

Impact of the Disasters on Colorectal Cancer Screening Across Lebanon: a Comparative Study: The Lebanese Experience

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Abstract

Objective: This study aimed to investigate the impact of disasters on CRC screening in Lebanon

Study Design: This study consisted of a data collection from 11 hospitals across Lebanon. The data was collected in April 2021 and consisted of each month load of CRC screening colonoscopies for the 2019 and 2020 years.

Methods: The data was then compared to a monthly chart to assess the impact of these disasters on the CRC screening.

Results: The data collected from the 11 hospitals showed a drop in the number of screening colonoscopies performed in Lebanon with the revolution of the 17th of October 2019, the economic crisis and the COVID-19 breakdown in the country. The explosion of Beirut led to a significant drop in the colonoscopies made in Beirut and Mount Lebanon for the next two-month post-explosion.

Conclusion: We identified a large impact of disasters on CRC screening in Lebanon and a massive decline in the number of colonoscopies used to screen for CRC in high risk patients. Each disaster from Lebanese Revolution, Economic crisis, COVID-19 pandemic and Beirut Explosion was a stimulating cause to a drop in the screening colonoscopies. Due to the importance of limiting undiagnosed colorectal cancers associated with negative consequences, the Lebanese experience should be a lesson to learn from and a motivation to implement new strategies and new policies less dependent from the political, economic and sanitary state of the country. Lesson should be learned and measures should be taken in the near future.

Keywords: Colorectal, Colonoscopy, Cancer, Disasters, COVID-19

Introduction

With the era of advancement and innovation especially in the medical field, cancer is still striking and causing large numbers of deaths worldwide. The burden of Cancer is increasing every year, with a lack of efficient treatment for a majority of the cancer types, and the most powerful way to achieve remission being early diagnosis and prevention of disease progression into local and metastatic states. Colorectal cancer is one of the most frequent and common cancers with a high mortality rate [1]. According to a study performed by Lakkis et. Al among the Lebanese population between 2005 and 2016, the age-standardized incidence rate of colorectal cancer increased from 16.3 to 23.2 per 100 000 among males and from 13.0 to 20.2 per 100 000 among females. Furthermore, this study expected the age-standardized incidence rates to continue to increase to become close to 28.8 per 100 000 males and 26.1 per 100 000 females by 2025 [2].

Prevention is still limited leading to a very limited strategy to help minimizing its incidence [3]. However, with the new recommendations of the “American society of clinical Oncology” and screening colonoscopies recommended at 45 years old in individuals with high risk factors and 50 years in non-high risk individuals, it is well known that the strategy of screening is efficient and leads to an early diagnosis at localized stages of disease with a life expectancy at 5 years tremendously elevated compared to stage III and IV CRCs [4] Colonoscopy is mainly considered as secondary prevention for colorectal cancer and helps reduce mortality. It may also be considered as primary prevention since resecting polyps prevent the development of cancer [5]. Therefore, strategies and screening campaigns should be the next backbone to our approach in the battle against CRCs.

Lebanon has faced several crises since October 2019, which severely impacted the country's economic, social and political situation. On the 17th of October 2019, a popular revolution started in Lebanon with massive protests throughout the country and road blockage by protesters. The country was totally paralyzed; the people were stuck at home and the political situation was escalating. However, healthcare workers and health centers were still functioning normally. The revolution with massive protests lasted around two months and the country returned to normal in the beginning of December 2019. However, the economy collapsed, and local currency underwent severe and continuous devaluation compared to the US dollar that is persistent and escalating in 2021.

On the 21st of February 2020, the first case of COVID-19 was detected in the country [6]. Three weeks later, with an increasing number of COVID-19 positive cases a strict lockdown was launched under the supervision of the Lebanese army. Health care providers were in the middle of a battle that would last for months. On the 4th of August 2020 a massive explosion stroked in the middle of the Lebanese Capital Beirut leading to at least 200 deaths, more than 7000 injured and 300 000 internally displaced persons from the capital [7].

Subsequently, the country's situation has worsened in different domains, including health domain. Therefore, cancer screening may be seriously impacted.

We aimed to Study the Impact of each of the variables mentioned here below on CRC screening:

1. COVID-19 pandemic
2. Lebanese Revolution
3. Economic Crisis
4. Beirut explosion

Methods

Data Collection

Our data collection targeted recommended CRC screening colonoscopies performed in the Medical Centers that were included in the study. The colonoscopies were all recommended based on the Lebanese National Guidelines for CRC screening. Collected information included the number of colonoscopies performed monthly for the Years of 2019 and 2020 in 11 Hospitals affiliated to a University Medical Center. Hospitals were chosen from different areas in Lebanon in order to get results that are representative of the Lebanese population.

The Demographic Repartition of hospitals is shown below:

- A main University Hospital in the capital Beirut
- A main Hospital in Mount Lebanon
- Four Hospitals in the North District
- Four Hospitals in the Bekaa District
- A main Hospital in the South District

Ethical Approval

The study protocol is in line with the ethical guidelines of the 1975 Declaration of Helsinki. An approval from the ethical comity of the Saint Joseph University of Beirut was given before data collection.

Exclusion Criterion

- Hospitals with reduced number of colonoscopies due to technical problems (Machine reparations etc...).
- Colonoscopies not done for screening purposes

Statistical Analysis

Our analysis aimed to compare the number of CRC screening colonoscopies before the different crises and after they occurred, and to observe the evolution of this number through-out the different months in late 2019 and 2020.

Results are shown in Charts (1,2,3,4,5,6) representing the numbers of CRC screening colonoscopies for each month. The results were performed as percentages compared to a baseline number. The baseline number is represented as the number of CRC screening Colonoscopies on September 2019 in each District. NCSS (Number Cruncher Statistical System) software 2007 was used for statistical analysis.

Results

The results were collected from 11 hospitals across Lebanon, with a monthly record of CRC screening colonoscopies for the Years of 2019 and 2020. The results were then compared to the last month before the first Disasters (Lebanese Revolution that started the 17th of October 2019).

We divided the results in 3 Categories:

a) Beirut Governate: Capital of the Country were the results were collected from one of the Biggest University Hospitals of the country → Beirut Hospitals were affected by the four disasters.

b) Mount Lebanon: The largest District and the most populated governate in the country where we chose also an affiliated University Hospital → Mount Lebanon Hospitals were also affected by the four disasters

c) Peripheral Governates: Including the North district, the South district and Bekaa District where we collected the data from 9 Hospitals → Peripheral Hospitals were mainly affected by the COVID-19 outbreak that stroked in the country at the beginning of April 2020 plus the economic crisis that started to evolve in the end of December 2019.

Beirut Governate

As we see in Chart (1), the number of screening colonoscopies in a major Beirut University Hospital show a decreased number of CRC screening colonoscopies starting from October 2019.

Compared to the number of colonoscopies performed in September 2019, a drop of 28% for the month of October, 48.6% for the month of November and 50.2 % for the month of December of the number of colonoscopies is shown in the Chart (1) and reflect the impact of the Lebanese revolution on the Screening policies.

What is also remarkable on the Chart is the drop of 76.5 % of the CRC screening colonoscopies (179 colonoscopies in September 2019 vs 42 colonoscopies in August 2020) in August 2020 after the Beirut Blast showing the impact of the explosion on the Health Care system and the sanitary situation of the country.

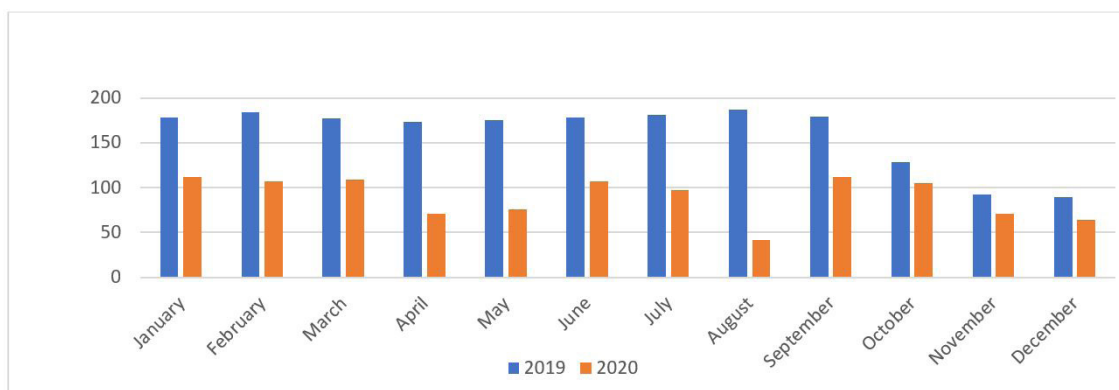


Chart 1: Number of Screening Colonoscopies in a Beirut Major Hospital

Mount Lebanon Governate

In Mount Lebanon, the largest governate in the country, the data was collected from a large university hospital and the results shown in Chart (2) reflect tremendously the impact of COVID-19 pandemic on CRC screening especially after the 1st wave and the 2nd wave.

For the 1st wave in April and May 2020, the country was facing the pandemic with strict measures and a complete lockdown that could explain the drop in the number of screening colonoscopies compared to the month of September 2019 prior to the beginning of the Lebanese revolution.

- April 2020 → 76.7% decline (17 colonoscopies vs 73 in September 2019)

- May 2020 → 69.8% decline (22 colonoscopies vs 73 in September 2019)

For the 2nd wave in October, November and December 2020 the fall in the number of colonoscopies is also extremely significant.

- October 2020 → 56.5% decline (33 colonoscopies vs 73 in September 2019)
- November 2020 → 56.5% decline (33 colonoscopies vs 73 in September 2019)
- December 2020 → 68.4% decline (24 colonoscopies vs 73 in September 2019)

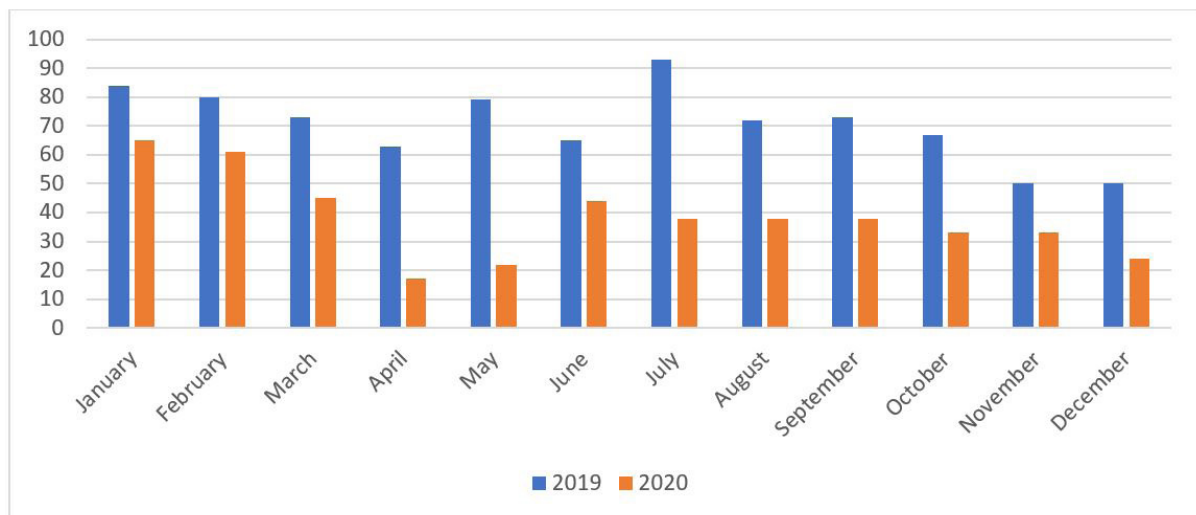


Chart 2: Number of Screening Colonoscopies in a Major Hospital in Mount Lebanon

Peripheral Governates

For the peripheral governates including North, South and Bekaa Districts the results are shown in Charts (3,4 and 5). The results are consistent with the findings in Beirut and Mount Lebanon with a significant decrease in the CRC screening colonoscopies from October 2019 till December 2020.

Those findings are relevant and show the impact of all the disasters on the country.

As we see in the Chart (4), representing the results collected in a major south university Hospital we see a fall of 87.8 % of the screening colonoscopies on April 2020 compared to September 2019 reflecting the impact of the COVID-19 pandemic.

In the Chart (3) we can conclude of an important drop in the screening colonoscopies in the times of the Lebanese revolution in the Northern district of the country, for example a fall of 58.6% was noticed in December 2019 compared to September 2019.

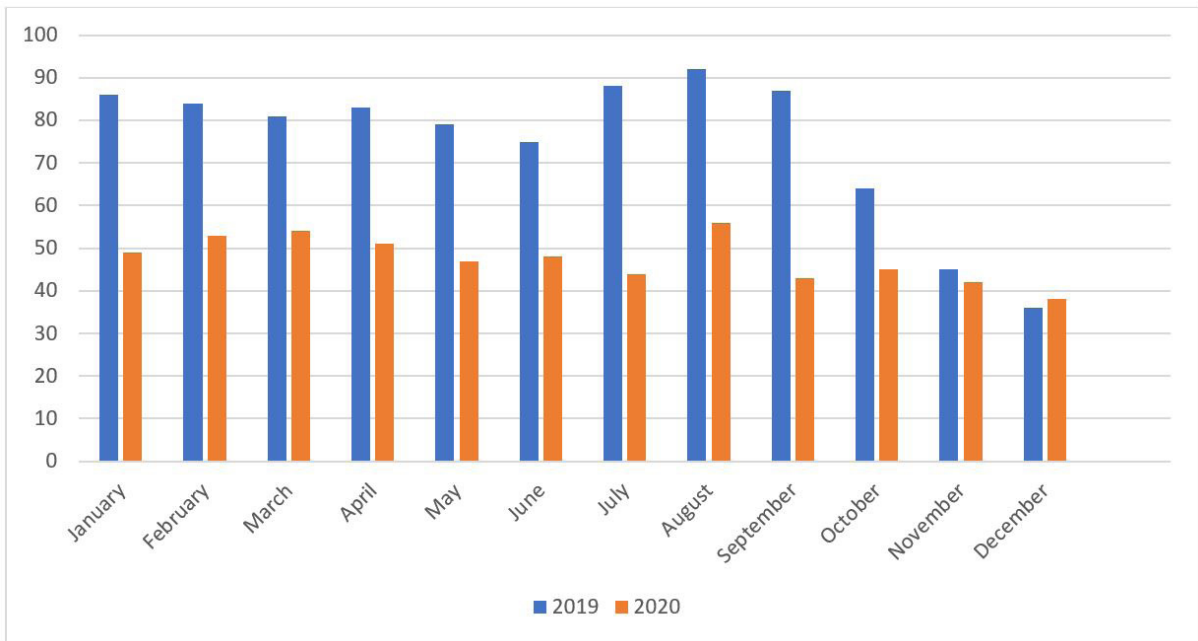


Chart 3: Number of screening Colonoscopies in 4 of North Governorate Hospitals

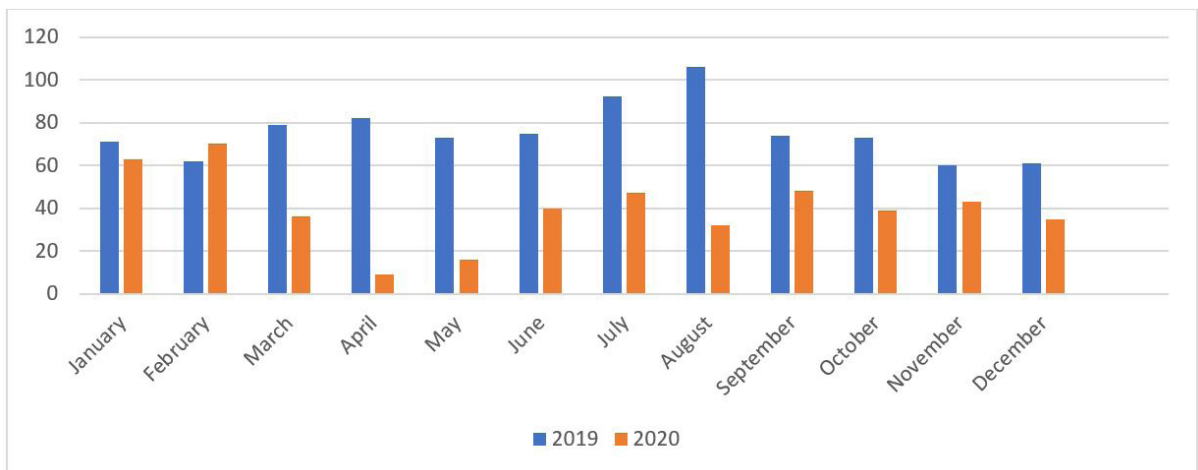


Chart 4: Number of screening Colonoscopies in a major South Governorate Hospital

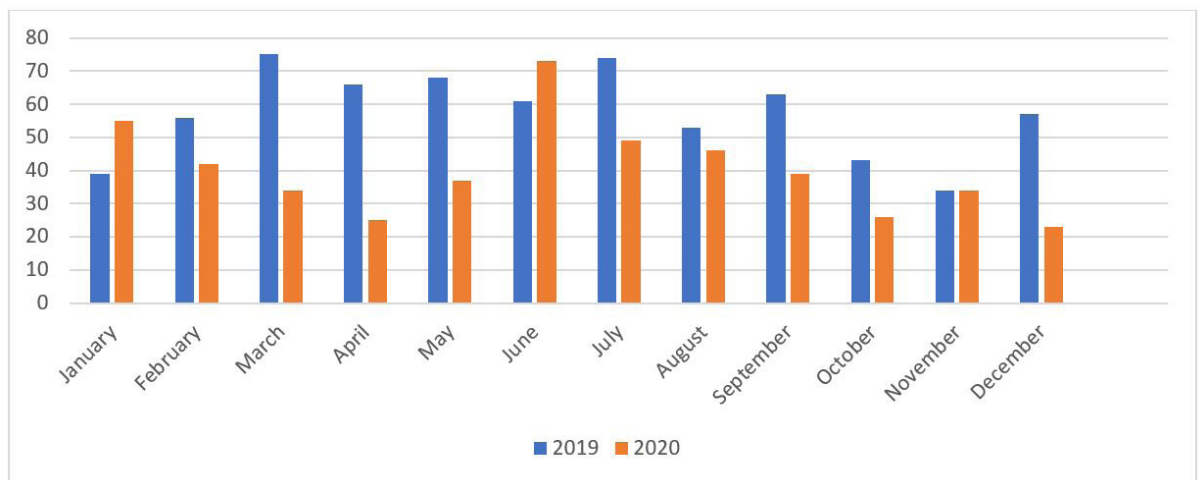


Chart 5: Number of Scening Colonoscopies in 4 of Bekaa Governorate Hospitals

Yearly Colonoscopies by District

As shown in chart (6), we can conclude to a yearly fall of:

- 44.1 % in Beirut District.
- 35.4 % in Mount Lebanon District.
- 30.3 % in Bekaa District.

- 36.7 % in North District.
- 47.4 % in South District.

This results reflect the impact of Covid-19 pandemic and of the economic crisis combined on the overall CRC screening colonoscopies performed in Lebanon in 2020.

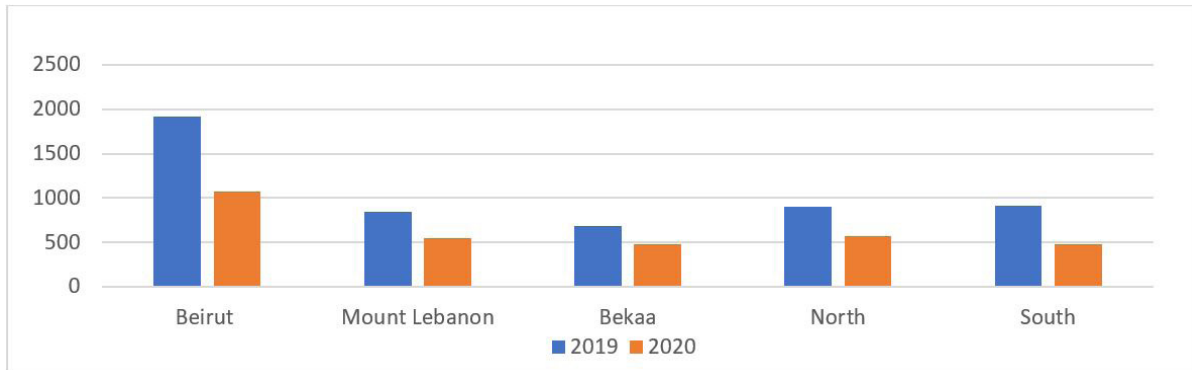


Chart 6: Total Number of screening Colonoscopies

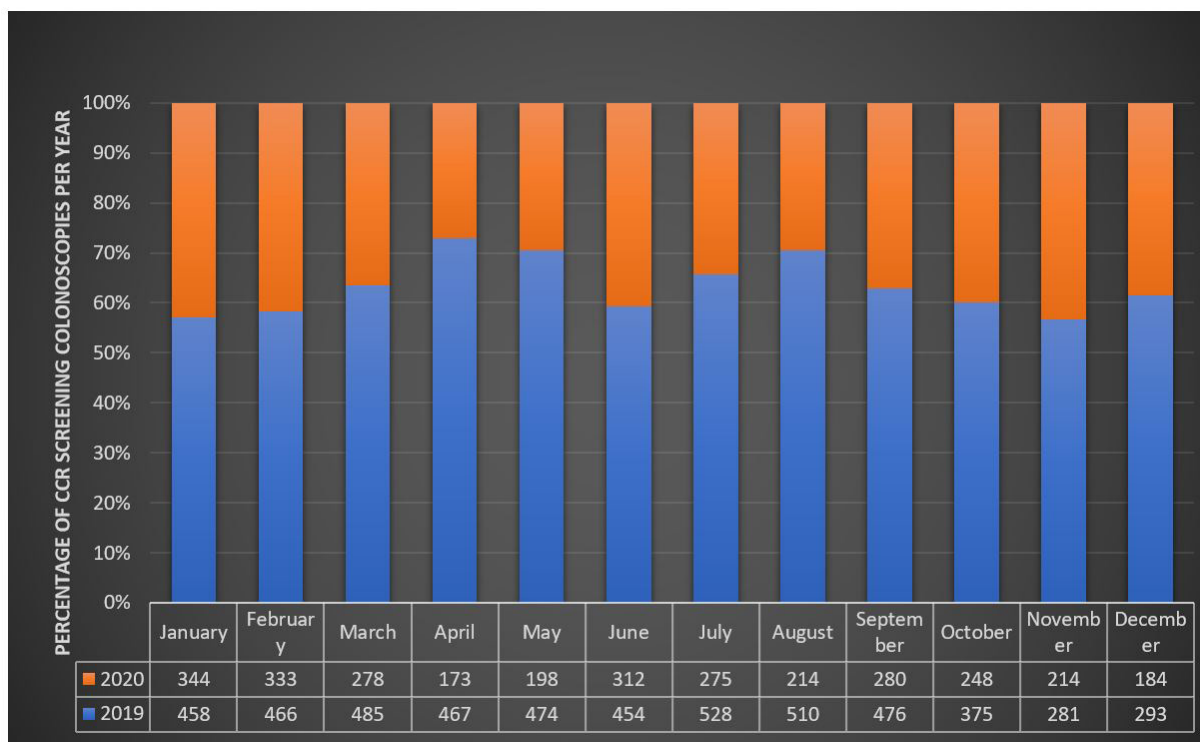


Chart 7: Overall CCR Screening Colonoscopies in Lebanon

Table 1: Lebanese Lira Value in American Dollars from the beginning of 2019 till the end of 2020

	January	February	March	April	May	June	July	August	September	October	November	December
2019	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5	1507.5	1800	2000
2020	2200	2250	2500	3400	3850	6300	7750	8000	8200	8000	7800	7800

Table 2: Major disasters from the beginning of 2019 till the end of 2020

	January	February	March	April	May	June	July	August	September	October	November	December
2019										Lebanese Revolution	Lebanese Revolution	
2020				Covid-19 Lockdown				Beirut Ex-plosion				

Discussion

Colorectal Cancer

According to the most recent numbers, 14 million new cases and 8 million deaths from cancer befell in 2012 [8]. Cancer is considered the second most common cause of death worldwide rambling behind cardiovascular diseases related deaths [9]. The morbidity and mortality of cancer are expected to increase annually in consequence of population growth and aging with lifestyle changes and socio-economic modifications [10].

Colorectal cancer (CRC) accounts alone in 2012 for about an annual of 1.4 million new cases and approximately 700 000 deaths being the 3rd most commonly diagnosed malignancy and the 4th utmost deadly cancer worldwide [8]. In 2018, 1849518 new cases were reported accounting for 10.6 % of all cancer new cases of the year.

Studies showed that a decline in mortality was reported in North America, Oceania and most of European Countries [11]. Those findings were linked to the adoption of best practices in cancer management and treatment [12]. The results were conclusive and outlined the importance of screening techniques especially early detection and removal of colonic polyps before evolving into high grade and disseminated malignancies with limited outcomes and survival [13-14].

The screening practices mainly consisted on: Colonoscopy, flexible sigmoidoscopy and other advanced practices like CT colonography, fecal occult blood testing and fecal immunochemistry testing. Those practices might increase the number of CRC yearly incidence but will contribute in the reduction of High grade, disseminated, advanced diseases due to the removal of precancerous lesions and polyps during colonoscopy [15]. A study done by Xabier García-Albéniz et al showed that screening colonoscopy reduces the eight-year risk of CRC from approximately 2.6% to 2.2% in beneficiaries aged 70 to 74 years, and from 3.0% to 2.8% in those aged 75 to 79 years [16]. The new

practices could clearly explain the reduced number of mortality from CRC in countries like USA and Canada where those practices were deeply implemented in the Health strategies to limit the burden of CRC [17].

Interpretation of the study Results

Our study findings are in concordance with other studies. A study done in Korea by Yang et al showed that household healthcare consumption was impacted by the country's economic crisis [18]. Another study done by Dorn et Al showed that during the recent economic recession in the US, insured 50-64-year-old Americans reduced their use of screening colonoscopy [19]. The latest World Bank Lebanon Economic Monitor (LEM) shows that the economic and financial crisis is likely to rank in the top 10, possibly top 3, most severe crises episodes globally since the mid-nineteenth century [20]. The Lebanese local currency is continuously devaluating, especially since Lebanon defaulted on a Eurobonds issuance that was due on March 9th 2020. People lost their money at the banks, as banks could not return the money in USD with their original value, but only a small part of it. The unemployment rate drastically increased leaving a big number of people unemployed. The Lebanese currency lost a big amount of its value and kept devaluating throughout 2020. The economic situation explains to a great extent the reduction of colonoscopy rates between 2019 and 2020. Many individuals may be unable to afford screening colonoscopy, or may perceive it to be less important than competing demands for their more limited resources [19].

Lebanon was severely affected by the COVID-19 pandemic. The viability of colonoscopy as the primary strategy for CRC screening, and of delivery of diagnostic and surveillance colonoscopy in a COVID-19 adapted world is uncertain. Several patients, primary provider, health system, and contextual factors contribute to this uncertainty [21]. A systematic review performed by Alkatout et al concluded that cancer screening rates have dropped at all levels of hospital care and in nearly all age groups [22]. The overall adherence to CRCS decreased during

the pandemic according to a study performed by d'Ovidio et al. [23]. During COVID-19 pandemic, asymptomatic patients are less likely to consult their physicians for a regular follow-up. Furthermore, during such a pandemic, the priority for patients would not be cancer screening. Their attention is shifted towards fighting COVID-19, whether it was by taking prevention measures or seeking medical help in case they present related symptoms. In addition to this, some patients may be worried of visiting healthcare settings due the fear of contracting COVID-19.

In Lebanon, the COVID-19 pandemic caused a temporary suspension of all clinical consultations, hospitals were receiving COVID-19 cases and non-Covid admissions were limited to medical emergencies. Just like in many countries, this pause was deemed necessary to allow health care facilities to establish appropriate infection-control measures to prevent COVID-19 outbreaks and to reserve health system capacity for COVID -19 patients [24].

Recommendations

The suspension of cancer screening or cancer prevention programs may be expected to aggravate the patients' suffering, disease burden, mortality rates at 5 years, the economic burden, and the workload for surgeons and oncologists [25-26].

In times of disasters (Pandemics, Revolutions, Economic Crisis, Conflicts, Natural disasters etc...) the state and the Health care authorities should anticipate solid solutions to manage the crisis knowing the importance of the screening procedures and the benefits of such practices.

Therefore, we strongly recommend:

- a) National awareness campaigns lead by Healthcare professionals under the supervision of the Ministry of Public Health
- b) Finding new ways to collectively reach a big number of patients, such as sending SMS messages or e-mails to incite them for cancer screening tests
- c) Management Planning to reduce the impact of disasters on Cancer screening procedures
- d) Widening of the Centers capable of performing those Tests to cover the whole country

e) Including the private Healthcare system (Radiologic private cabins, private laboratories and private hospitals) in the screening campaigns

f) Introducing the new techniques in the standard screening protocols, as an example in CRC, implement the usage of Faecal Immunochemistry Testing, CT colonography and faecal occult blood testing.

Conclusion

In conclusion, the results of the study showed a large decrease of the CRC screening colonoscopies in Central and Peripheral Hospitals due to the 4 disasters during the 2019-2020 period. Pandemics, Economic crisis, Explosions and Manifestations all of them impacted the screening campaign which can lead to a decrease in CRC diagnosis and a late onset of treatment especially curative surgeries that could lead to an increased expense on the health care system and the insurances. It will also lead to an increased morbidity and mortality from CRC. Therefore, in the future strict policies with wide campaigns should be launched prioritizing in crisis era the screening methods in our fight against Cancer. Further studies are recommended to study the impact of this decrease on the numbers of CRC diagnosed in the next 10 years, the mortality of CRC compared to the current average and the economic burden on the health care system in general.

Abbreviations

CRC: Colorectal Cancer

CRCS: Colorectal Cancer Screening

Acknowledgment

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Conflict of interest

The authors have no conflicts of interest to declare.

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