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RESEARCH ARTICLE

HOW CAN WE REDUCE COSTS IN ANOTHER PANDEMIC?

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Abstract

WHO declare COVID-19 infection? The effect of any pandemic include but not limited to loss of lives and economical , despite the fact that many countries have taken precautionary measures to prevent the disease from entering their countries or during its occurrence. The Kingdom of Saudi Arabia is one of the countries that was affected by the impact of COVID 19 pandemic despite its precautionary measures. Therefore, we will aim to review the precautionary procedures followed by the Kingdom, identify methods of the defect in it, and prepare a practical way to reduce economical losses in the event of another pandemic. The review had been conducted among online medical databases to include Google scholar, PubMed and Cochrane library to include the studies of Governmental policy documents including MOH of Saudi Arabia and World Health Organization besides, precautions taken by Saudi Arabia during the pandemic of SARS in 2012 and 2019, studying its effectiveness and its limitations. Data will be collected, rearranged, and presented in the results section and the proposed strategy that will be defined according to limitations found and the need for compacting new pandemic cost-effectively. The results indicated that Saudi Arabia has taken many precautionary measures, but it lacked several elements facing the spread of the virus. The lack of places for medical isolation was one of the most important element. Therefore, the kingdom was obliged to rent some hotels and luxury places for use in isolation, which increased spending and caused high burden. Based on the study findings, it was concluded the necessity of establishing and providing places designated for isolation and equipped this purpose, to be used in times of pandemic.

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Introduction:-

Saudi Arabia has a great responsibility in preventing many pandemics due to its importance to Muslims around the world to visit Mecca and Medina [1]. Saudi Arabia has a unique position among other countries as it receive millions of pilgrims who come to visit the holy cities of Makkah and Al Madina, throughout the year, and during Hajj time, the number of pilgrims increases to 2 -3 million every year [9]. The Ministry of Health in Saudi Arabia put extreme regulations to combat communicable diseases [9]. Moreover, pandemics are unpredictable and can occur at any time and any place []. The government of Saudi Arabia undertakes enormous efforts each year to ensure the healthiness, safety, and security of pilgrims, Umrah and Hajj still represent a high risk for spreading infectious diseases globally [1], [2]. In order to ensure the safety of citizens, residents, and foreigners, Saudi Arabia should

have disaster management plan to work with it in pandemic times [4]. Therefore, in this paper, we would provide a proposed strategy that could help in reducing both economic and human loss.

Review of Literature:-

Therefore, the introduction of a single case of respiratory syndrome of any cause in one of these overcrowded environments could start a type of a massive epidemic of this disease in these places and after that to countries to which pilgrims return. Therefore, in Saudi Arabia there are strict strategies to prevent the introduction of Severe Acute Respiratory Syndrome (SARS) into these holy places and Saudi Arabia at large.

Historically, the new coronavirus is not the first SARS pandemic that Saudi Arabia faced in the twenty-first century. In March 2003, the World Health Organization (WHO) issued an alert about SARS; therefore, Saudi Arabian health authorities formed a scientific task force to prepare a strategy to prevent the infection.

There are many strategies to combat an epidemic that had been established in many studies including the concept of Peter Daszak (2020) who saw that to prevent the next epidemic related to SARS we should invest in three areas that include; surveillance among the wildlife to find the most important and risky pathogens they carry and thus take precaution against them, studying the surveillance among people who are known to be in close contact with wildlife, as breeders and fishers to identify the early spillover events, and finally improving the market biosecurity that deals with the wildlife trade [4].

Moreover, Shagufta Perveen (2020) found that social distancing or self-quarantine which happens during pandemics is one of the most important and effective methods to stop the spread of the pandemic as in COVID-19. She gave an example of what happened in America in 1918 when two different states detected a few cases of influenza among the public where both states were planning for a massive military parade. However, in that time the head of Philadelphia city decided not to take any action and continued the events, which led to quick spread of the virus hence leading to the filling of hospitals in the state. On the other hand, the head of St. Louis city decided to cancel the parade and issuing precautionary orders including closing the schools, churches, and playgrounds, and banned the public gatherings, leading to fewer deaths and infections. In Philadelphia ten thousand people died because of the virus while in Saint -Louis, the deaths did not exceed 700 due to precautions and social distancing that had been applied [4].

Adam Kleczkowski performed a model of epidemiological and economic outcomes for controlling spreading of pre-symptomatic infectious disease on local and small-world networks. He found two effective ways including local strategy and global strategy and compared them to the null strategy. The global one depends on treating a large number of individuals while local one depends on treating individuals who were identified to be in the neighborhood of the detected case and null strategy with no action. He found that local strategy is optimal when the cost of a single vaccine is lower than the cost associated with hospitalization. It is only desirable if the disease spreads on a small-world network with sufficiently few long-range links; otherwise, it is optimal to treat globally. While global strategy is better for the case when the cost of prevention is much lower than the cost of treatment and there is a considerable non-local component in the disease spread. The properties of the pathogen might not be known in advance for emerging diseases, but the broad choice of the strategy can be made based on economic analysis only [5].

Moreover, Nilimesh Halder examined in his study the cost-effectiveness of several strategies to determine the most cost-effective strategies that can be used in a further pandemic with characters of H1N1 – 2009. The most effective strategies were treatment and prophylaxis using antiviral drugs with precautions including school closure, which seems that its limited duration closure is more cost-effective as compared to continuous closure. In those countries that have limited access to antiviral drugs, other social distancing strategy had shown an effectiveness, however, it is costly due to productivity losses [6].

Material and Method:-

We applied an abbreviated systematic review method, which in contrast to regular systematic review had the following methodological shortcuts:

1. No specific searches had been done for gray literature.
2. Not all abstract found had been screened
3. We did not explore the risk of bias of the evidence; however, we conducted a test for reliability and correctness.

The review had been conducted among online medical databases to include the studies and news of the policies and precautions taken by Saudi Arabia during the pandemic of SARS in 2012 and 2019, studying its effectiveness and its limitations.

Data was collected, rearranged, and pointed in the results section and the proposed strategy would be defined according to limitations found and the need for compacting any new pandemic cost-effectively.

Results:-

Historically, the new coronavirus is not the first SARS pandemic that Saudi Arabia faced in the twenty-first century. In March 2003, the World Health Organization (WHO) [7] issued an alert about SARS therefore; the Saudi health authorities formed a scientific taskforce to prepare a strategy to prevent the infection [8]. In the time of this epidemic, Saudi Arabia implanted some preventive strategies including

First, the kingdom banned citizens coming from countries with high rates unless the traveler spent 10 days (the maximum incubation period) since departure from these countries. However, this plan did not include Saudi citizens and legal residents of Saudi Arabia who traveled in these countries and allowed them to enter the kingdom. However; they were subjected to clinical assessment on entry to the kingdom and home-quarantine for 10 days with follow up from their nearest primary healthcare facility. They were asked to sign a form where they would remain indoors during the quarantine period, allowing no visitors to themselves and notify health care professionals with any respiratory symptoms or signs. Moreover, those who had any respiratory signs would be immediately hospitalized and isolated until their symptoms were resolved [9].

Second, providing laboratory tests for SARS including polymerase chain reaction tests to detect SARS virus genome and immunofluorescence assays to detect antibodies against the SARS virus in central labs in Riyadh.

Finally, an educational program had been conducted to health care providers including case definition, epidemiology, mode of transmission, clinical features, diagnostic tests, management, hospital infection control measures, and preventive strategies are undertaken using formal lectures and provision of educational material [9].

In 2019, the world was shocked by another epidemic of a new SARS virus called COVID-19 that started in Wuhan city in China in December 2019 and has resulted in an ongoing pandemic. On March 2, 2020; the Ministry of Health confirmed the first case in Saudi Arabia. In Saudi Arabia, the healthcare system has the advantage of being a social health care system, which means that all health care services are provided to all citizens as a responsibility of the government, however, non-citizens have their healthcare through their employers. At the beginning of the COVID-19 outbreak in Saudi Arabia, the majority of cases appeared to be returning travelers and their immediate contacts [10]. Moreover, it seems that the kingdom has benefited greatly from its experience with SARS where MOH prepared plans and strategies to ensure that all medical products are available in sufficient quantities including personal protective equipment, medications, ventilators, and diagnostic agents.

Saudi Arabia was one of the first countries to take very early precautionary measures against SARS-COV- 2 introduction into the kingdom before even recording any cases in the country with surveillance program. Furthermore, a national committee was established to follow global updates and all this before early January 2020. In February 2020, Saudi Arabia banned all direct flights between the kingdom and china [11]. In March 2020, Umrah was suspended and both two holy mosques in Makkah and Madinah have been closed. Moreover, schools and universities started to use remote learning and virtual classrooms and all flights were banned. In the same month, all social and governmental gatherings, sports workplaces were also suspended. In addition, all mosques were closed and prayers were asked by religious authorities to pray at homes for the first time in the kingdom's history [12]. Financially, all ministries have taken responsibility for fighting against this virus including providing the government with more than 120 billion Saudi Riyal (SPA, 2020z) where MOH received funds of 7 billion SR, and 8 billion SR was provided earlier from the government [13]. On April 15th 2020, the King of Saudi Arabia King Salman bin Abdulaziz has also ordered 47 billion SR for the MoH as an additional fund to help against COVID-19. He also ordered to fund 50 billion SR for private companies to reimburse those [14].

In addition, approximately 14.5 million SARS COV-2 tests will be performed, covering approximately 40% of the people living in Saudi Arabia making it the largest test capacity for SARS COV-2 worldwide. Also, establishing 6 regional laboratories all over the Kingdom to conduct 50,000 tests per day and mobile laboratory to conduct 10,000

tests per day [15]. All these precautions helped in reducing the numbers of patients in the kingdom which however reached 367,813 active cases, 359,299 cured and 6,372 deaths on January 2021 considering that fatality rate is from lowest countries worldwide [16].

Therefore, Ministry of Health established that Saudi Arabia had taken a great step after its experience with the MERS-CoV endemic that happened in 2012. For example, the Saudi Ministry of Health (MOH) established a command and control center and Saudi center for disease control and prevention (SCDC) after 2012 endemic which had a great role in the new virus SARS- COV 2 that appear in 2019 [17].

Although there are new cases of COVID-19 every day and these numbers fluctuate, the numbers are considered reasonable as a result of these precautions and restrictions, and we believe that without these actions, the numbers would be much higher. The number of cases depends on how well people follow the orders and guidance issued by the government because more than 95% of the cases within the country have been the results of transmission occurring at gatherings

- **The limitations of the applied strategies:**

- 1- One of the noticed limitations and problems that Saudi Arabia does not have special places that are prepared to be used as quarantine in the case of pandemics. Instead, all patients or suspected individuals as those who came from other countries were quarantined in hospitals, hotels and some luxury suites, which had an effect on the total costs of the kingdom. As it is reported that the kingdom spent millions of dollars to quarantine thousands of travelers and those who deal with infected patients in hotels around the kingdom. The government spent four million riyals for only one four-star hotel in center Riyadh for each month to be used as a quarantine facility [18].
- 2- Saudi Arabia was unsuccessful in limiting transmission among returning Saudi nationals who participated in an unmitigated super spreader event. The ongoing domestic transmission in the country is largely fueled by returning Saudi-national pilgrims. [19]

- **The future economic burden in health administration**

To reduce the future economic burden in health administration in case of another pandemic which according to the world today is not a strange thing, we have pre-established strategies and plans that we believe would help in combating the ongoing SARS-COVID-19, and will be useful in future pandemics. The strategy depends on the limitations of the ongoing strategies of the kingdom, which is the lack of places that are prepared to be used as quarantine facilities. Therefore, we suggest preparing structures in different places around the kingdom especially near ports of the country to be used as quarantine facilities for travelers and for those who contacted infected patients. These places would be provided with tools and equipment that are known to be important in the case of a pandemic. To reduce the cost of building these constructions we proposed to prepare these places to be used as a storage sector for medical equipment or food in time other than pandemic time. Therefore, in case of need, these buildings would be emptied from the storage equipment or food, which would be useful in if closeup had been applied to be dispensed over hospitals and markets and provide these building to be used as quarantine. This strategy has some advantages including:

- 1- Prepared for future epidemics, therefore, in case of emergency we would not need for providing emergency places, as we already will have them.
- 2- Reduce costs of emergency renting places like hotels and other building to be used as a quarantine.
- 3- These places would be used as quarantine that would be enough for many people, therefore, no need for home isolation of individuals who contact patients. During this epidemic we could not predict their actions where it is reported that some of these isolated individuals did not stick to precaution and orders. Instead, these places would be used to isolate these individuals and ensure their action and their adherence to rules.
- 4- The equipment and food that storage in these places would be used to support medical staff and markets in the event of a closure, as happened in this epidemic in COVID-19, so there will be no need to purchase medical supplies or tools during the epidemic.

Discussion:-

In Saudi Arabia, healthcare services are free to the general public that are provided through the ministry of health, military hospitals, and other government-sponsored hospitals besides the other hospitals in the private sector. Collectively, the number of beds per 1000 population in the kingdom of Saudi Arabia is at 2.2 which is considered lower when compared to some countries such as in Japan (number of hospital beds per 1000 persons was 13.05 in 2017), in Russia (8.05 in 2017) and in Germany (8 in 2017) [20, 21]. However, in the Saudi Vision 2030

program, there are prepared fundamental structural changes in the healthcare sector to meet the growing demand for health care services in the kingdom.

Pandemics have a great impact on several aspects of countries including human loss, economical losses, and physiological problems because of the lockdown that in most cases related to precaution to pandemics. During the past 20 years, the planet faced many pandemics because of viruses including SARS, H1N1 influenza, and Middle East respiratory syndrome coronavirus (MERS-COV) [22]. These increasing number of epidemics is alarming hence there must be tight plans to confront these epidemics and provide adequate plans, tools, and requirements to confront any new threat. Preparing for any new epidemic and planning for ways to confront it will reduce possible losses, whether in lives or material losses.

Saudi Arabia has learned from its experience of the previous pandemic that happened in 2012, and used this knowledge to combat the new COVID-19 virus, however, its strategies were not fully successful probably because public in some cases did not follow the rules and precautions of social distance. However, one of the sources of costs that happen to the kingdom is the lack of prepared places to be used as quarantine. Therefore, in this review, we proposed and give suggestion of building facilities in different areas around the kingdom that are prepared to have dual functions; storage in non-pandemic events and as quarantine facilities in pandemic events, and we believe that this would help in reducing the cost of pandemic and reduce the risk for spreading the disease.

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