, H. H., & Ahmad, F. A. (2020). Time series trends of Landsat-based ET using automated calibration in METRIC and SEBAL: The Bekaa Valley, Lebanon. *Remote Sensing of Environment*, 238, 111034.
- Kronfol, N. (2012). Access and barriers to health care delivery in Arab countries: a review. *EMHJ-Eastern Mediterranean Health Journal*, 18 (12), 1239-1246, 2012.
- Kronfol, N. M. (2006). Rebuilding of the Lebanese health care system: health sector reforms. *EMHJ-Eastern Mediterranean Health Journal*, 12 (3-4), 459-473, 2006.
- Lutz, B. J., & Bowers, B. J. (2000). Patient-centered care: understanding its interpretation and implementation in health care. *Research and Theory for Nursing Practice*, 14(2), 165.
- Merra, G., Noce, A., Marrone, G., Cintoni, M., Tarsitano, M. G., Capacci, A., & De Lorenzo, A. (2020). Influence of mediterranean diet on human gut microbiota. *Nutrients*, 13(1), 7.
- Metrics, I. f. H., & Evaluation. (2019). Global health data exchange. *Global Burden of Disease Study 2017 Data Resources*.
- Ministry of Public Health ((2012-2019)). “*Statistical bulletins*” Available at: <https://moph.gov.lb/en/Pages/8/327/statistical-bulletins>

- Murray, C. J., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasi-Kangevari, M., Abd-Allah, F., Abdollahi, M., Abedi, P., Abedi, A., & Abolhassani, H. (2020). Five insights from the global burden of disease study 2019. *The Lancet*, 396(10258), 1135-1159.
- Naoufal, P. (2020). *ANB provides free rental cars for nurses fighting COVID-19*
- Nouredine, F. Y., Chakkour, M., El Roz, A., Reda, J., Al Sahily, R., Assi, A., Joma, M., Salami, H., Hashem, S. J., & Harb, B. (2021). The emergence of SARS-CoV-2 variant (s) and its impact on the prevalence of COVID-19 cases in the Nabatieh Region, Lebanon. *Medical Sciences*, 9(2), 40.
- Orentlicher, D. (2018). The physician's duty to treat during pandemics. *American journal of public health*, 108(11), 1459-1461.
- Redmann, A. J., Manning, A., Kennedy, A., Greinwald, J. H., & deAlarcon, A. (2020). How strong is the duty to treat in a pandemic? ethics in practice: point-counterpoint. *Otolaryngology–Head and Neck Surgery*, 163(2), 325-327.
- Robert, R., Kentish-Barnes, N., Boyer, A., Laurent, A., Azoulay, E., & Reignier, J. (2020). Ethical dilemmas due to the Covid-19 pandemic. *Annals of intensive care*, 10(1), 1-9.
- Shallal, A., Lahoud, C., Zervos, M., & Matar, M. (2021). Lebanon is losing its front line. *Journal of Global Health*, 11.
- Steenkamp, I. (2021). Confirming" Ethical" Approach to Research.
- Vollset, S. E., Goren, E., Yuan, C.-W., Cao, J., Smith, A. E., Hsiao, T., Bisignano, C., Azhar, G. S., Castro, E., & Chalek, J. (2020). Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100: a forecasting analysis for the Global Burden of Disease Study. *The Lancet*, 396(10258), 1285-1306.
- Worldometer. (2021). *World population / Lebanese population*
- World Health Organization (2022). Build back fairer: achieving health equity in the Eastern Mediterranean Region: report of the commission on social determinants of health in the Eastern Mediterranean Region-executive summary.
- Zaazaa, B. (2021). *Lebanon clamps down on COVID-19 curfew violators*