Al-Kindy College Medical Journal (KCMJ)

Review Article

Health System in Iraq Post 2003 War

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Article history:
Received 22 May 2023
Accepted 13 September 2023
Available online 30 December 2023

https://doi.org/10.47723/kcmj.v19i3.1040

Keywords: Health system, Health services, War, Iraq

ABSTRACT

Background: War represents a major human crisis; it destroys communities and results in ingrained consequences for public health and well-being

Objective: We set this study to shed light on the public health status in Iraq after the successive wars, sanctions, sectarian conflicts, and terrorism, in light of certain health indicators.

Design: The primary source of data for this analysis comes from the Iraqi Ministry of Health, and The World Health Organization disease surveillance.

Results: Most of the morbidity indicators are high, even those that are relatively declining recently, are still higher than those reported in the region. Common communicable diseases such as schistosomiasis, mumps, and measles continue to be a problem. Mumps showed two recent epidemics; in 2015, and in 2020. The same with respect to Measles. More than 40·% of the surveyed population showed both systolic and diastolic hypertension. Fasting glucose of 10·4% of the participants showed hyperglycaemia, only 6·5% of whom reported being diagnosed and treated as diabetic. The leading cancer in males is Bronchus and Lung cancer, followed by Colorectal, Urinary bladder, and Prostatic cancers while in females; Breast cancer is in the top of the list, followed by Thyroid, Colorectal, Brain, and Bronchogenic cancers. Rates for childhood cancers are obviously higher even than those in high-income countries.

Conclusions: The struggling public health services in Iraq have been severely impacted by humanitarian and political crises and brutal armed conflict that resulted in restricted population access to food, clean water and basic services including healthcare and medicines.

Introduction

Public health is the science (and art) of preventing disease, prolonging life, and promoting physical and mental health. It originates from human interactions and decisions in dealing with the daily problems of social life, which call attention to the necessity of community action in the promotion of health and the prevention of disease. (1)

In the late 1970s, Iraq was a rapidly developing country with a very well-developed/ advanced health system, and was a main center for medical care and intervention in the East-Mediterranean region. However, after repeated wars, sanctions, conflicts and overwhelming of violence, health indicators (maily child and maternal) have been deteriorated. Outbreaks of communicable disease (such as cholera), increase prevalence of non-communicable diseases, long-term mental health such as post traumatic stress disorders (PTSD) and depression, destabilization of food, water and sanitation, have changed the previous bright picture of the public health status in the country. (2)

War represents a major human crisis, it destroys communities and results in ingrained consequences for public health and well-being. In addition to the immediate effect of war on health (injuries and deaths), there are other-long-term consequences, particularly on people health, through causing socioeconomic decline and poverty (which may lead to malnutrition), disability, and psychosocial illnesses. Conflicts also cause disastrous effects on the infrastructure of health, which may be either partially damaged, completely destroyed, or looted by parties or people, as happened in Iraq immediately after the 2003 U.S. invasion. The past four decades of war and brutal armed conflict have created massive devastation that resulted in less access to food, safe water and basic needs including healthcare services and medicines. (3, 4) Million of Iraqis have been internally displaced and millions have scattered and settled in the neighboring and European countries as refugees. (5, 6)

The successive wars have seriously affected the quality of health care. (7) Up to our knowledge; no major public hospital has been built in Iraq since 1986, only private hospitals, in spite of that the population has more than doubled from 16 million in 1987 to more than 44 million in 2021. (8) Research has shown that about 5,400 medical doctors emigrated outside Iraq every year. (9)

The health system in Iraq is struggling and have been heavily impacted by a continuous humanitarian crisis that caused a continuing exodus of Iraqi medical experties to other countries. Of those, especially are doctors and academics. Besides, the looting of health facilities that followed the U.S. invasion resulted in profound loss of equipment and pharmaceutical stocks, leading to more deterioration in quality of health services. (6, 10)

This review represents the condition of the Iraqi health system 18 years after the 2003 war. The purpose of this study is to throw light on the health status in Iraq after the repeated wars, sectarian conflicts and terrorism, and to explore the effect of these crises on the health system and health services in light of certain health indicators.

Subjects and Methods

This review article, which has been conducted in 2022, describes the status of the Iraqi health system during the past 18 years post war (2003-2020) through certain health indicators that were collected from the most recent official reports (up to 2021) of the Iraqi Ministry of Health, WHO/Iraq, and published articles relevant to this subject. The primary source of data for this analysis comes from the Iraqi Ministry of Health (MoH), depending on their annual reports (especially MoH report 2021 that covers all the Iraqi governorates including Kurdistan region. The dataset contains records at the governorate level for most of the communicable and non communicable diseases, which come from all public-sector hospitals and primary health care centers that send their monthly reports to the Preventive Health Department for their respective governorate. These reports are collected, analysed and interpreted in the statistical department in the Ministry of Health. Supplemental datasets from The World Health Organization (WHO) disease surveillance were also used.

We have categorized the data in three main parts: The health system, health services, and public health situation analysis, which includes mainly the mortality and morbidity statistics, particularly for communicable, non communicable diseases, cancer, accidents, mental problems, and other health indicators.

Results and Discussion

Through the 20th century, as the epidemiological transition incepted with the decreasing of infectious diseases, public health initiated to set additional focus on chronic diseases such as cancer, heart disease, and other chronic health problems. (11) Over the past four decades, a rapid demographic and epidemiological transition has occurred in Iraq. The population of Iraq reached more than 44 million in 2022, with an annual growth of 2·3%, this compares with 0·6% in Syria, 1·1% in Iran, and 1·7% in Egypt. From 1990 to 2020, the total fertility rate decreased from 6·1 to 4·0, however, it remained higher than other countries in the region. Iraq has been fallen in the trap of flare up of chronic (non-communicable) diseases without getting out from the era of infectious diseases. This situation increased the burden and challenges on the already exhausted health system. (12, 13)

Health system

The Iraqi Ministry of Health is formed of six central health directorates that make and lead the policy of the health system in the country through 20 health directorates distributed in the governorates. Currently, the doctor to population ratio is around 10/10000 as estimated by the Ministry of Health, however, the true ratio could be less than that, as the number of doctors who are continuously leaving Iraq is slowly up dated. Before the 2003 invasion, Iraq had more than 34 000 medical doctors. During the peak of the conflict (2006-2008), a large number of doctors left Iraq or were killed. (14) This outflow has now lessened, although of the 2500-3000 new medical graduates each year, more than a quarter leaves. (15) In the past 19 years, shifting of senior workforce in the Ministry of Health)based on political entanglements(and scarcity of investment, have left the ministry almost paralyzed to meet the new needs and emerging situations. The Iraqi Ministry of Health is still adopting the centralized health system that is based on the secondary and tertiary health care concept inspite of some hesitating and slowly going trials of applying the family health care model in some health institutions.

Health services

Iraq has 312 hospitals (78 teaching, and 234 general hospitals), and 178 specialty (tertiary) centers, with a total of 51548 beds, 1.3 bed/1000 population, compared with 17·3 in Egypt. Primary health care services are covered by 2693 primary health care center. (12) Although there are 170 private hospitals, they are not very supportive to the health system, as they are usually small, with a limited capacity (less than 25 beds as an average), most admissions to these hospitals are for a short time, and usually for surgery or deliveries, and they rarely provide general hospital care. A normal vaginal delivery in a private hospital could cost $500, while a caesarean-section may cost more than $1000, beyond the reach of many Iraqis. According to MoH, caesarean-section forms more than 40% of delivaries in the governmental hospitals, this number may reach up to 80% in the private hospitals. (16) The usual medical care services receivd by the population are through more than 15000 private clinics run by doctors that are working in the public sector at the morning, and run their private clinics in the afternoon. Most of the people (especially the rich) prefer the private health services for the better quality, care, availability of expertise, and swift management compared to the long waiting list in the general governmental hospitals, while poorer households prefer (or have) to go to the public sector hospitals and primary health care centers.

There are no health insurance programs, which means all private health care is met out-of pocket. The private hospitals and clinics are not controlled by any clear guidelines or strict regulations from the Ministry of Health. This policy puts the private hospitals and clinics

almost completely outside the national health supervision, information and surveillance systems. (17)

Primary care

The philosophy of the newly adopted family health-care concept is to link public health facilities, managed by family physicians, with the nearest relevant referral hospital; then to get back the referral system onward to tertiary hospitals. However, there are real obstacles in applying this approach successfully, the main of which (in addition to the weak political will) is the reluctance of the people to be referred, because they want to get the whole medical care in the nearest accessible place and according to their convenience. Training of the paramedical staff and provision of essential equipment is needed to achieve a successful and comprehensive family health-care services.

Public health situation analysis

Demographic indicators: Although no national census has been achieved since 1997, the annual reports of the Ministry of Planning show that the total population of Iraq has been doubled during the last 25 years (44 million in 2021 up from 22 million in 1997), with an almost equal gender distribution, and life expectancy of 72.5% (higher in females). More than two third of the population is clustered in the urban areas (69.9%). (12) Despite the ongoing conflict in Iraq, resulting in both a rising death rate and an exodus of refugees, the population continues to grow. This is explained by Iraq's high fertility rate of 3.9 births per woman and a drop in its infant mortality rate. According to current projections, Iraq's population will continue to grow for the rest of the century, surpassing 100 million people by the end of 2085. (8) Table (1) shows some numbers and indicators related to the demographic distribution of the Iraqi population. (12).

Table 1. Demography of the Iraqi population (12)

Indicators	Value
Total population	41190658
Males	20810479
Females	20380179
Sex ratio (male per 100 female)	102
Percentage of urban population	69.9
Percentage of rural population	30.1
Percentage of population less than 15 years	38.5
Percentage of population above (60) years	4.5
Population growth rate	2.3
Dependency ratio	75.4
Total fertility rate (birth per each woman)	3.9
Male life expectancy	71
Female life expectancy	74.1
Life expectancy for both genders at birth	72.5
Doctor/population ration	10.2/10000
Nurse/doctor ratio	2.2:1

One of the interesting indicators here is the nurse to doctor ratio (2.2:1) which is relatively low if compared to more than four nurses per doctor in Japan, Ireland, Finland and the United States. (18)

Mortality statistics: According to WHO, violence was the leading cause of death in Iraq after March 2003. (19) However, due to the complete destruction of all infrastructures post-war (including health infrastructurs) most of the other mortality rates (especially those from non-communicable diseases, cancer and accidents) slopped up.

Child and maternal health is an interesting issue in Iraq. Although there were apparently slow declines in infant and child mortality rates, there are some discrepancies between the rates estimated by WHO and those mentioned by the Iraqi Minstry of Health. Iraq's maternal mortality ratio according to WHO estimates is 64 per 100 000, while the estimate of the Iraqi Ministry of Health is 25/100000.

Table 2. shows the mortality statistics for the year 2021 as estimated and declared.by the Iraqi Ministry of Health. (12).

Indicators	Value
Crude death rate per 1000 of the population	4.5
Neonatal mortality rate	13.2
Infant mortality rate	17.8
Mortality rate for children under 5 years	21.8
Maternal mortality ratio per 100000 live birth	46.1
Adult mortality rate (15-60 year)	2.7
Mortality rate from road traffic injuries/10000	13.5
Suicide rate per (100000) population	1.1

Attributable to the Corona virus pandemic, the leading cause of death for the years 2020-21 was (exceptionally) infections and complications of Coronavirus (COVID-19), while the other usual causes of death were mostly related to non communicable diseases: Ischemic heart diseases, Cerebro vascukar diseases, Hypertension, and Diabetes mellitus. This means that in this transitional phase, Iraq started to register more deaths from chronic diseases, cancer, and road traffic accidents without lessening the mortality from the endemic and epidemic communicable diseases. Figure (1) shows the top ten causes of death in Iraq for the years 2020-2021 (12).

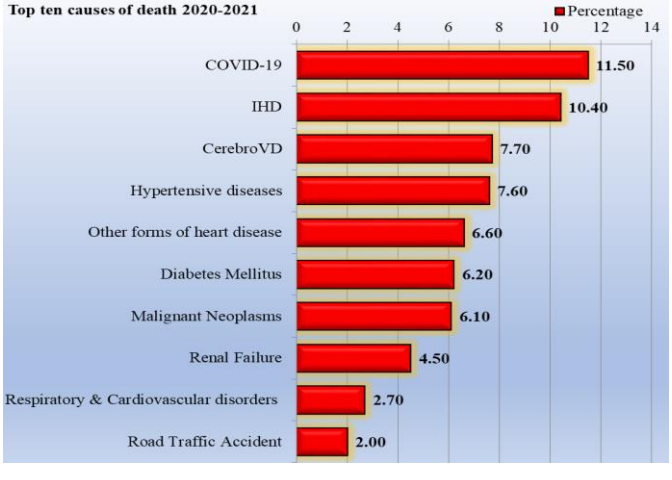

Figure 1. Top ten causes of death in Iraq for the years 2020-2021 (12)

Morbidity statistics:

Communicable diseases: Infectious disease outbreaks are still happening, some of which, especially outbreaks of cholera, are related

to the massive environmental and infrastructure damage (including safe water supply, sewage disposal, and interrupted electric power) caused by the first Gulf War. Additional damage after the 2003 U.S. invasion worsened the situation. Tuberculosis is re-flaring up with a prevalence of 70-80/100000, more among prisoners. Only small numbers of HIV cases are reported for now, however, with the weak control of borders, these numbers are expected to increase. Common communicable diseases such as schistosomiasis, mumps, and measles continue to be a problem. Malaria has been relatively controlled, but leishmaniasis is still reported in some areas. Scabies is widely spread in epidemics especially among the internally displaced persons (IDPs). (12, 20) Iraqi MoH announced-almost every year- a major cholera outbreak, the last of which was in June, 2022. The war-related deterioration of quality of water and general sanitation apparently facilitated cholera transmission. The registered incidence of Hepatitis B is exceeding 2.5/100000 for now, and seems to be increasing. Outbreaks of hepatitis A and E are reported in Iraq every now and then. (21) Hepatitis A rates increased significantly over the past 15 years, with an annual percent change of 15.3%. This could be attributable to poor basic hygiene practices, interrupted safe water supplies, and continuous population internal displacement, which are common in conflict settings. This could also be a possible explanation for the increase in the incidence of pneumonia and varicella, although varicella vaccine being now available and used globally, yet, it is still not covered by the Iraq national health system. (22)

Mumps showed two recent epidemics; in 2015, and in 2020. The same with respect to Measles. During the last 20 years, the mean incidence rate of measles was 2.6/100000 (apart from outbreak years), this is considered high if compared to that of Jordan (0.16/100000), and Iran (0.09/100000) in 2014. Moreover, Iraq had witnessed four epidemics during the last 20 year period (2004, 2008-2009, 2014, and 2019), which seem to occur almost every five years. An epidemic of Rubella occurred in 2004. (17, 23)

About 65% of children on the national level registered to receive the third dose (last dose- apart from the booster doses) of diphtheria-pertussis-tetanus vaccine. Immunisation for rotavirus (the leading cause of childhood diarrhea in Iraq) were included in the national immunization schedule since 2012. (24)

Similar to other countries, Iraq has suffered from the repeated waves of coronavirus during 2020 and 2021 with a total number (as for March 2023) that exceeds 2.46 millions cases and 25300 deaths. (25) The causes behind these outbreaks could be explained by lower vaccine coverage and higher vaccine failure rates. These factors could be attributed to the deterioration in health services after the conflict. The health system is suffering many difficulties starting from the devastation of the health infrastructure post-conflict to the corruption in the health system as part of the corruption in the whole country ending with the unprecedented fleeing of expert doctors outside as a result of continuous terrorism and threats to their lives. (15)

Typhoid fever seems to be decreasing, or it might be a weakness in the sensitivity of case detection. The diagnosis of typhoid fever in the Iraqi health sector is still dependent on Widal test which is known to be of low sensitivity and specificity, besides, many patients with such health problems are attending the private clinics, which are, unfortunately, not included in the national health surveillance system, this results in a sort of underestimation of many infectious diseases including typhoid fever.

Non-communicable diseases (NCD): In the last few decades, NCD started to form the main disease burden to Iraq's population. (26) The findings of the STEPwise approach to chronic disease risk-factor survey by WHO (that included 4800 households) showed that the percentage of smoking amomg men is 42%, with 67% of adults have a body-mass index more than 25. Regarding blood pressure measurement; more than 40·% of the surveyed population (from different age categories) showed both systolic and diastolic hypertension. This rate is considered relatively high when compared to the findings of surveys from the neiboring countries like Jordan (32.3%0), and Saudi Arabia (26.1%). (27) Moreover, fasting glucose of 10·4% of the participants showed hyperglycaemia, only 6·5% reported being diagnosed and treated as diabetic, this makes Iraq one of the medium prevalence countries of diabetes mellitus in the Middle East. (28)

With respect to maternal and child health, Iraqi Ministry of Health stated that caecarean section delivaries form more than 40% of the total delivaries (total births), this goes way beyond the acceptable rate stated by WHO (5-15%). Declines in infant and maternal mortality rates were going very slowly during the years of conflict, neonatal deaths form more than half the deaths of children less than five years of age, with 15% of newborn babies are estimated to have low birthweight, 6% of children below five years of age are mildly or moderately underweight, and 26% are stunted. (29)

The trend of thalassemia for the last five years shows an obvious up slop. Although not much, but there is an increase in the number of cases each year which adds more burden on the health system. (30) Many birth defects have been reported from hospitals, especially in Fallujah. (24)

Cancer: The recent estimations of the trend of total cancers in Iraq showed an overall elevation, with rates for childhood cancers are obviously higher even than those in high-income countries. Many factors are thought to be responsible for this increase, primarily related to the successive wars since 1980, during which different weaponry were used with known or (more seriously) unknown carcinogenic effects. The huge amounts of "smart" bombs fell on the country during the 2003 invasion caused great damage to the whole environment on a hand, and a noticeable destruction to the health system infrastructure on the other hand. The up slop of cancer trends was more remarkable after 2008, particularly in the middle region which has been the main target of bombing.

Breast, lung, and brain cancers had witnessed a significant increase. However, cancer rates in Iraq are still lower than the global and regional rates. This might be attributed to weak and incomplete registration, besides, many cancer cases in Iraq are diagnosed and treated in the private sector (which is completely outside the national surveillance system), or outside the country, resulting in an underestimation. (31) A doubling of childhood leukaemia has been reported from Basrah over a 15 year period. Future numbers of cancers are expected to rise with an ageing population, not mentioning the remote effects of wars' weapons that may take several years to show. (32)

The leading cancer in males is Bronchus/Lung cancer, followed by Colorectal, Urinary bladder, and Prostatic cancers, while in females; Breast cancer (which showed high increase in Iraq in the last two decades) is at the top of the list, forming approximately half the burden of all female cancers, followed by Thyroid, Colorectal, Brain, and Bronchogenic cancers. In children, Leukemia is the most prevalent cancer, then comes cancer of the brain and nervous system, followed by Hodgkins and Non-Hodgkin lymphomas. Figure (2) shows the trend of cancer in Iraq from 1994 to 2020, while the top ten cancers for males, females and children reported by the Iraqi MoH for the year 2021 are shown in figures (3-5) (33).

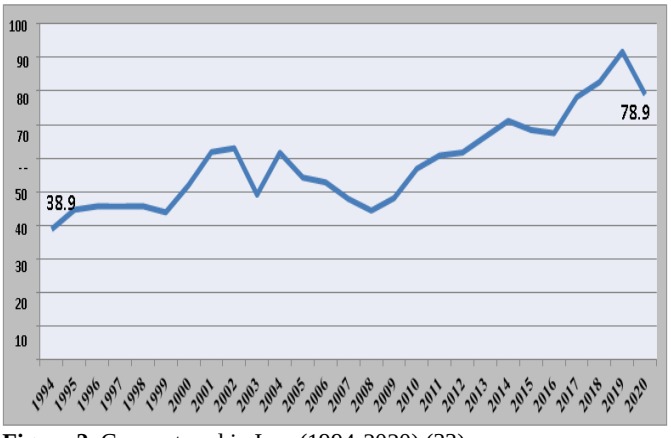

Figure 2. Cancer trend in Iraq (1994-2020) (33)

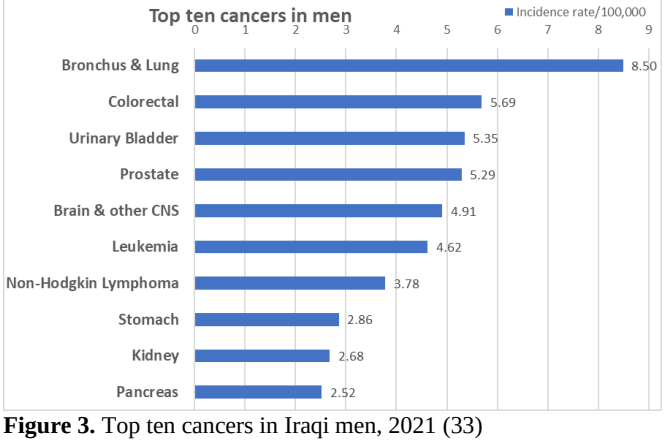

Figure 3. Top ten cancers in Iraqi men, 2021 (33)

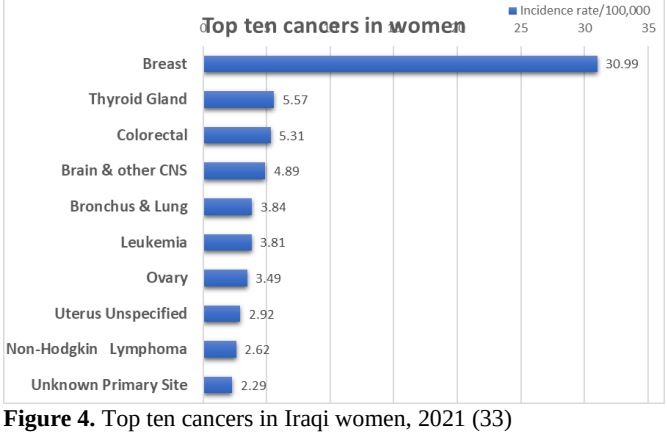

Figure 4. Top ten cancers in Iraqi women, 2021 (33)

Accidents: Although some accidents in Iraq are sloping down, such as firearms, sexual assaults, and assaults by sharp objects, other more prevalent accidents, such as road traffic accidents and accidental falls are slopping up. A cluster sampling survey conducted in Baghdad in 2014 revealed that in spite of 'underreporting', 41% of the total recorded injuries were intended, 39.1% of the total number died, and there was a disability rate of 56% among the survivors, with gunshots, blasts and explosions being the main causes of injuries; 46% of the victims were children and 80% of the fall injuries ended with a permanent disability owing in part to the damaged health system. Road traffic injuries had increased rapidly forming about 16% of all injuries. Burns formed 10% of all injuries reported in Baghdad in 2003 (39 per 100,000 persons), which had increased in the following ten years to 8780 (117 per 100,000); 15% of which were the direct result of conflict. The consequences were death (16%), disability (40%), and household financial hardship in 48% of the cases. (34) The findings of the survey concluded that Years of Life Lost (YLLs) due to death from intentional injury was 4.99 million years, and the estimated years Lived with Disability (YLDs) was 606,000 years. (35).

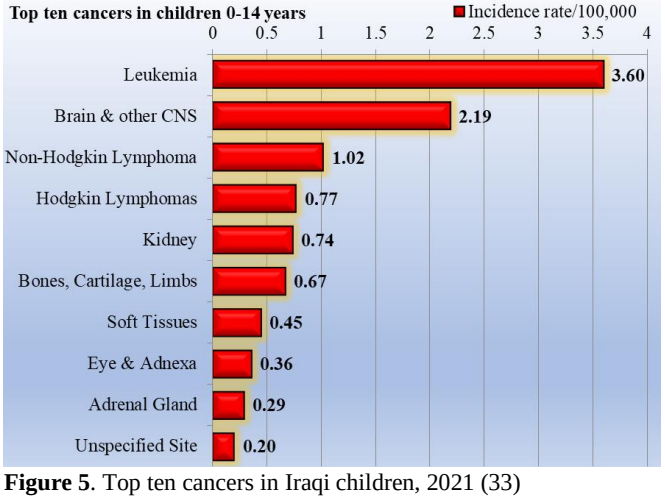

Figure 5. Top ten cancers in Iraqi children, 2021 (33)

Mental health: Iraq represents an obvious example of the challenging mental health needs in conflict–affected countries, particularly of the most vulnerable groups that include women, children and adolescents. The constant exposure of the Iraqis to large-scale traumatic events such as armed conflicts, terrorism, and organized violence for the last four decades negatively impacted on their psychosocial status, especially for children and adolescents. (36)

A previous survey in Iraq showed that the number of adolescents who had experienced traumatic events was 55.2% of the total sample surveyed. Traumatic-reaction symptoms like fear and/or terror and painful recall of traumatic events retrieved by 37% of the sample. The prevalence of post traumatic stress disorders (PTSD) was 17.1% with multiple factors contributing to its occurrence. (37) Child and Adolescent Mental Health Services in Iraq are almost non-existent. The Iraqi school system currently lacks a mental health philosophy, with most of the Iraqi teachers are not trained to identify children with emotional problems. Unfortunately, there are no reliable statistics or surveillance for mental illnesses in the MoH annual reports, however, local surveys revealed that major depressive disorder was 25% for males, and 37% for females, and psychotic disorders were 28% in males and 18% in females. (38, 39) Suicide and suicidality in Iraq is on the increase. Many psychological and environmental factors predispose to thinking, attempts, and completed suicide despite the religious and social taboos. Young females are more presented in suicide attempts and ideas with potentially lethal methods, such as self-burning, as a consequence of the higher rates of hopelessness, depression, community and domestic violence, and continuous instability of the country. (40)

Main challenges:

1. The governmental will of putting the refferal system in action is essential to organize the flow of work and lessen the unnecessary load on the secondary health facilities.
2. Health insurance is crucial to controle the overwhelming role of the private clinics that are substituting the governmental health

facilities causing an economic burden on the people, knowing that at least 30% of the Iraqis are living below the poverty line.
3. Provision of more health facilities to cope for the increasing number of population which is doubled during the last 25 years.
4. The health investment should be directed towards the primary health care and family health care models rather than the secondary and tertiary care, with more focusing on building capacities of the nursing and supporting staff.
5. Many of the health problems that burden the Iraqi health system are public health concerns and will not be solved by increasing the sophistication of secondary health care services, but, rather, through enhancing public awareness.

Conclusion

Decades of sanctions and wars have seriously compromised a once properly functional and well-developed health system, which is now struggling to rebuild itself, with adequate financial resources, but shortages of strategies. Most of the morbidity indicators are high, even those relatively declining recently, are still higher than what is reported in the region. The continuing political instability in Iraq makes even the well knit plans and strategies difficult to implement

Funding

This research did not receive any specific fund.

Conflict of Interest

Authors declare no conflict of interest.

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To cite this article: Lafta R. Health System in Iraq Post 2003 War. AL-Kindy College Medical Journal. 2023; 19(3):5–11. https://doi.org/10.47723/kcmj.v19i3.1040.