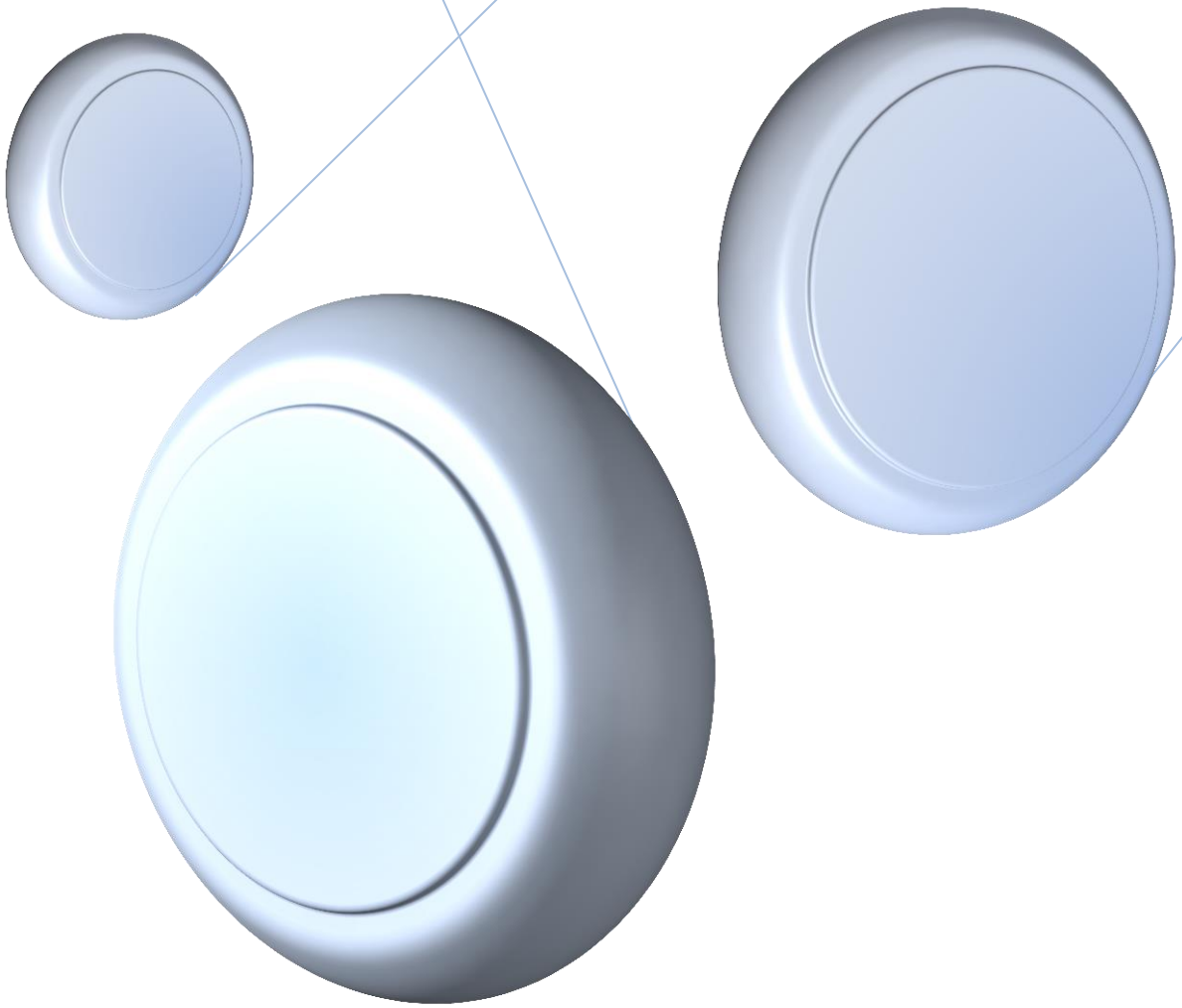
Wasit First International Conference on Coronavirus Pandemic

(25-26 /4/2020).



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Knowledge, Attitudes and Practices of Health Care Providers towards COVID-19 in Wasit Province

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Abstract

Background: Health care providers are the backbone of a country's defenses to save lives and limit the spread of any infectious disease especially during outbreaks. Previous studies showed that Health Care Workers had a lack of knowledge and attitude toward MERS CoV, SARS CoV1 and SARS CoV2 (CoVid-19).

Objectives: This study aimed to assess the knowledge, attitudes and practices regarding COVID – 19 disease- among healthcare workers in Wasit Province-Iraq.

Methodology: This was a preliminary descriptive observational cross-sectional study, a pretested semi structured online validated questionnaire was developed by the researchers and posted to a convenient sample of health care providers working in primary, secondary and tertiary health care services in Wasit who were invited via social media apps groups to participate voluntarily in this study. The questionnaire included data collection related to: demographic and job characteristics of participants, level of knowledge, their attitudes and practices regarding COVID-19 infection. Questions designed with triple and dichotomous responses. The duration of online data collection from April 8, to April 21, 2020.

Results: Seventy-seven of health care providers had participated in this study with response rate 94%. Their mean age (35.7 years ± 7.8 SD), while the mean period of experience was (12.8 years ± 7.6 SD). Only (25%) of them were working in the isolation and quarantine activities. Health care professionals had an overall moderate to high-level knowledge (56%) with higher knowledge towards common modes of transmission, preventive and control activities, but there was a gap of insufficient attitudes score level (53%) and moderate to strong practices score level (64%). Medical professionals had higher knowledge score level than other health professionals (P 0.02). Allied health professionals had significantly high score level of practices in health promotion and preventive activities as compared to other groups (P 0.01). Attitude correlated weakly with knowledge and practice (P >0.05).

Conclusions: The majority of participants had acceptable knowledge but low positive attitudes toward COVID-19. The level of some attitudes and practices had lower than that expected for them. On job training and educational campaigns are requested to improve their capacities in these high priority issues to manage this devastating health crisis.

***Keywords*:** CoVid-19; knowledge; attitudes; practices; healthcare providers; Iraq; Wasit.

Introduction

The world now is facing the third major pandemic of coronavirus infections, which are known to cause illness ranging from the common cold to severe acute respiratory syndrome [1, 2].

In 30 January 2020, the World Health Organization (WHO) declared COVID-19 a public health emergency of international concern [3], in the beginning of March, a devastating number of new cases were reported globally including Iraq, and emerged as a pandemic [4]. In our country, the first confirmed case was reported in Al-Najaf province on 24th of February 2020, which was of international student travelled to Iraq [5].

In particular, health authorities and scientists have warned that widespread misinformation about COVID-19 is a serious concern causing xenophobia and misconceptions worldwide [6-8].

In developing countries, it was determined that the knowledge, attitudes and practices of healthcare workers with respect to infection prevention was poor [9]. The fact that health care workers are at risk of infection in the epidemic chain is a critical issue because they help in controlling the outbreak [10]. The battle against COVID-19 is still continuing worldwide. To containing infection, people's including health care providers adherence to control measures of contagious diseases are essential, which is largely affected by their knowledge, attitudes, and practices (KAP) towards COVID-19 in accordance with KAP theory [11,12].

A poor understanding of the disease among healthcare workers (HCWs) may result in delayed treatment and the rapid spread of infection [13].

The WHO and Centers for Disease Control and Prevention (CDC) had published recommendations for the prevention and control of COVID19 for HCWs [14, 15]. The WHO also initiated several online training sessions and materials on COVID-19 in various languages to strengthen preventive strategies, including raising awareness and training HCWs in preparedness activities [16, 17].

In several instance, misunderstandings among health care providers have delayed controlling efforts to provide necessary treatment [18]. Studies explained that health education and programs aimed at improving COVID-19 knowledge are helpful for encouraging an optimistic attitudes and maintaining safe practice [19].

There has been a rapid surge in research in response to the outbreak of COVID-19. During this early period, published research primarily explored the epidemiology, causes, clinical manifestation and diagnosis, as well as prevention and control of the novel coronavirus among 65 studies conducted health care workers constituted the lowest target of the study population

only 6.2% [20]. There is no published data about the knowledge, attitudes and practices of Iraqi health care workers regarding this novel disease.

This study aimed to assess the knowledge, attitudes and practices of health care workers in Wasit Province toward COVID-19 disease.

Methodology

Study design and sampling technique:

This is an observational, preliminary descriptive cross-sectional study, which was conducted in Wasit governorate –Iraq during the period 8-21 April 2020 enrolling all titles of health care providers working in the governorate health facilities. A pretested semi structured online validated questionnaire was developed and adopted from previous studies as well as the question and answer about COVID-19 in the webpage of WHO [21,22]. The electronic questionnaire posted to a convenient sample of health care providers working in primary, secondary and tertiary health care services in Wasit province, they were invited via social media apps groups to participate in study voluntarily. The questionnaire begin with explaining the purpose of study with an option for consent with (agree or disagree) in participation.

All health care providers with any potential exposure to a COVID-19 infected patient within health care facilities to participate voluntarily.

Health care givers were participated in this study after obtaining their informed consents, which was performed following the Helsinki declaration revised in the year 2013 and following the checklist for reported internet results of E-survey guidelines [23].

Measurement and data collection:

The 74 items questionnaire included information related to: demographic and job characteristics, participant's knowledge, attitudes and practices regarding COVID-19 disease. Questions designed with dichotomous (yes, no) and triple responses (true, false and do not know). The time needed to full the self-filed anonymously questionnaire was about 10-15 minutes.

Scoring of scale

The knowledge partition of the questionnaire consisted of four parts (36 questions) the first had 10 questions regarding modes of transmission, 12 about the preventive and control measures. Nine questions asked about incubation period, asymptomatic infection, and infectivity. In addition to five questions for risk factors that increasing the severity of disease, and the recurrent of infection. These questions were in the form of a multiple-choice response. Correct answers had 3 points, while incorrect answers were allocated 1 point. A “do not know” answer had 2 points. Eventually, the overall knowledge score ranged from 36 to 108. Participants scoring 96 and under were categorized as having poor knowledge, 97 to 100 as having moderate/ acceptable knowledge, and above 100 as enjoying high knowledge of COVID-19.

To estimate the attitude of the HCPs towards the disease, eight questions were asked about (seriousness of disease, fear of contagion, satisfaction with control interventions and thinking about the ability of health services to manage the critical cases). The answering were dichotomous scale coded with (yes=1, and no=0). The total attitude score ranged from zero to

nine. A score of under 5, 5 to 6, and above 6 was classified as low, moderate, and high level attitude towards COVID-19, respectively.

Regarding the health worker's practice and approach towards the disease, nine questions were asked with a similar scoring system as previous mention (yes=1, and no=0). Total scores of under 6, 6 to 7, and above 7 were classified as a weak, moderate, and strong practice towards COVID-19, respectively.

Data analysis

Data were entered, coded and analyzed using SPSS V 0.25. Descriptive statistics was applied to summarize data with frequencies and percentages. Independent T-test, ANOVA, Contingency Coefficient, Chi square test, Fisher Exact Test and Correlation Coefficient were used to examine the statistical level of differences and associations in variables. A p-value of less than 0.05 considered as statistically significant.

Results

A sample of 77 participants (70 males and 7 females) figure [1], their age range from 24-54 yrs. figure [2], with mean age 35.7 years. ± 7.8 SD, while the mean period of employments was 12.8 years. ± 7.6 SD, only 19 (25%) of them worked in isolation and quarantine activities, table [1]. Response rate was 94%. Allied healthcare professionals consisted 39% of them and, one third were medical professional, figure [3]. Only 33 (43%) of HCPs engaged in training activities at health facility or DOH, figure [4].15 (19%) of this sample have been in contact with a patient with a disease either (outpatient or inpatient) and later found to be infected with the coronavirus. Moreover, one of them been quarantined.

Table 1: Description of study sample (N=77)

Socio-demographic and employment characteristics		No. (%)
Social status	single	11 (14)
	married	65 (85)
	divorced	1 (1)
Working in isolation and quarantine activities	yes	19 (25)
	no	58 (75)
Age groups (years), mean age, 35.7 years. ± 7.8 SD (Range 24-54 yrs.)		
Period of experience, mean years, 12.8 years. ± 7.6 SD (Range 1-29 yrs.).		

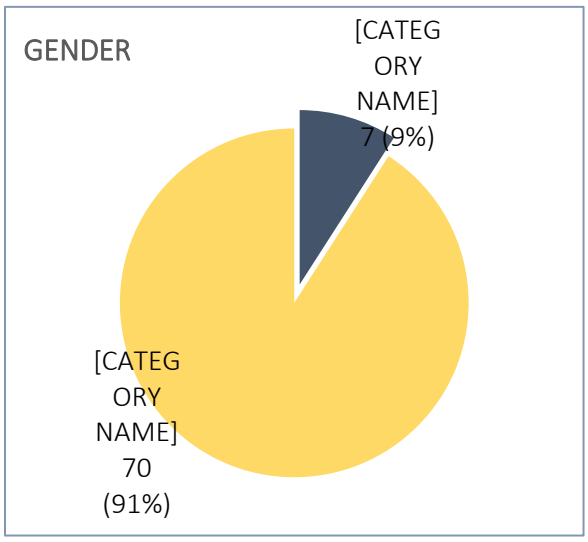


Figure 1: Gender distribution (N=77)

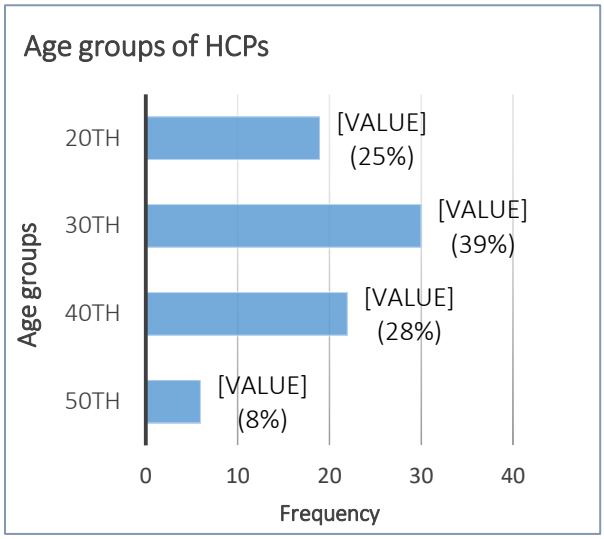


Figure 2: Age groups distribution (N=77)

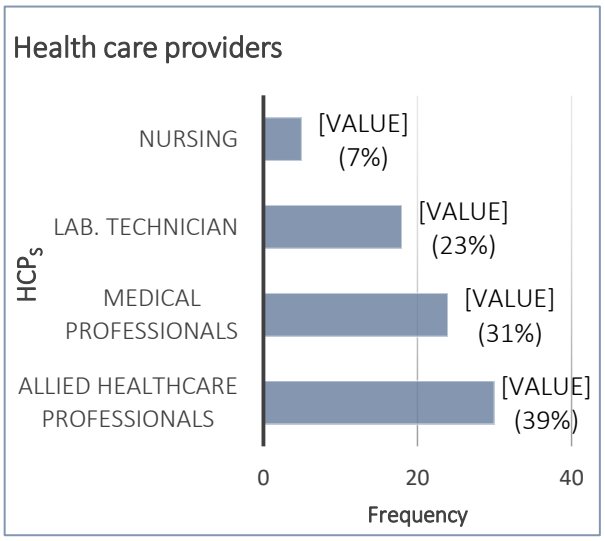


Figure 3: Health care provider's distribution (N=77)

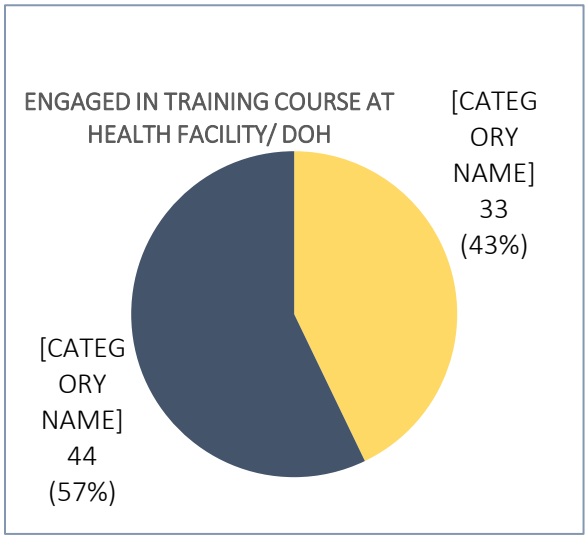


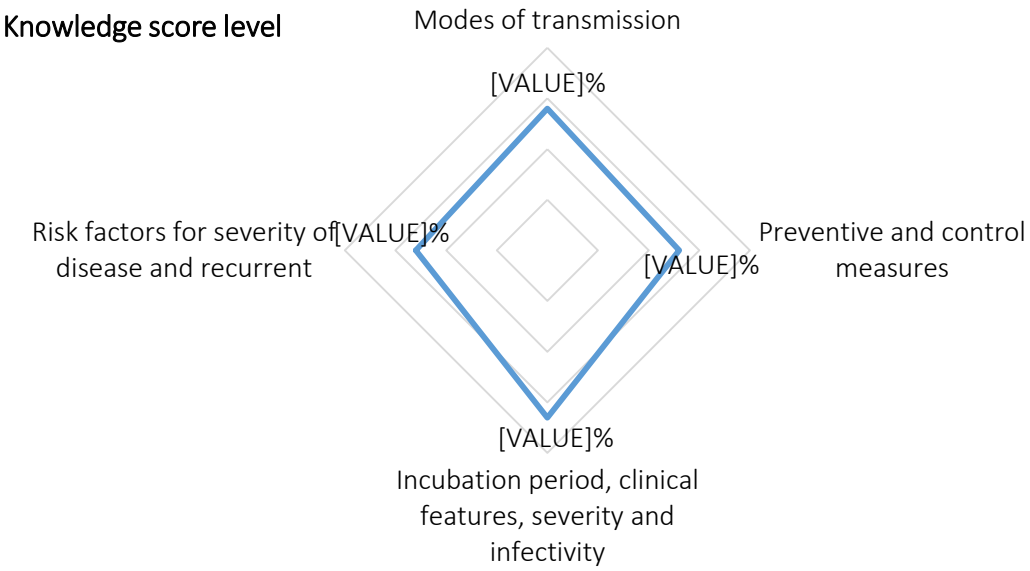
Figure 4: Engaged in training about COVID-19 (N=77)

Knowledge of COVID-19

The mean knowledge score was 96.92 ± 3.60 SD indicated an overall moderate to high-level knowledge (56%) towards COVID-19, table [2]. The highest level was about common modes of transmission (droplets transmission, touching objects and surfaces) and common preventive and control measures (hand washing, do not touch T shape in face; eyes, nose and mouth, sneezing and cough with tissues or elbow, use mask, social distancing, stay home and lockdown) followed by knowledge about incubation period, clinical features, severity. While less knowledge about airborne, fecal-oral transmission, vertical transmission, risk factors,
recurrent of infection and infectivity. In addition, misconception about pets, fresh vegetable intake transmission and antibiotics uses in prevention, figure [5].

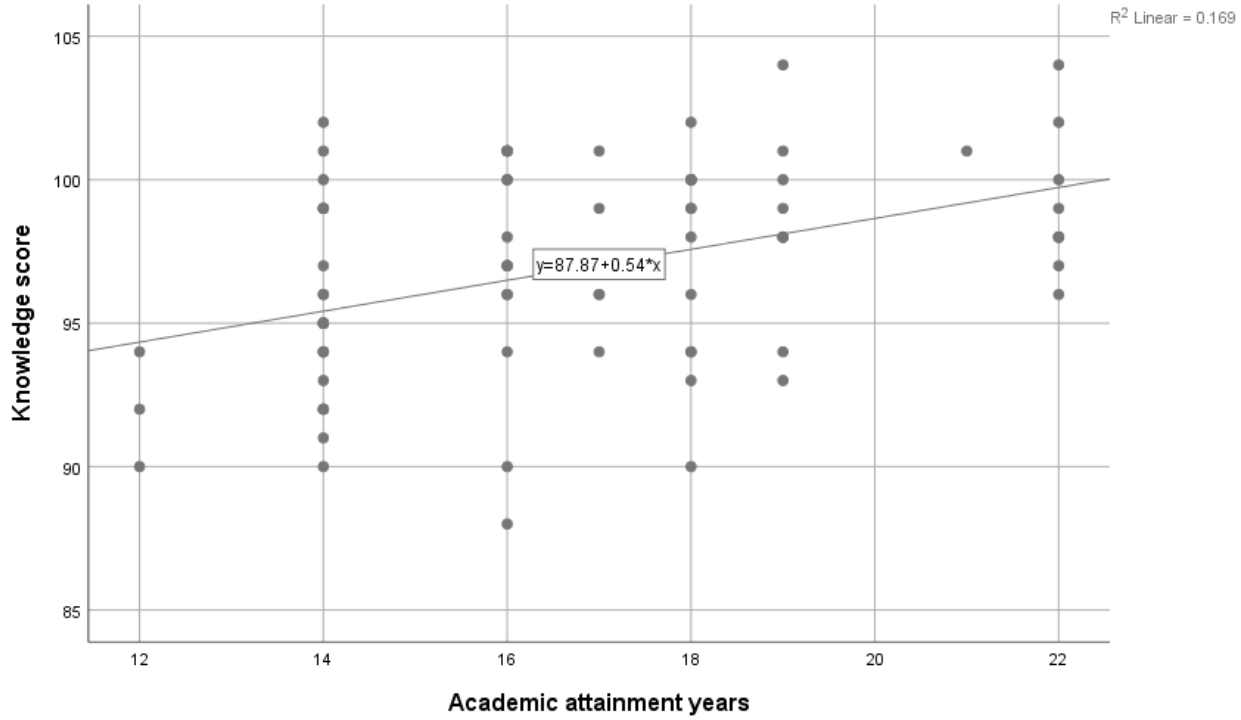
Figure 5: Four dimensions of knowledge score level (percentage) of healthcare providers about COVID-19 (N=77).

Medical professionals had higher knowledge score level than other health professionals (P 0.02). They have best knowledge about pet's transmission option (P 0.008) and obesity as a risk factor



that increasing the severity of disease than other health professionals (P 0.02); also, they have less misconception about antibiotics use in prevention than other healthcare providers (P 0.002). On the other hand Lab technician have best knowledge about vertically transmission of infection than other health care providers with no significant level.

Gender, age groups, marital status and working in primary or secondary health services level do not influence the level of knowledge, table [3]. Knowledge score correlated positively with years



of academic attainment (r 0.392, P 0.0001), figure [6].

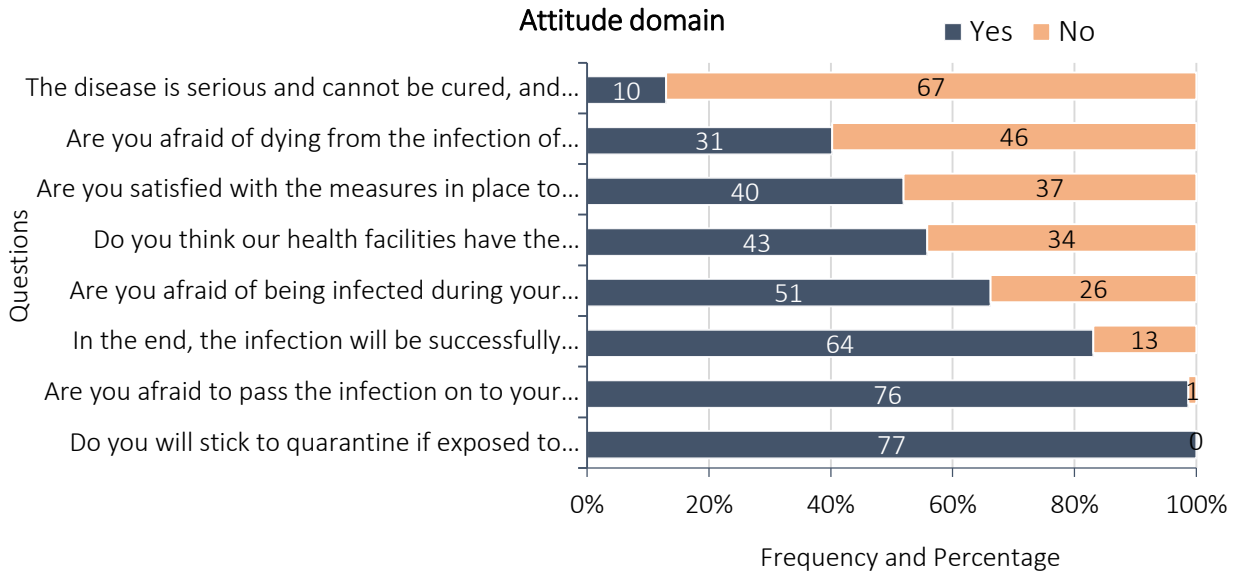
Figure 6: Correlation of knowledge score with years of academic attainment (N=77).

Attitude towards COVID-19

The mean positive answer score of the eight questions regarding the attitude towards COVID-19 rate was 5.71 ± 1.48 SD suggesting an overall moderate to high-level attitude rate 52%, table [2]. Males reported mean score of attitude higher than females (P 0.06) table [3]. Good attitude towards following quarantine measures if they infected with coronavirus infection and the ability to end epidemic successfully in Wasit governorate figure [7]. The high-level of negative feelings were about fear of contagion. Thinking about seriousness of disease less in medical and Lab technician in comparison with nurse and allied healthcare professional (P 0.013). All healthcare providers express the same feelings of fear of contagion for them and their families. The most experienced healthcare providers with mean employment years of 15 yrs. thought negatively about the ability of health facilities to manage critical care than those have mean years of ten (P

0.006). Those 19 individuals who contacted with patients (later found to be infected with the coronavirus) have an attitude mean score 3.73 ± 1.16 less than those reported with no exposure (P 0.003). Healthcare provider's attitude score had weak correlated with years of academic attainment (r 0.130, P 0.259).

Figure 7: Stacked bar 100% for the questions with answers (yes, no) of health care provider's



attitude towards COVID-19 (N=77), total attitude score level (52%).

Practice towards COVID-19

Almost of health care providers using Personal Protective Equipment (PPE) during work, and advice their colleagues to do this, figure [8]. They had moderate to strong practices score level (64%), table [2]. Allied Healthcare professionals more engaged in health education campaigns and intervention practices (active surveillance) in comparison with medical professionals with statistically significant differences (P 0.01). Health care providers especially Lab technician engaged in disinfection campaigns more than other professionals (P 0.005).

However, concerning the practice score level it was negatively correlated with years of academic attainment (r – 0.251, P 0.03). Medical professionals reported more years of academic attainment (mean years 16.9 yrs.) than other healthcare professionals did (P 0.009).

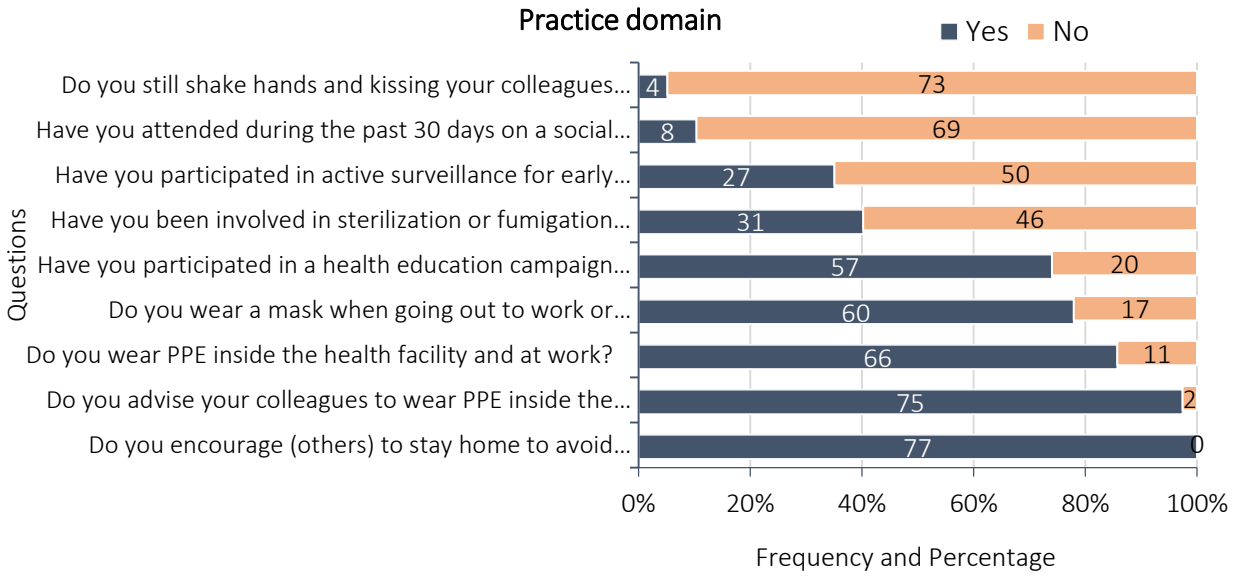


Figure 8: Stacked bar 100% for the questions with answers (yes, no) of health care provider's practice towards COVID-19 (N=77), total practice score level (64%).

The attitude score had a weak correlation with both knowledge and practice scores (r 0.05, P 0.66 and r 0.067, P 0.56) respectively, figures [9-10]. In this study healthcare providers told about the shortage of PPE and mask in their health facilities, figures [11-12]. Finally most of HCPs based on televised and social media as a source of information regarding COVID-19.

Table 2: Number of questions, range, scores and levels of knowledge, attitude, and practice about COVID-19 in health care providers

Indicators	No. of questions	Range of score	Total score (mean ± SD)	Level (%), N=77		
				Poor/ weak	*Moderate*	*high/ excellent*
Knowledge	36	36-108	96.92 ± 3.60	44	39	17
Attitude	8	0-8	4.73 ± 1.47	47	35	18
Practice	9	0-9	6.95 ± 1.32	36	54	10

Table 3. Association of socio-demographic and job characteristics with the knowledge, attitude and practice towards COVID-19.

Characteristics		Mean ± Standard deviation					
		Knowledge	*P**	Attitude	*P*	Practice	*P*
Gender	male	96.99 ± 3.6	0.63	4.83 ± 1.48	0.06	7.06 ± 1.30	0.02
	female	96.29 ± 3.9		3.71 ± 0.95		5.86 ± 1.07	
Age groups (years)	20-29	96.47 ± 3.29	0.55	4.95 ± 1.47	0.51	6.63 ± 1.38	0.17
	30-39	96.47 ± 3.70		4.53 ± 1.27		7.27 ± 1.31	
	40-49	97.68 ± 3.14		4.95 ± 1.70		7.00 ± 1.11	
	50-59	97.83 ± 5.67		4.17 ± 1.60		6.17 ± 1.72	
Marital status	single	96.73 ± 4.10	0.84	4.73 ± 1.42	1.00	6.73 ± 1.27	0.55
	married	96.95 ± 3.55		4.73 ± 1.49		6.98 ± 1.34	
Job	medical professionals	98.38 ± 3.36	0.02	4.50 ± 1.64	0.33	6.42 ± 1.28	0.01
	allied health professionals	95.70 ± 3.39		4.63 ± 1.52		7.50 ± 1.19	
	nursing	95.0 ± 4.36		4.40 ± 1.14		6.20 ± 1.30	
	Lab. technicians	97.56 ± 3.40		5.28 ± 1.17		6.94 ± 1.30	
Health care services level	primary	96.59 ± 3.69	0.71	4.72 ± 1.33	0.56	7.41 ± 1.27	0.01
	secondary	96.92 ± 3.71		4.51 ± 1.56		6.59 ± 1.23	

* Independent t-Test and ANOVA

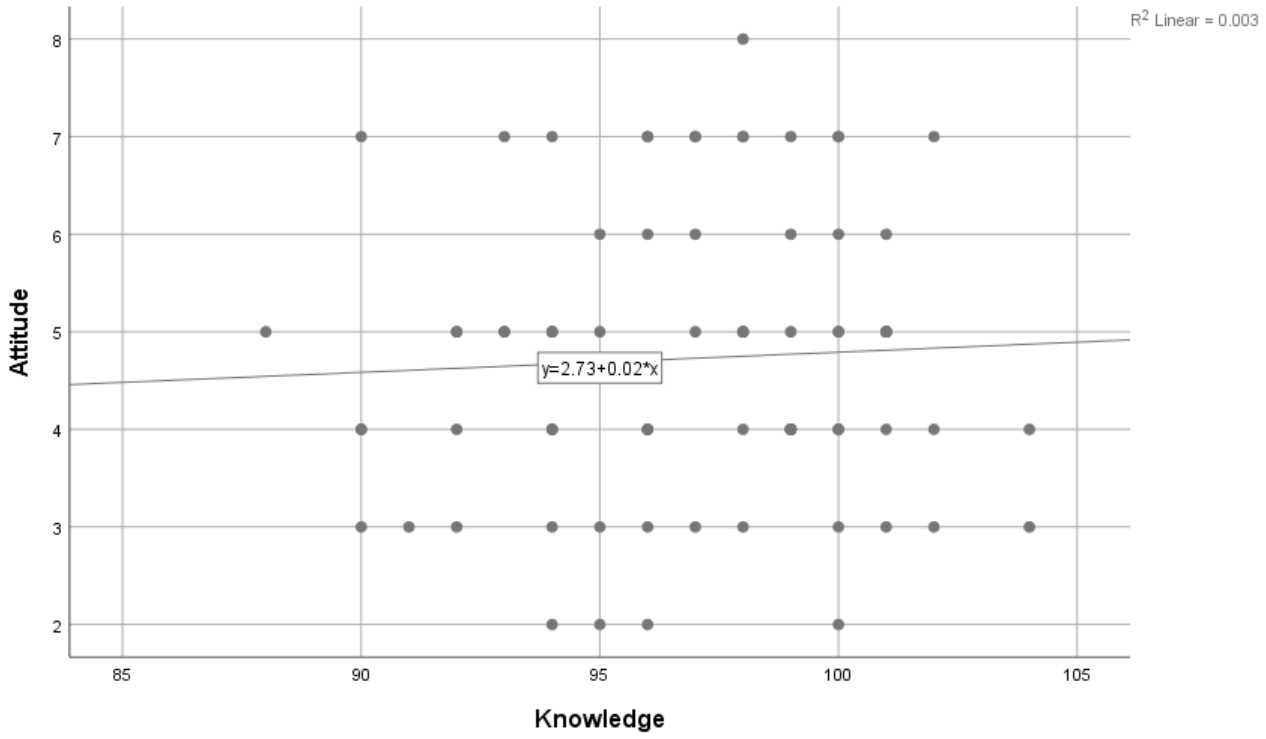


Figure 9: Correlation between knowledge and attitude scores (N=77)

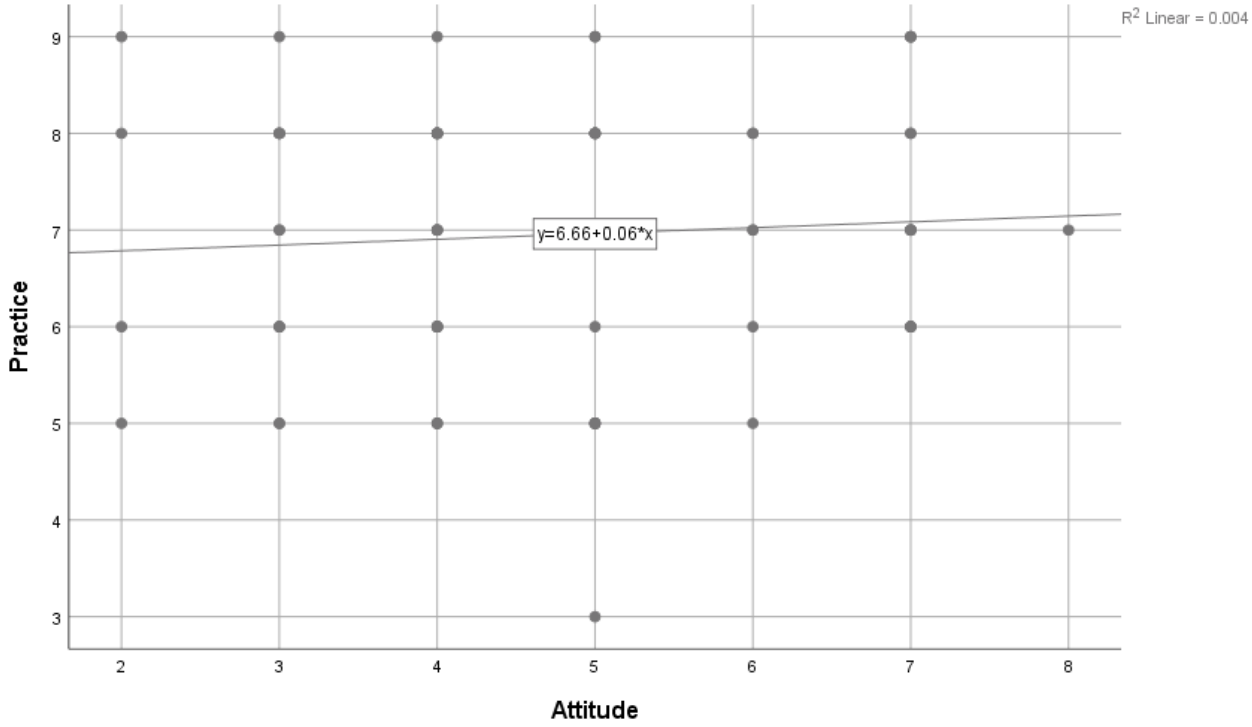


Figure 10: Correlation between attitude and practice scores (N=77)

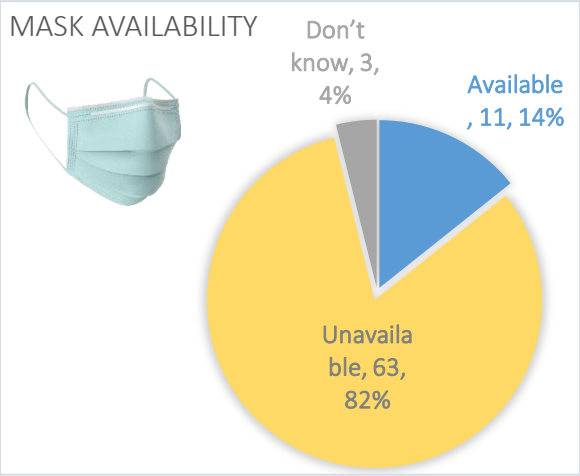


Figure 11: Mask availability in health facility (N=77)

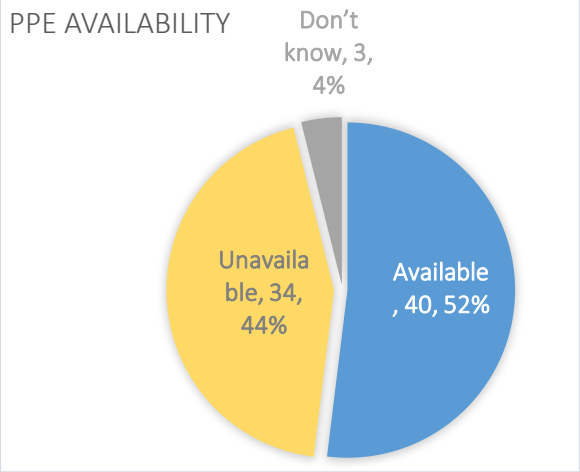


Figure 12: PPE availability in health facility (N=77)

Discussion

Health workers have contacts with infected patients and have important role in epidemic control [24]. Without optimistic capacity building of health care givers, epidemic prevention and control of serious infectious diseases cannot be anticipated effectively. Health education programs and good on job training, particularly targeting lower knowledge health care workers regarding COVID-19, are essential for promoting positive attitudes and maintain safe practices

[24, 25]. Going through searching the literature and to the level of our best information, this is the first research work conducted in Iraq regarding knowledge, attitudes and practices of Iraqi health care providers working in health care institutions in Wasit province during the epidemic of COVID-19. According to our findings, the majority of participants have an acceptable level of knowledge this result is similar to the result reported by researchers who investigated the level of knowledge of COVID-19 disease among sample of 84 Iranian nurses during the epidemic [26]. This sufficient knowledge may indicate the massive distribution of information about COVID-19 through different types of media; other studies reported that participants got their information about infectious diseases from internet and TV watching [27-29]. These findings also go in line with other studies, which revealed a very good knowledge among doctors and other health care workers towards COVID-19 and Middle East Respiratory Syndrome [10, 30-31].

The attitude of health workers in this study is lower than level of knowledge this may be explained that the sources of information were not sound to be fully trusted and accepted to change the perception of the health care providers. This finding in agreement with the finding of other hospital based study conducted in Vietnams district hospital during the pandemic of this disease in 2020 [32]. There was a weak positive correlation between knowledge and attitude, other population-based and health professionals-based studies found that the greater the knowledge, the more confident they were in beating the virus [10, 24].

This study revealed that there is a significant difference in some aspect of the attitudes according to contact with patients, fear of contagion and the period of employment. Around tow third of the surveyed HCPs were afraid of becoming infected with COVID-19 at work, this percentage lower than the fearing of contagion in region geographically close to Wuhan the epicenter of COVID-19 in China [10]. Surprisingly, those who have more than 15 years of employment showed low attitudes toward the ability of health institutions to manage critical care as compared to newly employed health care workers, and this finding disagrees with the finding of another study conducted in Islamic Republic of Iran [26]. The practices of the workers is decent which indicates that people working in the health care are seriously fighting this deadly disease and most of the workers witnessed previous infectious respiratory disease epidemic such as H1N1 and repeated cholera epidemics. This finding is similar to the finding reported by Iranian community based study during 2020 [24], the study depicted that health workers were stimulate to work hard to contain the epidemic, the paramedics are more engaged in active surveillance as compared to medical professionals. In practicing, we should take in consideration the nature of primary health care services in health education and field working such as active surveillance, while secondary health services engaged in clinical and surgical interventional practices. Additional interventional campaigns are strongly required for health care providers to avail them with the knowledge of the mode of transmission, the isolation period and treatment strategies, as well as the risk of personal and family infection with COVID-19. Based on these results, and in order to enhance health and medical education, support programs regarding COVID-19 epidemic in our country are needed. An effective and flexible managerial process not handicapped by

bureaucrats and it can be implemented at fast pace and low operative costs with production of changes in the knowledge, attitudes and establishes confident relations and partnerships with the community and other partners [33]. The District Team Problem Solving (DTPS) approach which was implemented in Iraq and other developing countries [34, 35]. DTPS may be the real optimum answer for the on job training of health care workers effectively within a relatively short time through learning by doing approach after identifying a real high priority health problem to contain (Coronavirus Sars-2) at a district and provincial level. Finally, Healthcare workers reported big shortage of PPE especially mask. They depend on personal protective equipment to protect themselves and their patients from being infected and infecting others with coronavirus. Shortages are leaving doctors, nurses and other frontline workers dangerously ill equipped to care for COVID-19 patients [36].

Conclusions

We conclude that there is a need for improving COVID-19 training of HCPs mainly nurses and for wider implementation of universal precautions and post exposure prophylaxis availability in public health facilities in Wasit province.

Limitations

This study has some limitations that should be considered such as the short period for conducting the study, the small sample size that limits the generalization of the results, the study design (cross sectional study has its own disadvantages such as the inability to assess the causality). In addition, the measurement variations, and the data in the current study are self-reported online survey and partially dependent on participants honesty, commitment and seriousness in responding to give accurate data as well as the ability to recall.

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Olfactory and taste disorders (OTDs in COVID 19 patients in Wasit Provence.

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Abstract:

Background: American Academy of Otolaryngology Head and Neck Surgeons (AAO-HNS) announced at **March 22, 2020, that** Anosmia, Hyposmia, and Dysgeusia Symptoms of Coronavirus Disease.
Aim of study: Is to evaluate the incidence of OTDs among the COVID 19 positive patients.

Study design: A descriptive observational cross- sectional study done from all the patients whom been admitted to Al Zahraa Teaching Hospital in Al Kut Wasit Provence.
Patients & Methods: the 35 positively confirmed patients with COVID 19 had been assessed regarding their olfactory and taste disorders by special questioner and clinical assessment by specialties, during the March to April 2020.
Results: six patients out of 35 (+COVID 19) had OTDs, which is 15% , highly significant p-value 0.0001. Their ABO groups were (A, B & O), All of the five patients complained from mild symptoms (low grade fever+ No Pneumonia), & they have no any type of Allergic Rhinitis except one patients. OTDs started early with the diagnosis of the disease & it was transient where All patients regain their olfaction and taste through 5-10days.
Discussion: Internationally the percentage of OTDs among the COVID 19 positive patients were ranging from 2/3 to 1/3, where in Wasit it was 15%. While other finding were not differ from the international date. The relatively small number of our sample may affect our results or the lower Iraqi prevalence of COVID 19 may put its impact on this disease presentation.
Conclusions: OTDs could be an early sign or is the only sing of COVID19, hence it could be a marker to indicate individuals who might be infected with COVID 19 disease.
Keywords: Anosmia, Disguise, OTDs, COVID 19 & Anosmia

Introduction:

In 30 January 2020, the World Health Organization (WHO) declared that COVID-19 is a public health emergency of international concern [1], in the beginning of March 2020, a huge number of new cases were reported overall the world including our country, Iraq, and announced as a pandemic [2]. In Iraq, the first confirmed case was reported in Al-Najaf province on 24th of February 2020, which was of international student travelled to Iraq [3].

The 1st Announcement about OTDs was by the American Academy of Otolaryngology (AAO-HNS) that: Anosmia, Hyposmia, and Dysgeusia could be symptoms of Coronavirus Disease (4), this announcement had been done at March 22, 2020 - 2:19 pm.

The 2nd Announcement about OTDs was through the Nirmal Kumar, the President of the British Rhinological Society who said that loss of smell (Anosmia) could be a marker that pointed to individuals who might be infected with Covid-19 disease but are not showing any symptoms (asymptomatic) they are not exhibiting fever or coughs etc. this announcement done at Mar 23, 2020.(5)

A mucus-secreting non-sensory respiratory mucosa is lining cover of the most of the nasal cavity, except the olfactory cleft which is area along parts of the superior nasal turbinate and adjacent nasal septum a which is lined by olfactory neuroepithelium .This highly organized neuroepithelium contains the bipolar olfactory receptor neurons, that transmit inspired odor particles into a neural codes to the brain (6).

The disorders of smell could be conductive or sensorineural or mixed. In conductive Anosmia, the cause prevent the inspired odorants particles from touching the olfactory tissue in nasal cleft in the nasal cavity. In the 2nd type of loss of smell, the sensorineural, the problem is within the olfactory receptor neurons or with their central projections. While conductive type of Anosmia or mixed loss could be seen in the cases of nasal polyps or chronic rhinosinusitis (7-10).

Regarding the pathophysiology of Anosmia during the COVID 19 infection it could be explained on the following bases. (a)Virus could infect the inner lining of the nasal cavity, triggering localized inflammation. This will result in a Transient Anosmia. (b) Virus may target the cells olfactory receptor it will not be able to generate signals to brain. This will result in a transient Anosmia. (c) Virus may infiltrate to the olfactory bulb," the brain region where cells in the nose send smell information to be processed. This will result in an permeant Anosmia).(11)

Aim of study: Is to evaluate the incidence of OTDs among the COVID 19 positive patients.

Patients and methods:

Using a special questioner and clinical assessment that had been done by the specialist physicians whom responsible for taking care about patients in the confirmed positive COVID 19 patients words, All the 35 patients available in Al Zehraa Teaching Hospital during for the March to April 2020 period were assessed.

A descriptive observational cross- sectional study done from all the patients whom been admitted to Al Zahraa Teaching Hospital in Al Kut Wasit Provence.

The inclusion criteria were all positively confirmed patients with COVID 19 except those with acute or chronic Rhinosinusitis patients or patients with previous OTDS or patients complaining from bilateral nasal polyps.

The questions that had been asked to the in-patients in the special department for the positively confirmed patients with COVID 19, were about onset of OTDs, severity, duration associated ENT symptoms, ABO blood group & Age. The availability of OTDs were assessed by questions also at time of discharge after 14-21 days, to decide the duration of presence of OTDS.

No Pennsylvania smell identification test was done for any of the patients to determine the objectivity of the OTDs because of difficulty to perform such a test in the infection department.

The General state of patients were taken from the patients records to determine the category of the case severity of patients.

The date were collected, analyzed and statistical studies done, where the percentage and the p-value were calculated according to the SPSS version 25.

Results:

Among the 35 patients whom were admitted to the special department for the positively confirmed patients with COVID 19, there was only six patients who got OTDs (four had anosmia only, two had Anosmia+ Taste Disorders) p-value highly significant p-value 0.0001.

The age of those six patients were between 11 years the youngest to 60 years the older. Their ABO blood group were (three B+, one A+, one A-, one O+) as can be seen in Figure No. (1) & figure No. (2).

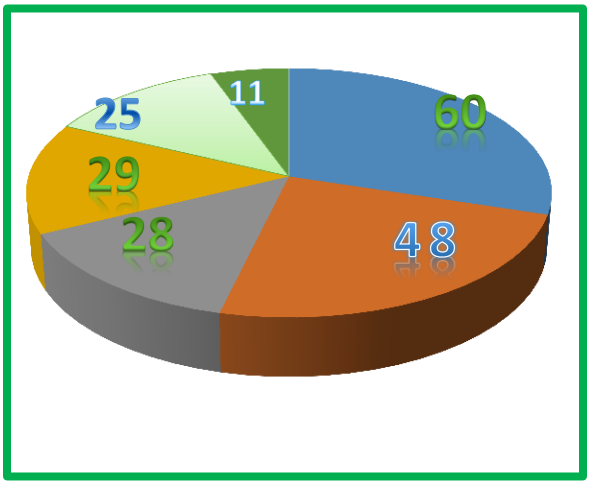

Figure No. (1)

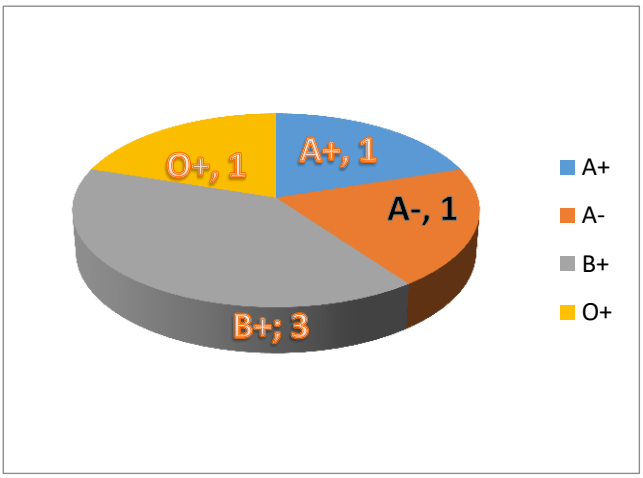

Figure No. (2)

Only one patient was complaining from Allergic Rhinits, and no nasal polyps or chronic rhinosinusitis. All patients were in mild case (low fever+ no pneumonia) as seen in Figure No. (3) & No.(4).

All of those patients were complaining from transient Anosmia and taste disorders that they regain their olfaction and taste after a period ranged from 7 to 14 days

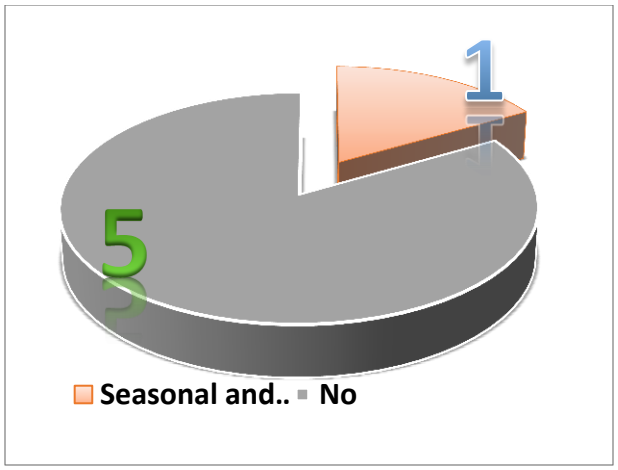

Figure No.(3)

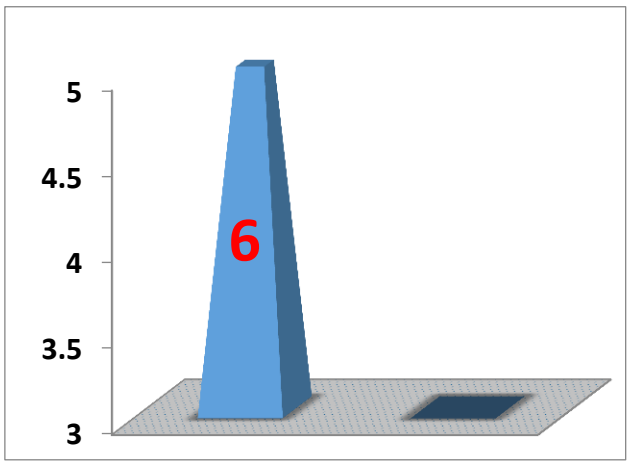

Figure No.(4).

As a summery we can see the table No. (1) Below which show the results of the patients whom complain from OTDs .

Discussion:

Reviewing the international results show us that the percentage of OTDs among the COVID 19 positive patients were ranging from the lowest percentage 1/3 to the highest percentage 2/3 in the highly affected countries (5).

Patient No.	*Age*	*Blood Group*	*Anosmia*	*Taste Disorder*	*Allergic Rhinitis*	*Duration od Anosmia*	*Case Severity*
1	*60*	*A+*	+			*Transient*	*Mild*
2	*48*	*B+*	+			*Transient*	*Mild*
3	*29*	*B+*	+			*Transient*	*Mild*
4	*28*	*O+*	+			*Transient*	*Mild*
5	*25*	*A-*	+	+	+	*Transient*	*Mild*
6	*11*	*B+*	+	+		*Transient*	*Mild*

The knowledge with high confirmation that come from South Korea, China and Italy showed that interested numbers of patients with proven COVID-19 infection had got some sort of smell disturbance. On the north side of Europe, specifically in Germany it had been found that there was more than 2 cases in every 3 positively confirmed cases have a kind of anosmia. In the country that became early high focus of infection in the Middle East after the Wuhan, the Republic of Iran has showed a rapid increase in number of isolated OTDs. The Eastern side of

the world also reported many cases of OTDs among COVID 19 patients those were in the US, France and Northern Italy (5).

The most detailed and early paper that published discussing the OTDs in a descriptive way was that which is achieved by a group of health care providers in Milan demonstrating a cross-sectional study on the prevalence of OTDs in 59 patients confirmed to be positive with COVID 19 and were hospitalized .This paper showed that 34 % had this type of disturbance, 20 % before and 14 % after admission to the hospital.

While in this study in Wasit it was 15%, although other findings were not differ from the international date, the relatively small number of our sample (which were the only available patients at this period) may affect our results or the lower Iraqi prevalence of COVID 19 may put its impact on this disease presentation. On the other hand inability to perform the Pennsylvania smell identification test in the isolation department may also lower the number of the patients whom really got the OTDs.

Hence there is an advise against use of steroids as a medicine to n the treat some of cases anosmia during the pandemic, especially if it has no relation to head trauma or nasal pathology (12).

On the other hand this indicate that it will be very important to have full PPE for ENT physicians because they at a higher risk of getting infection among other healthcare workers (13).

Conclusion & Recommendations:

The changes in the smell and taste in some patients who do not complaining from any other symptoms may be now consider as an early hint to suspected or diagnose the patient with COVID 19 disease.

The therapeutic trial that the otolarngologest use to do it with most of the Anosmia case to be treated with steroid should be stopped now during the pandemic (12), to be reviewed again later to avoid the side effect of steroid during the viral infection pandemic.

Dealing with OTDs patient in ENT outpatient clinics should raise the precaution to have a full protected otolaryngologist when treating such patients because of the higher risk to get the infection.

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Conflict of interest:

None to declare.

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Coronavirus diseases 2019 Vaccine

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Coronavirus disease 2019 (**COVID-19**) is an infectious disease initiated by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was first recognized in December 2019 in Wuhan, the capital of China's Hubei province, and has since spread globally, resulting in the ongoing 2019–2020 coronaviruspandemic. Public symptoms consist of fever, cough and shortness of breath. Other symptoms may include fatigue, muscle pain, diarrhea, sore throat, loss of smell in addition to abdominal pain. The time from exposure to onset of symptoms is typically around five days, but may series from 2 to 14 days. While the common of cases result in slight symptoms, some progress to viral pneumonia and multi-organ failure. As of 9 April 2020, more than 1.48 million cases have been reported in more than 200 countries and regions, resulting in more than 88,500 deaths. More than 329,000 people have recovered(1).

ARS-CoV-2 particles are spherical and have mushroom-shaped proteins called spikes protruding from their surface, giving the particles a crown-like appearance. The spike binds and fuses to human cells, allowing the virus to gain entry. However, coronavirus infection can be prevented or slowed if this process is disrupted.

Scientists in China shared the genome of a SARS-CoV-2 virus isolate to a global database, which NIAID and UT experts used to start their work determining the spike structure. The spike undergoes a massive rearrangement as it fuses the virus and cell membranes. The researchers confirmed that the original spike stabilized in its prefusion conformation is more likely to preserve targets for infection-blocking antibodies induced by a vaccine(2).

Importantly, the new data supports NIAID's approach to a gene-based vaccine for COVID-19 and will also be useful in other vaccine approaches including protein-based vaccines and other nucleic acid or vector-based delivery approaches. NIAID scientists designed the stabilized spike antigen based on previous knowledge obtained from studying other coronavirus spike structures. NIAID and the biotechnology company Moderna, based in Cambridge, Massachusetts, are

developing a messenger RNA (mRNA) vaccine, which directs the body's cells to express the spike in its prefusion conformation to elicit an immune response(2).

The new research also confirms that the structure of the SARS-CoV-2 spike is very similar to that of the coronavirus responsible for the global outbreak of severe acute respiratory syndrome in 2003 that was eventually contained (known as SARS-CoV). However, despite the similarities, the paper shows that some monoclonal antibodies developed to target SARS-CoV do not bind to the new coronavirus, indicating that antibodies that recognize the SARS-CoV from 2003 will not necessarily be effective in preventing or treating COVID-19, the disease caused by the new virus(3).

Recent reports show that the novel virus and SARS-CoV also bind to the same receptor on the host cell. However, NIAID and UT scientists determined that SARS-CoV-2 binds more easily to this receptor as compared to SARS-CoV, which could potentially explain why SARS-CoV-2 appears to spread more efficiently from human-to-human.

mRNA-based vaccines can induce the cell-mediated immunity that is important for cancer vaccines through MHC class I proteins. This is because mRNA can direct the synthesis of antigenic proteins directly in the cell, whereas peptide vaccines must introduce antigenic proteins into the cell from the outside. mRNA is usually prepared by enzymatic synthesis with RNA polymerase from a DNA template followed by enzymatic addition of the 5′-cap and the 3′-poly(A) tail(4).

mRNA-1273 is a novel lipid nanoparticle (LNP)-encapsulated mRNA-based vaccine that encodes for a full-length, prefusion stabilized spike (S) protein of SARS-CoV-2. Enrollment will occur at one domestic site. Forty-five subjects will be enrolled into one of three cohorts and will receive an intramuscular (IM) injection of **mRNA-1273** on Days 1 and 29 in the deltoid muscle. Subjects will be followed through 12 months post second vaccination (Day 394)(5). The primary objective is to evaluate the safety and reactogenicity of a 2-dose vaccination schedule of **mRNA-1273**, given 28 days apart, across 3 dosages in healthy adultsForty-five subjects will be enrolled into one of three cohorts (25 microgram [mcg], 100 mcg, 250 mcg). Subjects will receive an intramuscular (IM) injection (0.5 milliliter [mL]) of mRNA-1273 on Days 1 and 29 in the deltoid muscle and will be followed through 12 months post second vaccination (Day 394). Follow-up visits will occur 1, 2 and 4 weeks post each vaccination (Days 8, 15, 29, 36, 43, and 57), as well as 3, 6 and 12 months post second vaccination (Days 119, 209 and 394)(6). The primary objective is to evaluate the safety and reactogenicity of a 2-dose vaccination schedule of mRNA-1273, given 28 days apart, across 3 dosages in healthy adults. The secondary objective is to evaluate the immunogenicity as measured by Immunoglobulin G (IgG) enzyme-linked immunosorbent assay ELISA to the SARS-CoV-2 S (spike) protein following a 2-dose vaccination schedule of mRNA-1273 at Day 57(7).

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Dental Care Procedures During COVID-19's Spread

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Abstract:

According to the response of the Covid-19 pandemic many are readjusting to a new way of life in hopes of slowing the spread of the virus. The safest thing for everyone is not to see a doctor or at least avoid the need to see a doctor and this most certainly includes the dentist. Right now the medical community is trying to pool resources to care for those afflicted by Covid-19, as well as simply trying to keep people at home. That doesn't mean all dental services are completely off the table, particularly if the situation is dire. Hence, there are a handful of dental services that are considered essential by the American Dental Association (ADA), such as: uncontrollable bleeding, painful swelling around the mouth, and pain in your tooth or jawbone, post-surgery treatment, in addition to broken tooth is considered as an emergency. As our country starts taking greater steps to quarantine and self-isolate during this time to try to minimize the spread of the virus, there are some important things to think about when it comes to the dental health. Oral health has a major impact on public health, and vice versa, so caring for both during this crisis is crucial and at the same time is the main reason for choosing this subject to help answer questions about the impact of the Covid-19 pandemic on caring for dental health at home and visiting a dentist, in addition to what the dentist is required to do regarding planned dental visits and treatments during this sensitive period and there are some policies that must be applied in dental clinics or centers during this critical period to maintain the safety of patients and dental personnel. The aim of this review article was primarily to view the importance of dental care procedures and precautions during Covid-19's spread based on the information and evidences available in the current literature.

***Keywords*:** Corona viruses, infection control, morphology of COVID-19, dental care in Covid-19 pandemic, Covid-19 spread, precautions with Covid-19 spread.

Introduction:

Human corona viruses, first characterized in the 1960s, are responsible for a substantial proportion of upper respiratory tract infections in children. The name was first used in 1968 by an informal group of virologists to designate the new family of viruses.[(1)] Since 2003, at least five new human corona viruses have been identified, including the severe acute respiratory syndrome corona virus, which caused significant morbidity and mortality. The most of these have involved serious respiratory system infections is SARS-CoV-2 in 2019.[(2)] The outbreak of this type was identified in Wuhan, China, in December 2019, declared to be a Public Health Emergency of International Concern on 30 January 2020, and recognized as a pandemic by the WHO.[(3,4)] The 2019–20 corona virus pandemic is caused by the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), which is so called now

Covid-19.[5] Although dental practices have suspended routine care to help prevent the spread of the Covid-19 in accordance with the state directive and CDC recommendation, dentists must either remain available to patients of record who require emergency dental treatment or have arranged coverage for emergencies with another dentist? [6,7] Oral health service sites have been advised to remain open only for emergency services at this time. The practice sites are options for the urgent oral health needs during the Covid-19 outbreak. If a patient is already established with a dental provider, we recommend that they follow up with that provider to discuss urgent appointment options first.[8] In the coming weeks it is especially important that oral health providers take extra precautions to protect themselves and their patients.[9] The aim of this research paper was primarily to view the importance of dental care procedures, facilities and precautions during Covid-19's spread based on the information and evidences available in the current literature.

Methods:

A systematic review was undertaken for global literature addressing about the severe acute respiratory infection caused by Covid-19 pandemic and the dental care procedures and precautions in this period. The search terms included: corona viruses, Covid-19 pandemic, oral healthcare facilities and precautions in Covid-19's spread, in addition to infection transmission and prevention tips. The present review covers global studies published about these topics in the specialized scientific journals and guidelines at 2019–2020 periods. Also, several government agencies and professional organizations have a direct influence on dentistry, infection control, and other health care safety issues. In addition to issuing recommendations and regulations some have regulatory roles and others are advisory. These agencies and organizations, [Centers for Disease Control and Prevention (CDC), Australasian Society for Infectious Diseases (ASID) and World Health Organization (WHO)] can serve as an excellent resource for information on occupational dental healthcare issues under Covid-19 pandemic spread. This information is particularly focused on the measures and procedures for treating patients during Covid-19's spread and on the infection prevention practices.[10-12]

Results and Discussion:

All selected publications were further scrutinized for adherence to the following points: the structure of Covid-19, disease signs and symptoms, incubation period, prevention tips, dental care procedures or facilities for patient treatment during Covid-19's spread, transmission, and precautions for the transmission of infection. The outcome measures of the selected publications through this research paper were focused on main topics, as: morphology and structure of Covid-19, disease signs and symptoms, urgent or emergency dental cases, mode of transmission and prevention, dental care procedures and precautions during Covid-19 spread and survive of COVID-19 outside the host cell.

Topic 1: Morphology and signs & symptoms of Covid-19.

A. Morphology and Structure:

The morphology of COVID-19 is created by the viral spikes, which are proteins on the surface of the virus. The envelope of the virus in electron micrographs appears as a distinct pair of electron dense shells. This envelope consists of a lipid bi-layer where the membrane (M), envelope (E) and spike (S) structural proteins are anchored.[13] A subset of corona viruses (specifically the members of beta corona virus subgroup A) also has a shorter spike-like surface protein called hem-agglutinin esterase (HEs). The HEs is a glycoprotein that certain envelope viruses possess and use as invading mechanism. The HEs helps in the attachment of virus and destruction of certain receptors that are found on the host cells surfaces. The esterase region of the HEs is responsible for the destruction of the receptor. In molecular biology, HEs fusion glycoprotein (HEF) is a multifunctional protein embedded in the viral envelope of several viruses, including influenza C virus, influenza D virus and corona viruses.[14] Protein shell surround the virus is called a capsid. Some viruses have an added layer of lipids that coat the capsid as COVID-19. Little extensions on the virus are called antigens, which help the virus to catch the target hot cells.[15]

B. Disease signs and symptoms:

The signs of COVID-19 are usually begin to appear 2 - 14 days after a person exposure to the virus and has been infected. The people with COVID-19 have had a wide range of symptoms reported which ranging from mild symptoms to severe illness.[16] Some people get infected with the corona virus but do not have any symptoms. Most of those people get better without treatment. People who are older or who have existing chronic medical conditions, such as heart disease, lung disease or diabetes, or who have compromised immune systems may be at higher risk of infection. This is similar to what is seen with other respiratory illnesses, such as influenza. Covid-19 can have potentially serious complications, such as trouble breathing and pneumonia. So, it is important to be able to recognize the signs and symptoms of Covid-19 and how they differ from other conditions.[17] More than 55,000 cases of the illness in China showed the range of symptoms that can happen with COVID-19 and how common they are: Fever: 88%, Dry cough: 68%, Fatigue: 38%, Coughing up thick phlegm from the lungs: 33%, Shortness of breath: 19%, Bone or joint pain: 15%, Sore throat: 14%, Headache: 14%, Chills: 11%, Nausea or vomiting: 5%, Stuffy nose: 5%, Diarrhea: 4%, Coughing up blood: 1%, and Swollen eyes: 1%. Some people have experienced the loss of smell or taste.[18]

Topic 2: Kinds of Dental Cases Qualify as Emergencies.

We are hearing that many non-urgent medical visits and procedures are being postponed. This is to reduce the virus spread by keeping people away from each other and to preserve medical resources for sick patients. Dental Care patients who are coming for urgent care by asking a series of questions based on the most current risks and by taking patients and employees temperature at the entrance to dental settings.[19] These steps are taking to protect patients and slow the spread of COVID-19 by reducing the number of in-person exchanges and to increase ability to care for those with emergency dental needs. It is necessary to evaluate the procedures daily as new information is learned. The

bringing people together in waiting room do not support social distancing and not a crucial preventive measure against covid-19 threat. Even if people are not sick, when they come in and somebody is a carrier, risk increased just by being around other people. Every time you can keep people away from each other, it prevents the probability of another spread. Each practice will have to develop the own list. The additional ADA recommendations are more detailed and will help dentists develop a plan.[20] What is most important is minimizing the number of patients brought to the office and minimizing the number of aerosol-producing procedures that create droplets. Dental care is now restricting treatment to urgent or emergency care only, as:

1. Severe toothache pain (on a pain scale of 1 to 10, a 5 that has lasted more than 24 hours).
2. New or recent swelling of the gums or face (within the past three to seven days).
3. Bleeding in the mouth that does not stop following tooth extraction or gum surgery.
4. Tooth infection.
5. Recent trauma (a broken tooth causing pain).

Topic 3: Dental care procedures and precautions during Covid-19 spread.

Routine dental procedures are important to overall health. But with the continued spread of the COVID-19 virus, the ADA is recommending postponing elective dental procedures. The leaders speaking up about the importance of dental practices focus on urgent and emergency care and taking greater precautions during COVID-19's spread. In general, it is safe if patient go to the dentist as soon as possible. First of all, let us say city state is allowing dental offices to be open for elective procedures. There are a few things for patient, he should know about his risk of contracting COVID-19 in a dental setting specifically regarding he is as a dental patient.[21] Because COVID-19 spreads primarily through respiratory droplets that often make their way into his mouth, nose, or even eyes, he may be putting himself in danger while sitting in the dentist chair (remember: dental hygienists and dentists are all up in patient mouth during cleanings and procedures and patient wearing a mask is basically impossible). Viral transmission can happen if someone isn't showing symptoms yet, so even if a dental office is making staff whose are showing symptoms stay home, that would not be helpful if a staffer is asymptomatic.[22] So, the safety rules which should be applied in dental care settings to protect the personnel and patients are as follow:

A. The Dental Appointment for Patient Care:

The COVID-19 pandemic has changed a lot of things about daily lives. The patient regular visit to the dentist has changed too. Through the spread of the pandemic ADA recommended that dentists postpone all but emergency procedures to help reduce the spread of the virus, save masks gloves and other personal protective equipment and help keep patients who need emergency treatment from going to busy hospital emergency rooms. Now that this date has passed and dental health care settings are

reopening, dental practices are seeing patients for non-emergency appointments.[23] The ADA has developed science-based guidance to dentists on extra steps they can take in addition to the infection control procedures they have always followed, to help protect their patients and staff. Here's what patient can expect at the next appointment. To help make sure that patients arriving for their appointments are healthy, the dental office may call patient before appointment and ask him some questions about his current health. They may also repeat these questions when he arrives to make sure nothing has changed. His dentist's office staff may also ask that he limit the number of people he brings to the appointment. That could mean leaving his children at home or allowing older children to go into the office alone while their parent waits outside during their appointment. If the state or city is requiring people to wear masks in public, be sure to wear one to the appointment. When patient arrives at the dental office, he may be asked to wait outside until they're ready for him. This will reduce the number of people in the office and reduce the risk to be close to other people. When patient enter the office, he may check his temperature. Inside the office, he may notice things people often touch in the waiting room, like toys or magazines, has been removed. They may have hand sanitizer available for him to use and may wipe down items he touch, such as pens, clipboards or furniture. When he is in the dental chair, he may notice some things look different from the last time he was there.[24] The dentist may have covered the computer's keyboard with a disposable cover so it can be easily cleaned between patients, for example. The dentist may also be using different protective equipment than they have used at previous appointments. This could include different masks, face shields, gowns and goggles. These additional precautions help protect both you and the dentist. After patient appointment is over, the staff will thoroughly clean the areas where patient has been using disinfectants that are effective against the virus that causes COVID-19 to prepare for the next patient. This helps reduce the risk of illness being passed to others.

B- Rules to Protect Dental Patients and Staff from COVID-19:

Even before the pandemic, dental offices were required to maintain pretty strict hygiene practices. All dental practices should follow the standards for cleaning and sanitizing everything with approved disinfectants specially designed for use in a healthcare setting to kill viruses, bacteria, and other pathogens. Additionally, it has long been standard protocol for an entire dental care team to wear protective gear, including gloves, surgical masks, and goggles for eye protection to minimize the risk of transmitting germs from one patient to another. These standards are in practice every day, regardless of whether there's a known outbreak of an infectious disease. Now, due to COVID-19, there are additional safety precautions in place, many of them recommended by the CDC and the ASID.[6,11] When open during the COVID-19 pandemic, dental personnel enforce social distancing between all individuals in the office, patients and staff has to wear personal protective equipment and routinely disinfect common surfaces in lobbies or waiting rooms, including doorknobs, countertops and pens. When more people eventually start coming in for dental procedures, it is important to depend a schedule of appointments with more time allotted for each patient in order to reduce the number of people in the office at any given time. Chairs will be placed six feet apart in the waiting room

depending on the facility design, patient may be asked to wait in your car, or may be taken immediately back to a private room upon arrival. If the patient wants reading material, he has to bring his own. The usual magazines, toys, etc in waiting rooms must be removed. In their place patient will find tissues, hand sanitizer, and extra trashcans. First, if patient experiencing any type of dental emergency swelling, uncontrolled bleeding, pain, trauma from an accident, or if he has a dental concern related to an underlying condition (chemotherapy, uncontrolled diabetes, etc.) it is important to see his dentist as soon as possible.[25] Also, many dental offices are still open for emergency procedures and visits. If patient is in need of a checking, but his city dental offices are still closed to any non-essential procedures, he should have to wait until they open back up.

Topic 4: Effective Measures for Control COVID-19 in Dental Institutions.

The rapid spread of COVID-19 is related to the manner in which transmitted. However, the transmission modes of the virus have not been completely defined. At present, the respiratory droplet transmission mode and the contact transmission mode have been confirmed. Whether the virus spreads through the fecal-oral route, aerosol or other methods is uncertain, and this poses greater challenges to the Chinese government in its efforts to prevent transmission.[26] COVID-19's infectiousness during the incubation period further complicates its prevention and control. According to the latest reports, the longest incubation period so far is 24 days. In addition, the virus was detected in a sample from a Canadian patient who had been discharged from the hospital 14 days previously, although it is not clear whether the virus was still infectious. So, in order to solve this problem, dental health care settings have to apply an effective measures: first one is to provide the patients advises about modes of transmission and spread of COVID-19, second one is to provide an advise about procedures for prevention and control of the virus.

A. Modes of Transmission and Spread of COVID-19:

It is thought that COVID-19 spreads mainly through close contact from person-to-person in respiratory droplets from someone who is infected. People who are infected often have symptoms of illness.[18,27] Some people without symptoms may be able to spread virus. How easily a virus spreads from person-to-person can vary. Some viruses are highly contagious, like measles, while other viruses do not spread as easily. Another factor is whether the spread is sustained, which means it goes from person-to-person without stopping. The virus that causes COVID-19 is spreading very easily and sustainably between people.[28] Information from the ongoing COVID-19 pandemic suggests that this virus is spreading more efficiently than influenza, but not as efficiently as measles, which is highly contagious. It spreads and transmits through two ways:

1 - Person-to-person spread:

The virus is thought to spread mainly from person-to-person, as follows:

1- a - Between people who are in close contact with one another (within about 6 feet).

1- b - Through respiratory droplets produced by coughs, sneezes or talks.

1- c - These droplets can land in the mouths or noses or possibly be inhaled into the lungs.

1- d- May be spread by people who are not showing symptoms.

Maintaining good social distance (about 6 feet) is very important for preventing the transmission and spread of COVID-19.

2- From contact with contaminated surfaces:

It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes especially in dental settings.[29] This is not thought to be the main way the virus spreads, but we are still learning more about this virus. Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub. Also, routinely clean frequently touched surfaces.[30]

B. Procedures for Prevention and Control of COVID-19:

In the process of preventing and controlling the disease, hospitals, as places where large numbers of people are brought close together, are especially important. Dental units and departments, in particular, face a higher risk of disease transmission by the very nature of dental treatment operations.[31,32] The relevant characteristics of these operations are listed as follows: (I) the water mist generated by the air-driven high-speed hand piece, air polisher, and various other instruments mixes with the saliva and blood of patients, forming aerosols and diffusing into the surrounding air; (II) dental treatment is characterized by relatively long operation times, which results in the persistent existence of aerosols within a large area of the clinical office and introduces a potential risk of spreading disease; (III) conventional protective measures are not 100% effective, and patients have no protection during the treatment process; (IV) the incubation period and possibility of patients concealing medical history could easily lead to the spread of disease and (V) saliva, blood, and mixed water droplets carrying the virus would contaminate dental treatment equipment.[33] Through direct contact in the dentist's operation, both dental workers and patients are likely to become infectors and transmitters of COVID-19. It is suggested that patients should be cautious when visiting the dentist, and also informed dental workers to protect themselves comprehensively. Along with the further developments of the epidemic situation, a nationwide restriction on dental clinics in controlling the number of patients and diagnostic and treatment procedures has been imposed.[34] In parallel, the emergency channels for patients with oral and maxillofacial trauma, maxillofacial infection, severe swelling, severe tooth pain, and other emergencies have been maintained, while the treatment needs of patients with oral malignant tumors are still being addressed. According to the current working guidelines for the prevention and control of COVID-19 in Chinese medical institutions, and the current working status of several domestic dental institutions, summarized here are the prevention and control measures and points of attention taken by Chinese dental institutions during different treatment sessions, for the reference of dental institutions and dental workers during the COVID-19 outbreak and those of other similar infectious diseases.[35]

Topic 5: Survive of COVID-19 Outside the Host Cells.

Viruses are not living things, so they need a host (a living organism) that gives them everything they need to work. Viruses take any chance they can to find a host. They get inside the host's cells and take it over. Viruses use the host cells machinery to make lots of copies, so many that the cell bursts

and infects other cells around it. A virus cannot multiply outside a living host cell. The life of a virus depends on what type of virus it is, the conditions of the environment it is in, as well as the type of surface it is on. Cold viruses have been shown to survive on indoor surfaces for approximately seven days.[36] Flu viruses, however, are active for only 24 hours. Most of the time, our immune system is able to completely get rid of the virus. But some viruses can "hide" inside certain cells in our bodies, and avoid being totally removed by the immune system. Some viruses can do this for a long time. Some can even causes a permanent, life-long infection. Inside the envelope, there is the nucleo-capsid, which is formed from the nucleo-capsid (N) protein, which is bound to the positive-sense single-stranded RNA genome in continuous beads on a string type conformation. The lipid bi-layer envelope, membrane proteins, and nucleo-capsid protect the virus when it is outside the host cell.[37] Because viruses must invade cells of a living host to reproduce, their life spans outside are generally shorter than that of living pathogens, which reproduce on their own. Although viruses can survive outside a host on household surfaces, their ability to duplicate themselves is compromised-shortening the virus's life span. By saying survival of viruses, it means how they can stay active outside a host without any cell to replicate in. The virulence of a virus when outside a host is one of the major factor which helps in the spreading of the virus from host to host.

Conclusions and Recommendations:

To our knowledge, no oral health worker or patient has been infected with COVID-19 due to oral treatment, and no patients have complained about the suspension of treatment due to COVID-19 which is a novel challenge for oral healthcare. During an epidemic, it is very important to maintain the oral healthcare is a serious problem that requires attention and appropriate measures. COVID-19 is a novel challenge for oral healthcare. Attention should be paid to oral healthcare during the outbreak of COVID-19.

More research is required to analyze the potential diagnostic of Covid-19 in saliva to develop rapid chair side tests for the detection of Covid-19 and it is also pivotal to improve and develop successful strategies for prevention, especially for dentists and healthcare professionals who are involved in performing aerosol-generating procedures. As a result, the whole dental teams should be vigilant and keep patients and themselves in a safe environment by the guidelines mentioned in this study. All members of the dental team have a professional responsibility to keep themselves informed of current guidance and be vigilant in updating themselves as recommendations are changing so quickly. For emergency clinical care of patients with known or suspected COVID-19, dental providers should follow the Interim Infection Prevention and Control Guidance for Dental Settings during the COVID-19 Response.

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إجراءات العناية بالأسنان أثناء انتشار كوفيد – 19

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الخلاصة

إن الاستجابة لجائحة كوفيد – 19 جعلت الكثير منا يلجأ للتكيف مع طريقة جديدة للحياة على أمل إبطاء انتشار هذا الفيروس. أن الشيء الأكثر أمانًا للجميع هو عدم مراجعة الطبيب أو على الأقل تجنب الحاجة إلى زيارة الطبيب وهذا بكل تأكيد يشمل طبيب الأسنان. في الوقت الحالي ، يحاول المجتمع الطبي تجميع موارده لرعاية أولئك الذين يعانون من جائحة كوفيد – 19، وكذلك محاولة إبقاء الناس في منازلهم. لا يعني هذا أن جميع خدمات طب الأسنان غير متاحة تماماً خاصة إذا كان الوضع صعباً. وبالتالي ، هناك عدد قليل من خدمات طب الأسنان التي تعتبرها جمعية طب الأسنان الأمريكية ضرورية مثل : نزيف في تجويف الفم لا يمكن السيطرة عليه ، تورم مؤلم حول الفم ، ألم في الأسنان أو عظم الفك إضافة إلى ذلك يعتبر العلاج ما بعد الجراحة حالة طارئة لابد من معالجتها. مع بدء بلدنا في اتخاذ خطوات أكبر للحجر الصحي والعزل الذاتي خلال هذه الفترة لمحاولة تقليل انتشار

جائحة كوفيد – 19 ، هناك بعض الأشياء المهمة التي يجب التفكير فيها عندما يتعلق الأمر بصحة الفم والأسنان. علماً أن لصحة الفم تأثير كبير على الصحة العامة ، والعكس صحيح ، لذا فإن الاهتمام بكليهما خلال هذه الأزمة أمر بالغ الأهمية وفي ذات الوقت يعد السبب الرئيسي لاختيارنا هذا الموضوع للمساعدة في الإجابة على الأسئلة حول تأثير جائحة كوفيد – 19 على الاهتمام بصحة الأسنان في المنزل وزيارة طبيب الأسنان ، إضافة لما هو مطلوب من طبيب الأسنان أن يفعله بشأن زيارات وعلاجات الأسنان المخطط لها خلال هذه الفترة الحساسة وهناك بعض السياسات التي يجب تطبيقها في عيادات ومراكز طب الأسنان خلال هذه الفترة الحرجة للحفاظ على سلامة المرضى وكوادر طب الأسنان. كان الهدف من هذا البحث في المقام الأول هو عرض أهمية إجراءات العناية بالأسنان وعلاج المرضى خلال انتشار جائحة كوفيد – 19 استنادًا إلى المعلومات والأدلة المتاحة في الأدبيات العالمية في الوقت ألحاضر

كلمات مفتاحيه : فيروسات كورونا ، السيطرة على العدوى ، شكل جائحة كوفيد 19 ، العناية بالأسنان في وقت جائحة كوفيد 19 ، انتشار جائحة كوفيد 19 ، الاحتياطات مع انتشار جائحة كوفيد 19.

Fighting the Pandemic Outbreak: The Chinese Way

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Abstract

Novel Coronavirus-19 or lately known as COVID-19 is a pandemic that has sickened more than two million people with more than 165,000 deaths across the globe according to the latest updates of Johns Hopkins University. Unfortunately, these numbers of cases and deaths are increasing in the world. No drug or vaccine has been invented or produced yet; therefore it is important to protect ourselves from this dangerous disease at any cost and in any possible way. If the ways of protection are impossible, we should make them possible in order to overcome the pandemic and save ourselves and also provide our next coming generations the best health system and protection from pandemics. This article sheds light on the Chinese way and its success in containing the spread of the outbreak.

***Keywords*:** COVID-19, GHS Index, Chinese technology, Iraq

1. Introduction

The World Health Organization (WHO) [1] has identified the emerging coronavirus which is known as COVID-19 as a pandemic due to its rapid spread in the whole world. But this is not the first time in history that the world is witnessing an outbreak of a dangerous disease. There were other pandemics which killed millions of innocent people in the entire planet. Unfortunately, we have not learned from these past pandemics a lesson on how to manage such crisis in case we are exposed to it again.

Plague, a bacterial disease, is caused by Yersinia Pestis, affects wild rodents. Infected rodents spread the disease through fleas. Infected fleas help transform the disease into human. There are three types of plague pandemic: the three caused devastating and catastrophic social and economic crises. The three types of plague namely, the Justinian plague occurred between the period AD 542 and AD 750 in central Africa and the Mediterranean basin. The Justinian plague killed more than 100 million people. The second plague is called “the black death”. The Black Death started in Europe in the mid-14 century and killed around 25 million. The third pandemic is called modern plague which appeared in China in mid-19 century and then spread through different parts of the world and killed more than 10 million [2,3].

Cholera is a deadly disease caused by the microorganism bacterium called Vibrio Cholerae, which causes rapid dehydration and death [4, 5]. Ali et al. [6] demonstrate that nearly about

1.4 billion people are at risk from cholera and about 2.8 million cases of cholera occurred annually in endemic countries, while 87,000 cholera cases occur in non-endemic countries. Children, less than 5 years, are more liable to get infected. An estimated 91, 000 people die of cholera in endemic countries while 2500 people die due to cholera disease in non-endemic countries.

Spanish flu (H1N1) which appeared in 1918-1919 is another deadly pandemic that killed about 50 million deaths worldwide [7]. The "Spanish flu" was wrongly identified due to the research and observation made on the disease in Spain. The first appearance of this disease was in the United States of America. The pandemic was devastating killed millions, more than the causalities of the First World War [8].

The acquired immunodeficiency syndrome (AIDS) epidemic has caused a devastating impact on health and economy for many countries. According to WHO [9], an estimated 75 million cases with HIV virus and nearly 32 million have died of the disease.

Date	Historical Name	Death toll (estimate)	Disease
429-426 BC	Plague of Athens	75, 000- 100,000	Typhus (?)
1665-1666	Great Plague of London	100, 000	plague
1629-1631	Italian Plague	280, 000	plague
1968-1969	Hong Kong Flu	1,000, 000	Influenza
1957-1958	Asian Flu	2,000,000	Influenza
165-180	Antonine Plague	5,000,000	Smallpox (?)
541-542	Plague of Justinian	25-50 million	plague
1960-present	HIV/AIDS pandemic	>30,000,000	HIV/AIDS
1918-1920	1918 Spanish Flu	75,000,000	Spanish Flu
1331-1353	Black Death	75-200,000,000	plague

Table (1): Historical Pandemics with their Fatalities [10]

Unfortunately, we have not learned a lesson from the above previous pandemics and their catastrophic impacts on people and economy. This article attempts to shed lights on the Chinese way of controlling and containing the spread of the outbreak. China's fight of the pandemic is considered the best way of controlling the outbreak and preventing its spread.

2. COVID-19

Coronavirus disease 2019 is classified as a pandemic due to its huge danger, rapid spread, and deaths. COVID-19 is the third virus that belongs to the corona viruses' family. Before covid-

19, there were two corona viruses namely, SARS-CoV (Severe Acute Respiratory Syndrome) which appeared in 2002-2003 in China and MERS-CoV (Middle East Respiratory Syndrome) which appeared in Middle East particularly in 2012, Saudi Arabia.

In the late of December, 2019, an outbreak was caused by unknown disease emerged in Wuhan, Hubei province, China. The disease has spread widely to infect thousands people in Wuhan, China. Then, the mysterious disease was identified as novel coronavirus (nCoV). A new name has been identified as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization put the last name for it as COVID-19 [11].

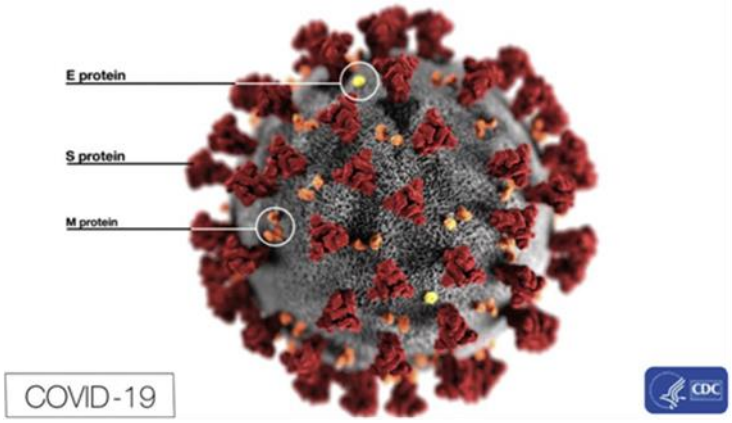


Fig. 1 Spikes of COVID-19 on its outer surface with several protein particles [12]

Genomic analysis showed that COVID-19 is phylogenetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses. Bats might be the primary source of the virus. The way COVID-19 has transferred to humans is not known, but the rapid human to human transfer has been confirmed widely [13].

COVID-19 has caused devastating problems to our health, economy, and put the whole world under harsh curfew. Patients suffering with more difficulties from COVID-19 are old. The pandemic symptoms are fever, dry cough, and difficulties (shortness) in breathing. An estimate 80% of COVID-19 patients are suffering from mild illness, 14% are experiencing severe disease, and 6% are suffering from critical illness. The severity of illness depends on or is associated with age (over 60s) and other chronic and comorbid conditions [14, 15].

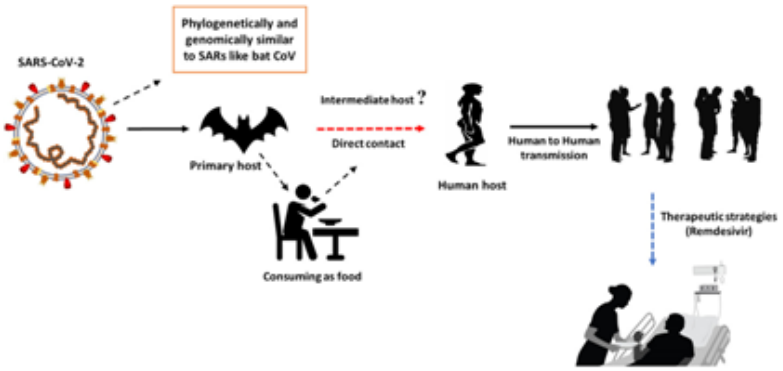


Fig. 2 COVID-19 Transmission [13]

3. Global Health Security Index (GHS Index)

The information provided in this section is taken from (Global Health Security Index) [16]

The GHS Index is the first comprehensive assessment of global health security capabilities in 195 countries. The GHS Index assesses countries' health security and capabilities across six categories, 34 indicators, and 85 sub-indicators. The findings are drawn from open source information that answered 140 questions across the categories.

The GHS Index analysis demonstrates that no country is fully prepared for epidemics or pandemics. International preparedness is described as weak. Many countries do not have health security potentials to prevent, detect, and respond to dangerous disease outbreaks. The average overall GHS Index score is 40.2 out of a possible 100. While high-income countries report an average score of 51.9 out of 100. The index shows that all international preparedness for dangerous infectious diseases remains very weak.

The GHS Index was developed due to the cooperation between The Nuclear Threat Initiative (NTI), the Johns Hopkins Center for Health Security (JHU), and The Economist Intelligence Unit (EIU). The GHS Index aims to *set a high threshold for preparedness against epidemics that can lead to pandemics*.

The GHS Index team and experts developed the framework, which consists of 140 questions, divided across six categories, 34 indicators, and 85 sub-indicators. Countries were assessed across the 140 questions, with scores aggregated at the sub-indicator, indicator, category, and overall levels. The scale of the scoring is 0 to 100 in which 100 means the best. Countries scoring between 0 and 33.3 in the bottom tier (low scores), countries scoring between 33.4 and 66.6 in the middle tier (moderate scores), and countries scouring between 66.7 and 100 in the top tier (high scores).

The main categories and indicators that are included in the GHS Index are six. They are presented as follows:

1. Prevention: prevention of the emergence or release of pathogens. Fewer than 7% of countries score in the highest tier for the ability to prevent the emergence or release of pathogens.

2. Detection and reporting: early detection and reporting for epidemics of potential international concern. Only 19% of countries receive top marks for detection and reporting.

3**. Rapid response:** rapid response to and mitigation of the spread of an epidemic. Fewer than 5% of countries scored in the highest tier for their ability to rapidly respond to and mitigate the spread of an epidemic.

4. Health system: sufficient and robust health system to treat the sick and protect health workers. The average score for health system indicators is 26.4 of 100, making it the lowest-scoring category.

5. Compliance with international norms: commitments to improving national capacity, financing plans to address gaps, and adhering to global norms. Less than half of countries have the ability to adhere to important international norms and commitments related to biological threats.

6. Risk environment: overall risk environment and country vulnerability to biological threats. Only 23% of countries score in the top tier for indicators related to their political system and government effectiveness.

Iraq ranked 167 out of 195 countries with Index score 25.8 out of 100. This is very weak. Iraq is described as **least prepared with a red map**. The following tables illustrate Iraq's GHS Index scores in terms of the six main indicators namely, prevention, detection and reporting, rapid response, health system, compliance with international norms, and risk environment: the tables illustrate the indicators, the country scores with the average scores:

Table (2): Prevention and Detection and reporting indicators with the country score and the average score [16]

Prevention	Cou. score	Aver. score	Detection and Reporting	Cou. score	Aver. score
Antimicrobial resistance	8.3	42.4	Laboratory system	16.7	54.4
Zoonotic disease	20.4	27.1	Real-time surveillance and reporting	36.7	39.1
Biosecurity	0	16.0	Epidemiology workforce	25	42.3
Biosafety	0	22.8	Data integration between human/animal/environmental health sectors	100	29.7
Dual-use research and culture of responsible science	0	1.7			
Immunization	87.7	85.0			

Table (3): Rapid response and health system indicators with the country score and the average score [16]

Rapid Response	Cou. score	Aver. score	Health System	Cou. score	Aver. score
Emergency preparedness and response planning	0	16.9	Health capacity in clinics, hospitals and community care centers	5.6	24.4
Exercising response plans	0	16.2	Medical countermeasures and personnel deployment	0	21.2
Emergency response operation	0	23.6	Healthcare access	41.9	38.4
Linking public health and security authority	0	22.6	Communications with healthcare workers during a public health emergency	0	15.1
Risk communication	0	39.4	Infection control practices and availability of equipment	0	20.8
Access to communications infrastructure	68.4	72.7	Capacity to test and approve new medical countermeasures	25	42.2
Trade and travel restrictions	100	97.4			

Table (4): Compliance with international norms and risk environment indicators with the country scores and average scores [16]

Compliance with international norms	Cou. scores	Aver. scores	Risk environment	Cou. scores	Aver. scores
IHR reporting compliance and disaster risk reduction	50	62.3	Political and security risks	7.1	60.4
Cross-border agreements on public and animal health emergency response	0	54.4	Socio-economic resilience	53.6	66.1
International commitments	43.8	53.4	Infrastructure adequacy	8.3	49.0
JEE and PVS	0	17.7	Environmental risks	38.6	52.9
Financing	16.7	36.4	Public health vulnerabilities	42.6	46.9
Commitment to sharing of	66.7	68.1			

genetic and biological data and specimens					

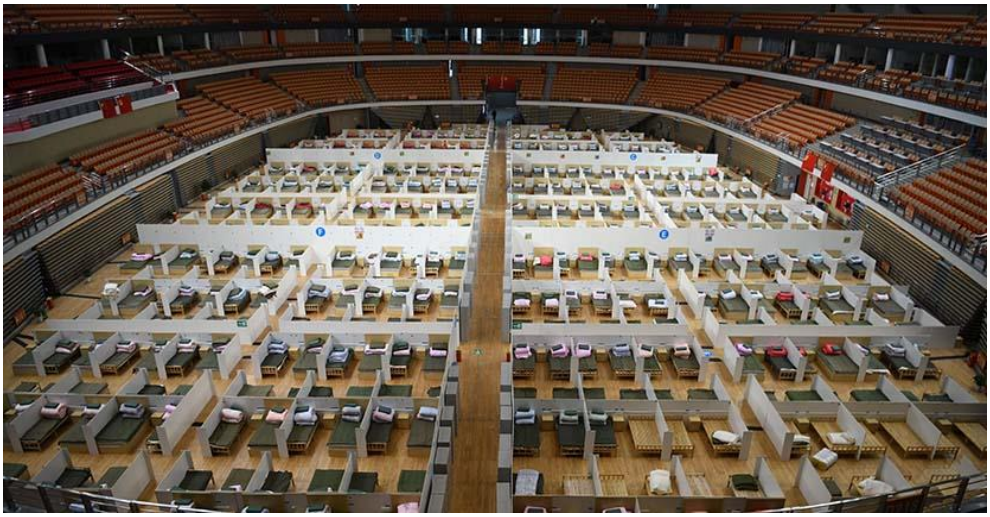
The above tables clearly prove and demonstrate that Iraq is less prepared and very weak in fighting and controlling or containing an epidemic or pandemic.

4. The Chinese Way

China's health protocols and treatment steps are crucial in controlling and containing the disastrous pandemic (COVID-19) in Wuhan and such steps can be influential and useful anywhere in the world.

In a report entitled "Chinese COVID-19 experts share public health protocols with US doctors", which was reported by China Daily [17], Wang Chen, president of the Chinese Academy of Medical Sciences illustrates that China restricted and controlled COVID-19 pandemic outbreak through using the following successful steps:

1. Enforcing strict isolation protocols to prevent the spread of the pandemic
2. Mandating city wide isolation
3. Designating specific hospitals for the critically ill
4. Setting up temporary sub-medical facilities and "Fangcang Shelter Hospitals" or mobile cabin hospitals that can admit asymptomatic and mild-to-moderately symptomatic patients to achieve strict control and isolation of all infectious sources.
5. Establishing quarantine sites such as empty hotels for people exposed to the virus and not yet symptomatic
6. Doing Strict and detailed protocols for each step in the management of COVID-19 patients and the protection of medical personnel.
7. Implementing coordinated leadership groups that were given temporary administrative power to bypass the usual bureaucracies to coordinate and carry out comprehensive and intelligent public health mandates at different levels.

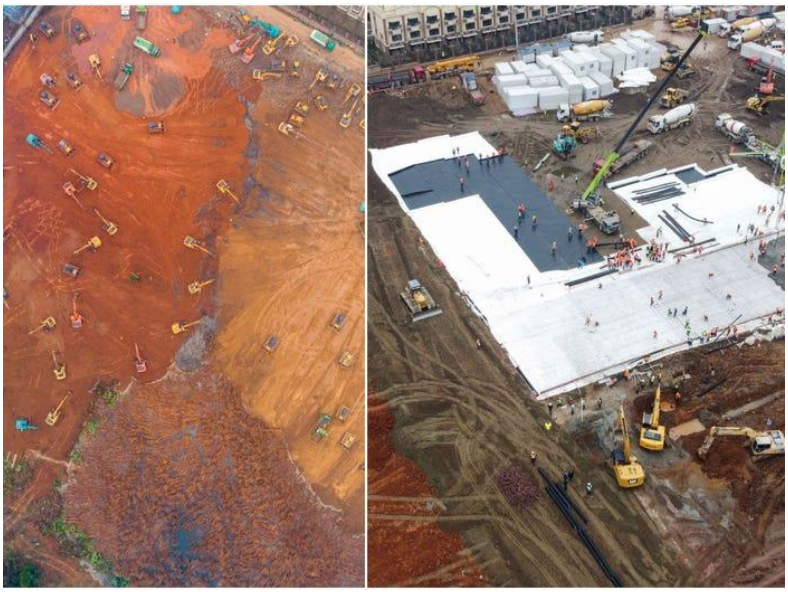


A temporary "shelter hospital" for COVID-19 patients with mild symptoms at Wuhan Sports Center, Hubei province, Feb. 12, 2020. [18]

Chen et al. [19] state that:

> Fangcang shelter hospitals are a novel public health concept. They were implemented for the first time in China in February, 2020, to tackle the coronavirus disease 2019 (COVID-19) outbreak. The Fangcang shelter hospitals in China were large-scale, temporary hospitals, rapidly built by converting existing public venues, such as stadiums and exhibition centres, into health-care facilities. They served to isolate patients with mild to moderate COVID-19 from their families and communities, while providing medical care, disease monitoring, food, shelter, and social activities. We document the development of Fangcang shelter hospitals during the COVID-19 outbreak in China and explain their three key characteristics (rapid construction, massive scale, and low cost) and five essential functions (isolation, triage, basic medical care, frequent monitoring and rapid referral, and essential living and social engagement). Fangcang shelter hospitals could be powerful components of national responses to the COVID-19 pandemic, as well as future epidemics and public health emergencies (1)

China gets benefits from stadiums, convention centers, offices, factories, airports, gymnasiums and changed them into temporary large-scale health facilities and treatment for thousands of patients. Such facilities are used for mild and moderate COVID-19 patients, while hospitals are used for the severe and critical cases of COVID-19.



A before-and-after image of the Huoshenshan Hospital being built in Wuhan, China. [20]

The above photos are related to the Huoshenshan Hospital which was built as an emergency shelter for the COVID-19 patients in ten days only in Wuhan, China. The hospital holds 1000 bed and received patients at the beginning of February.

Aerial photo shows the construction site of Leishenshan Hospital in Wuhan, central China's Hubei Province, Feb. 4, 2020.[21]

The above photo belongs to Leishenshan hospital which was also built in Wuhan, China. The hospital accommodates 1,600 patients and started taking patients on the beginning of February.

4.1 China's Anti-viral Efforts

China's anti-pandemic efforts and protocols proved crucial in controlling the spread of the outbreak. Such useful efforts are [17]:

1. Immediately close all public venues.
2. Stop crowds and gatherings of any kind.
3. Restrict traffic flow in and out of the city.
4. Wear masks at all time when in public.
5. Frequently wash hands and disinfect.
6. Set up public temperature monitoring stations to identify transmission sources.
7. Provide COVID-19 testing for symptomatic individuals and healthcare professionals.
8. Deliver food and essential supplies by non-contact means; and strictly isolate the sick.
9. The doctors also advocated for Rapid Medical Response Teams with experienced doctors and nurses.
10. Immediate intensive training for medical personnel on COVID-19 specifics.
11. The reasonable and fair distribution of medical resources wherever needed nationwide, and sufficient protective equipment for medical personnel and first responders serving on the frontlines in the war against COVID-19.

12. Chinese citizens appeared to be much more willing to wear masks while in public than Americans were.

In order to make the aforementioned anti-pandemic efforts real on the ground, China and in addition to its rapid response in dealing with the pandemic, isolating the cases, applying harsh quarantine system, and building emergent hospitals, got benefits from technology in its war against COVID-19:

Drones

Drones are used to combat COVID-19 by doing three crucial things: they are used for aerial spray and disinfection (unmanned vehicles are used to disinfect areas by spraying disinfecting chemicals on touchable surfaces). Drones were proved useful for high buildings and unreachable areas. They are used to transport samples. They transport medical testing supplies and medical samples from hospitals loaded with patients to other laboratories and research agencies such as the Chinese Center for Disease Control and Prevention. This is useful for social distancing and shortening time. The third useful thing that drones did during the spread of the pandemic is to send delivers for consumers or people in the infected areas. This will definitely limit the human contact and the spread of the outbreak [22].

Drone is used to fight COVID-19 [23]

Robots

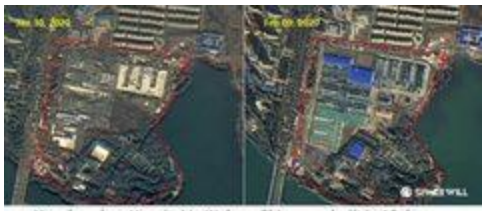
China does not only have doctors and nurses fighting a dangerous pandemic in the frontlines, but also it has frontlines robots which have played crucial role in combating COVID-19. Robots were used to transport meals for patients. In this way, they limit the human contact and infection.

They were used to disinfect suspected infected surfaces, streets, and public places. They were also used for performing, diagnosis, and conducting thermal imaging [24].

Photos show Chinese robots doing multiple jobs in combating COVID-19 [25]

Satellite Monitoring

China used satellites to combat the pandemic and monitor infected people as well as the construction of different hospitals. For example, China used GaoFen, a constellation of high-resolution earth observation satellites. Zhuhai-1 hyperspectral imaging satellite and ESA's Sentinel-1 are used to monitor the stages of building the two urgent hospitals namely, Huoshenshan and Leishenshan [24]. HaiGe Smart Epidemic Prevention Management Platform which is used to display maps of the infected areas and shows the routes of the infected persons through a tracking algorithm. The system compares the infected area with the common routes of the people or employees. Through this process, the system re-plans a safer journey to work [26]. TFSTAR, another satellite which has powerful analytics and processing capabilities, was used to help people see the geographical areas that contain the pandemic and find out the distance between them and the infected area [24].



Huoshenshan Hospital in Wuhan, China was built in 10 days.
Source: GF-2 | Resolution: 0.8m

Leishenshan Hospital in Wuhan, China was built in 14 days.
Source: GF-2 | Resolution: 0.8m

Hangfang Hospital in Wuhan, China
Source: SuperView-1 | Resolution: 0.5m

An Example of China's use of Satellite Imagery to fight COVID-19

Mobile Apps

China used mobile apps to combat the pandemic (COVID-19). One such app is designed by Alibaba Tencent companies. The QR code (color-coded health rating system) was developed by Alibaba Company and a similar app was also developed by Tencent. The app classifies people according to three colors: green, yellow, and red based on their medical and travel histories. People have to log into the smartphone app using pay wallet services like Alipay. People are allowed to leave home and travel in public places if they have green colors. People with yellow color should be isolated for 7 days. If people are normal during the 7 days quarantine, the color will return into green. People with red colors should be isolated for 14 days. If they are normal after the 14 days, their red colors will turn into green. In the streets and public places, there were checkpoints in which the QR Code and temperature of the people are checked [24].

People are showing their QR Code colors to checkpoints [27, 28]

Smart Helmets and Glasses

In China, police officers were given smart helmets. The AI powered-fever helmets can detect the temperature of the people walking in streets and public places at a distance of 5 meters. In addition to detecting people's temperature, the helmets can provide other personal information such as the person's name because such helmets are also equipped with facial-recognition technology, on a virtual screen inside [29]. Smart glasses were also used to combat COVID-19 pandemic. The thermal-imaging glasses were made by Chinese technology Rokid. The glasses are capable of checking the fever of hundreds people in minutes [30].

Smart Helmets and Glasses joining the fight

Artificial Intelligence (AI)

Baidu, the Chinese internet giant, helped bring artificial intelligence to join the frontlines in the fight against the pandemic. Since COVID-19 is rapidly mutating, it is difficult to make vaccine development and virus analysis. Therefore, Baidu presented its linear-fold algorithm to

support scientific and medical experts fighting the pandemic. The Linearfold Algorithm can predict virus's secondary RNA structure faster than the traditional RNA folding algorithms. During COVID-19 outbreak, scientists used Baidu AI algorithm to predict the secondary structure for the virus RNA sequence. The time of the overall analysis was reduced from 55 minutes to 27 seconds which means it is 120 times faster. Scientists hoped that such technology can help improve the speed of pandemic research and vaccine development. Chinese internet present different AI powered machines, monitoring systems, and temperature sensors to help control the spread of the outbreak. Such machines, systems, and sensors can check hundreds of people in minutes. Chinese technology and internet even monitored Chinese people in crowded areas to make sure that they are wearing face masks and other safe health procedures. Baidu's online doctor consultation platform (BODCP) was used to give professional answers to people's questions that live in areas with limited medical staff and resources. The platform contains more than 100,000 doctors. All of them are specialized in respiratory. The doctors answered more than 15 million questions and enquiries which were raised by users. This definitely help in controlling the spread, raise awareness in people's minds, and provide patients with the best care plans based on their disease severity. Baidu also developed a robocall platform which was able to make more than three million automated phone calls and at least 1,500 calls in one second asking people to send their travels history, social contacts, and their current health conditions [31].

5. COVID-19 Waste Disposal in China

Since the pandemic outbreak in China, medical workers and patients in hospitals have left huge growth of medical waste. COVID-19 medical wastes are very infectious. Therefore, such infectious waste should also be safely and carefully eliminated. According to the China Energy Conservation and Environmental Protection Corporation (CECEP), there are two methods used in china for the treatment of COVID-19 wastes. The first one is by incinerating the wastes by special incinerators with a high temperature degree not less than 850 degrees Celsius. Then, the remaining ashes and slags will be sent to a landfill. The second way is done by sterilizing the wastes by high temperature and steam not less than 134 degrees Celsius for 60-90 minutes. COVID-19 wastes are collected and treated in every 12 hours. For the transportation and collection of COVID-19 wastes, China used special vehicles, special routes, and specialized workers. Before sending COVID-19 wastes to the incinerating facilities, the wastes are put inside a multi-layer medical waste bag. Then, the bag is disinfected, sealed and put into a pressure-resistant cardboard box. The specialized workers should wear protective clothes, goggles, extra layer of gloves, shoe covers, use of disinfected chemical substance, and other precautionary measures [32, 33].

6. Conclusions

This article presents the way China response to the COVID-19 pandemic. In fact, the way China response to the outbreak was credible and quick. China is similar to a clever warrior who is using every think he/she has to win the battle. China used its human and technological armies in the frontlines fighting the enemy (COVID-19). Trained medical workers, enough medical supplies, high-level protective equipment, hospitals built in days for patients with severe cases, solidarity and unity among Chinese, and spirit of self-sacrifice. Chinese awareness of the seriousness and risk of the disease made them comply with the health and quarantine instructions.

The rise of Chinese technology is also the second frontline army that weakened and stopped the spread of the outbreak. Millions of cameras used for monitoring and detecting disease symptoms in people like fever, satellite used for monitoring people and construction of buildings such as emergent hospitals, drones for transforming samples, alerting people, and giving instructions, smart helmets and glasses for detecting people's fever and face recognition, robots for disinfection and social distancing, artificial intelligence (AI), online internet platforms, Baidu which are used for answering people's questions and enquiries about the pandemic and giving health and protective advice, and organized methods for COVID-19 waste disposal and treatment.

7. Recommendations

1. China provided a good example of fighting the pandemic. Therefore, we should benefit from its experience.
2. According to the GHS Index, Iraq gained 25.8 index score in its ability to fight and resist pandemic attacks. Iraq's GHS index scores in terms of the six main indicators namely, prevention, detection and reporting, rapid response, health system, compliance with international norms, and risk environment is described as very weak and less prepared with a red line map.
3. The Iraqi health care system is very weak in its response to epidemics or pandemics. Therefore, we need to develop our health care system by searching for the weak points or gaps and then we should work on strengthening the weak points or filling the gaps with possible and immediate solutions.
4. In Iraq, there are a total of 253 government hospitals with a ratio of 8.5 physicians per 10,000 people according to Ministry of Health annual report of 2015. These are very weak numbers. Iraq is in need of building large number of hospitals. The hospitals should be well equipped with professional trained and experienced doctors, other medical workers, medical supplies and equipment.
5. Security and stability and the health system are interrelated. Through history, Iraq's health care system and capacities have been negatively affected by wars, sectarianism, terrorism, and political instability.
6. People's cultural, social, and health awareness and their rapid responses to the health care instructions are also crucial factors in containing epidemics and controlling their outbreaks.
7. Technology in Iraq is almost non-existent. Technology and artificial intelligence proved their huge capacities in fighting diseases and pandemics. Therefore, Iraq is need to the help of technology.

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Using Machine Learning Algorithm to Create Self check examination APP of COVID- 19

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Abstract:

Accurate analysis of medical data supports early disease identification, patient treatment, and community services through data development in biomedical and healthcare populations. In addition, various regions exhibit specific features of some regional diseases that that undermine the prediction of disease outbreaks. In this paper, we streamline machine learning algorithms to provide efficient coronavirus prediction. Coronavirus or called SARS-CoV-2 is RNA virus discovered in Wuhan- China the last 2019 than transmitted to worldwide. COVID- 19 become global pandemic in 2020 than World Health Organization (WHO) works on quarantine people and reducing contact even in hospitals and health centers to control this pandemic. Experimented in this study with the updated models of prediction over COVID-19 disease data gathered from recent studies. Compared to many traditional prediction algorithms, our proposed algorithm's prediction accuracy achieves a convergence level that is faster than that of the COVID- 19 unimodal disease risk prediction algorithm. This scientific application aimed to help predicted COVID- 19 and work reducing number of people for visiting hospitals and health centers to check up about coronavirus with spreading health awareness about this critical virus.

***Keywords*: Coronavirus, COVID- 19, Machine learning, Self-checker**

Introduction:

COVID- 19 is one a novel critical RNA virus family of coronavirus. COVID- 19 has crown shape that to crown-like spikes on their surface. Spikes on surface COVID- 19 consist protein compound used to attached host cells and given virus some characterizes of virulence. 1937, was first time discovered coronavirus in chicken, in addition identified in human on 1965. There are seven types of coronavirus discovered able to infect human. In December 2019 was recorded the first case by COVID- 19 in Wuhan- China than transferred to world-wide. Family of coronavirus has been divided into four genera called alpha, beta, gamma and delta coronavirus [1, 2, 3].

The clinical symptoms for COVID-19 disease are high fever, dry cough and weakness inside majority of patients with shortness of breath in most patients. Some of patients have other symptoms beside above points such as headache, sore throat, nausea, vomiting and diarrhea. The symptoms among Iraqi and Kurdish illness with COVID- 19 were mostly mild, however

symptoms in European cases with coronavirus SAR- Cov2 were mostly hard breath, needed using ventilator to survive [4, 5].

COVID- 19 virus diagnoses depend on clinical symptoms of disease and laboratory result by real time reverse transcription polymerase chain reaction technic with CT scan of chest. Pneumonia infection with SAR- Cov2 has not any medication or vaccine until now. The method of transition of infection of COVID- 19 by contact with people who virus carrier, to reduce contact between people to necessitate congestion in hospital and health facilities. The most of infected with COVID- 19 can recover by take rest at home and following health orders [6, 7].

Technology to allow exploring the data, analyzing data, and visualizing the data of large databases at the top of imagination, information about large datasets, very huge datasets, it is help findings of then on obvious, information which is useful in improving the process, it cannot be performed manually. Nowadays, too many of complex data about issues such as, patients, detecting diseases, recording patients electronically, hospital machines and devises are being produced by the health care industry [19, 13]. A large number of data is the main resource to be dealt with for extracting knowledge which supports lowering the cost and making decision shown in figure 1 [8, 9, 11].

Data mining introduces a collection of tools and techniques that can be added to this processed data to find out patterns which are not obvious. This paves the way for the hospital staff to get a rich source of knowledge for decision making [12]. Data mining is a collection of algorithmic ways to extract informative patterns from raw data – Data mining is purely data-driven; this feature is important in health care, $y = f(x)$, We have seen x(set of independent variables) and observed y(dependent variable); data mining tells us something about the nature of f x = symptoms or test results, y = diseases ,x = treatments, y = symptom ,It tells us "how" How is x related to y? What function describes their relationship (x, y) = score, or $f(x|y) = Pr(x|y$ [17].

Data mining facilitates the Healthcare insurers notice deception and cruelty, besides healthcare administration establishes relationship with the customer for management and decision making [15]. Physicians on the other hand recognize successful treatment and finest practices. finally, patients are offered better healthcare services [18].

One of Data types, for example, an HER is an electronic element which saves data about a patients' medical history and consists of important administrative medical information related to the patient's attention in a particular source, together with demographics, advancement notes, troubles, medication, important symbols, earlier medical history, immunizations, laboratory facts, radiology and imagery [14, 19]. (Data mining can be mainly helpful in medicine in cases when there are no conclusive facts aiding a selective healing option, depending on patients report, history, physical examination, analysis of earlier treatment patterns. Recommendations for latest treatment strategy can be proposed [16].

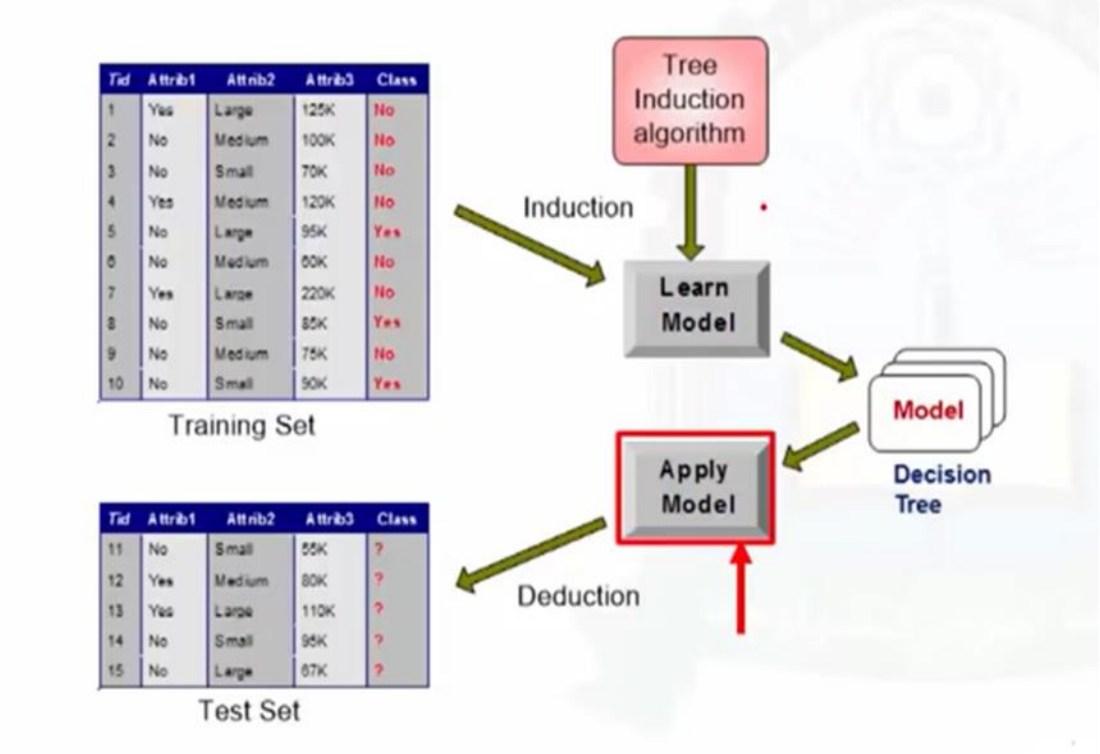

Figure1: how to create model to machine learning.

Methodology:

1. Computer programming languages: computer programming languages permits humans to give orders to a computer in a language that is familiar for the computer. Similar to human beings"s language varieties ,there are a range of computer programming languages that programmers are able to use to interact with a computer. The part of the language a computer can understand is called "binary". Interpreting programming language into binary is identified as "compilling".

1.1 Python: python is a high-level programming language. It was created in 1991 by Dutch programmer Guido Van Rossum. Readability" is a key factor in Python's philosophy. As such, it aims to limit code blocks (blocks of source code text) and have white space instead, for a clearer, less busy appearance. The construction of its language and OOP method designed to help programmers write flawless, logical code for variant projects [20].

1.2 Algorithm: algorithm is a set of rules used to perform a particular task, usually the task is mathematical. The process can be simple such as multiplying two numbers, or a complicated operation, such as predicting future scientific events by machine learning and neural network algorithm [21].

2. Machine learning (ML): machine learning is a form of artificial intelligence AL which helps software applications to be clearer at predicting results without being obviously

programmed to do so. Furthermore, Machine learning algorithms use historical data as input to imagine new output values.

2.1 Anaconda for Data Scientists: anaconda is unrestricted and open-source distribution of Python and R programming languages used for logical computing, which attempts to make package management and deployment easier. The variants of package are controlled by package management system conda.

2.2 Jupyter Notebook: jupyter notebook is a free web application which helps to create and share documents that include live code, equations, visualizations and narrative text. The usage consists of: data cleaning and transformation, statistical model or simulations, visualizing data and finally machine learning.

Results:

Application designed by learning machine algorithm to analyzed symptoms of COVID-19 disease such as fever, dry cough, nausea etc figure 2. user or checker answered questions of that feeling symptoms of disease, then program analyzed to predicate health situation of user as shown figure 3&4.

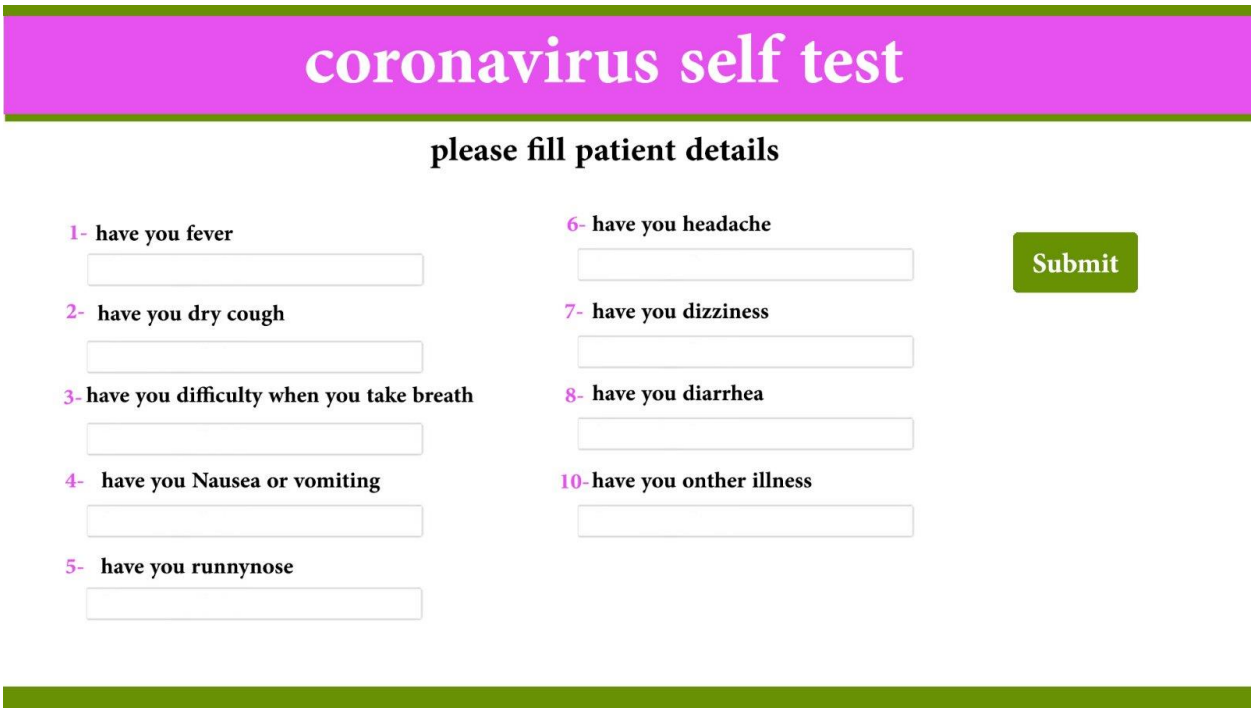

Figure 2: shown view screen of self-check application.

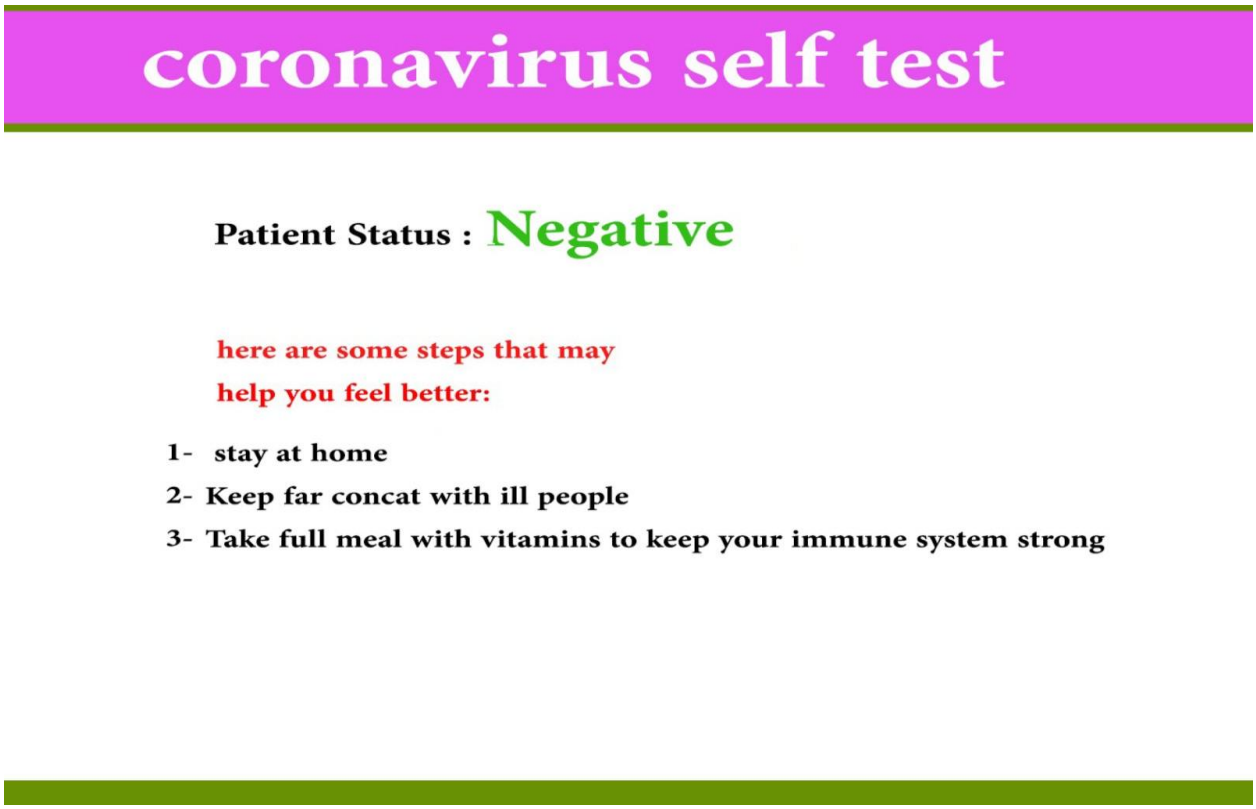

Figure 3: shown negative result of self-check application.

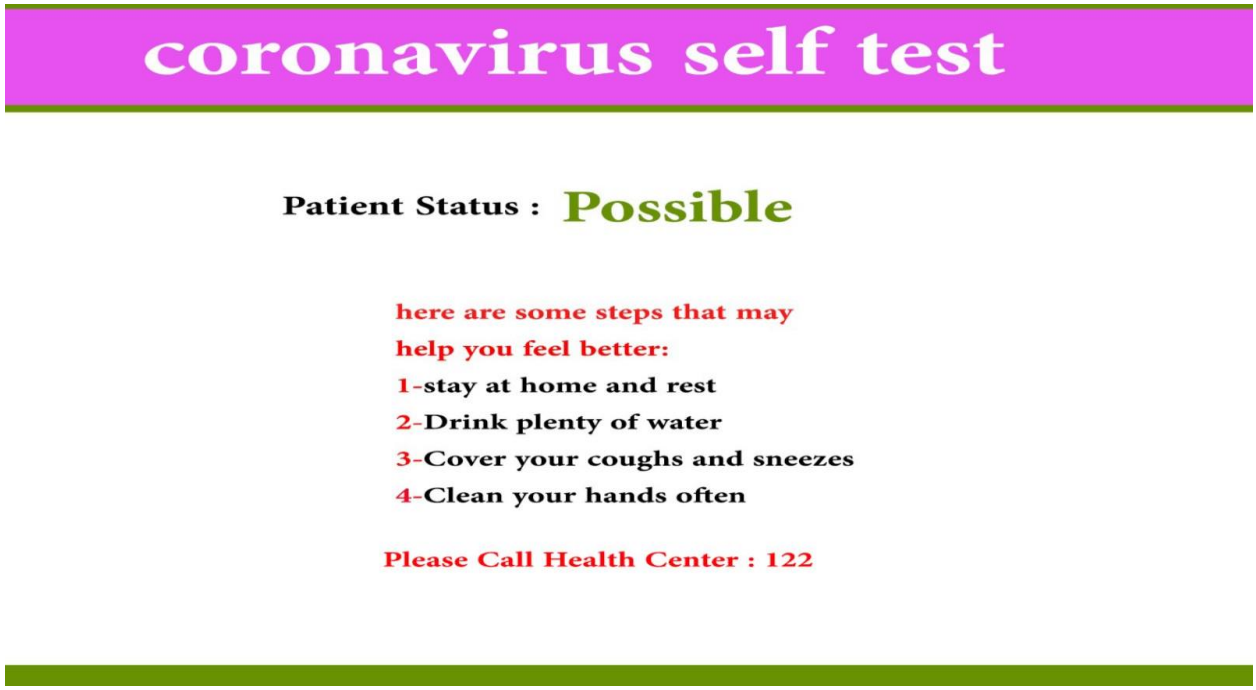

Figure 4: shown possible result of self-check application.

Conclusion:

Designing program by learning machine algorithm analyzed symptoms of coronavirus 19 to predicate health cases. Using self-check program of COVID- 19 helps reducing congestion in health centers and hospitals and recognized people who may carrying COVID – 19 viruses from them residences. As well as self-check technology can measured as health awareness ways also, given some advice to user to stay at home with right medical method to protect from the coronavirus. Recombined to develop software with huge datasets of COVID- 19 cases to give less error, as well as design medical application check to help centers of coronavirus to analyzed patient result and data by scientific methodology.

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COVID-19 Treatments ..... a spark of hope

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Abstract

This is the first time in history that world scientists focus on one topic. After the outbreak of the new Corona virus in most countries of the world, and its transformation into a pandemic threatening the lives of millions of people, many researchers stopped following their research and all focused on finding a cure for the virus Through this article, we will review the most important treatments that have been clinically tested by scientists from different countries of the world and the most important drug , One of the most important treatments that have been observed to have a strong effect in treating patients is the use of plasma that comes first and second Chloroquine and hydroxychloroquine.

Introduction

Coronaviruses (CoVs) are positive-sense, single-stranded RNA viruses of the family Coronaviridae (subfamily Coronavirinae) that infect a wide host range to produce diseases ranging from common cold to severe/fatal illnesses. The novel virus was initially named "2019-nCoV" which was changed to "SARS-CoV-2" b, since it was found to be the sister virus of severe acute respiratory syndrome coronavirus (SARS-CoV).(1). The novel coronavirus infection (COVID-19 or Coronavirus disease 2019) that emerged from Wuhan, Hubei province of China has spread to many countries worldwide. Efforts have been made to develop vaccines against human coronavirus (CoV) infections such as MERS and SARS in the past decades. However, to date, no licensed antiviral treatment or vaccine exists for MERS and SARS. This article highlights ongoing advances in designing therapeutics to counter COVID-19.(2)

The use of antiviral drugs in the treatment of(COVID-19)

❖ **EIDD-2801**

EIDD-2801 is the isopropylester prodrug of N4-hydroxycytidine.1,2 With improved oral bioavailability in non human primates, it is hydrolyzed in vivo, and distributes into tissues where it becomes the active 5'-triphosphate form. An oral EIDD-2801 has shown promise in test-tube experiments with human lung and airway cells, scientists reported online April 6 in the journal Science Translational Medicine. The drug might even be more efficient at blocking the novel coronavirus, SARS-CoV-2, than remdesivir, a drug being tested against COVID-19 in clinical trials that began in March. While remdesivir stops the novel coronavirus from replicating entirely, EIDD-2801 introduces genetic mutations into the virus's RNA. As the RNA makes its

copies, so many damaging mutations accumulate that the virus is no longer able to infect cells, Scientific American reported. The drug also seems to work against several RNA viruses, and as such, the researchers said it could be a multipurpose antiviral. And unlike remdesivir, which needs to be given intravenously, this drug could be swallowed as a pill.."(3)

❖ **Japan flu drug**

Fujifilm Toyama Chemical Corporation in Japan developed promising results in treatment of at least mild and moderate cases of COVID-19. Named favipiravir or Avigan, it was used in Japan to treat the flu, and the drug was approved as an experimental treatment for a COVID-19 infection .The drug works by preventing some viruses from multiplying, shortening the duration of the virus and also improving lung conditions in patients who have been tested. The study found that faviravir greatly reduced the time people experienced fever or coughing (4)

❖ **An HIV drug combination**

The antiviral drug kaletra, a combination of lopinavir and ritonavir, generated early excitement. However, new data from China, published March 18 in the New England Journal of Medicine, could not detect a benefit when patients took the drug. A total of 199 people with low oxygen levels were randomized to either receive kaletra or a placebo. While fewer people taking kaletra died, the difference was not statistically significant, meaning it could have been due to random chance. And both groups had similar levels of virus in their blood over time. However, other studies are still ongoing, and there's still a possibility this combination could show some benefit. As with other antivirals, this drug would likely work better if given earlier in the disease

The use of anti-inflammatory drugs in the treatment of (COVID-19)

❖ **Chloroquine and hydroxychloroquine**

Chloroquine (CQ) is an amine acidtropic form of quinine and hydroxychloroquine (HCQ) differs from chloroquine by the presence at the end of the side chain of a hydroxy group: β-hydroxylated is the N ethyl substituent. CQ and HCQ have been front line medicines for the prevention and prophylaxis of malaria for decades and are also used to combat autoimmune disorders, including rheumatoid Previous studies indicated that CQ / HCQ has a wide range of antiviral effects on a variety of viruses as diverse as human immunodeficiency virus (HIV), Zika virus, dengue virus, Ebola virus, and SARS-CoV-1(5). CQ and HCQ may interfere with viral particle binding to their cellular surface receptor or with the pH-dependent endosome-mediated viral entry of enveloped viruses to inhibit the viral cycle they can also interfere with viral protein post-translation alteration or hinder the proper maturation of viral protein by pH modulation[6]. In addition, CQ and HCQ can regulate the immune system by influencing cell signaling and pro-inflammatory cytokine production. Although CQ or HCQ are widely used for the treatment of rheumatic diseases due to their immunomodulatory and anti-inflammatory effects, the advantage in treating COVID-19 can be attributed primarily to its anti-viral effects. Several studies have recently shown CQ and HCQ to reduce the viral load from SARS-CoV-2 and to shorten the duration of viremia .Until now, the Chloroquine phosphate group has shown efficacy in a clinical trial involving more than 100 patients in reducing pneumonia exacerbation, improving lung imaging findings and increasing the negative rate of nucleic acid testing. The Guidelines in light of these

findings For COVID-19 therapy it is recommended that chloroquine phosphate be administered orally in adults at a dosage of 500 mg (300 mg for Chloroquine) 2 times a day (no more than 10 days)[7]

Glucocorticoids

Numerous clinical studies have confirmed the effectiveness of glucocorticoids in treating coronavirus pneumonia (such as SARS and MERS) or influenza pneumonia, but there was no consensus. Glucocorticoid was the main drug in immunomodulatory therapy during the SARS outbreak in 2003. The timely age of glucocorticoid can impede early fever, promote pneumonia absorption , In compliance with international recommendations for sepsis and septic shock treatment, if glucocorticoid is to be used, limited dosages and short-term use should only be administered to patients in whom sufficient fluid and vasopressor therapy do not restore hemodynamic stability (8) Actually, systemic glucocorticoid administration has been empirically used for extreme complications to reduce symptoms in COVID-19 patients such as acute heart attack, acute complication of the kidney and patients with elevated levels of D-dimer, et al [9,10] However, there is no evidence from randomized clinical trials to support glucocorticoid treatment for COVID-19. Wang et al reported glucocorticoid therapy to 44.9% of COVID-19 patients, with no successful results observed[16].Russell et al. reported clinical evidence that the COVID-19 lung injury treatment did not help corticosteroid therapy [11].Due to the lack of evidence, WHO's interim guidelines do not support the use of systemic corticosteroids to treat viral pneumonia and ARDSFor alleged cases of COVID-19 as of 22 February 2020 [12].Consequently, the efficacy and related adverse effects of COVID -19 glucocorticoids need to be further elucidated**.**

❖ **Tocilizumab treatment**

Tocilizumab (TCZ) is a recombinant human IL-6 monoclonal antibody which specifically binds to IL-6 receptors (IL-6R) that are soluble and membrane-bound, thus blocking IL-6 signaling and its inflammatory response.TCZ was commonly used in rheumatism, such as rheumatoid arthritis.TCZ has been licensed in the United States on 30 August 2017 for severe life-threatening cytokine Release syndrome caused by immunotherapy with the Chimeric Antigen Receptor T-cell (CART). Immunotherapy .Wei Haiming, et al conducted a retrospective study which observed the effectiveness of Tocilizumab in the treatment of serious or critical COVID-19 patients .In addition to the standard anti-virus drug, TCZ was once intravenously administered to 20 patients at 400 mg. The fever returned to normal within a few days, and other symptoms improved dramatically .Oxygenation had improved by 75.0 per cent. In 90.5 per cent of patients, the opacity lung lesion on CT scans was removed. In addition, in 52.6 per cent of patients, the number of peripheral lymphocytes returned to normal. Their data indicate that TCZ could be an effective therapy in serious COVID-19 patients. Several clinical trials on the safety and effectiveness of Tocilizumab in the treatment of serious COVID-19 pneumonia in adult

patients have been reported so far, including a multicenter, randomized controlled trial for the efficacy and safety of Tocilizumab in the treatment of novel coronary pneumonia (13)

❖ **Janus kinase inhibitors (JAK inhibitors)**

The receptors of novel coronavirus pneumonia (2019-nCoV) may be Angiotensin-converting enzyme 2 ACE2, a cell-surface protein that has been widely found in cells in the heart, kidneys, blood vessels, especially lung alveolar type II AT2 alveolar epithelial cells.By endocytosis 2019-nCoV may invade and enter cells. One known endocytosis regulator is the adaptor protein complex 2 AP2-associated kinase 1 protein (AAK1). AAK1 inhibitors can disrupt the virus' passage into cells and can be effective in preventing viral infections. Baricitinib, both a JAK inhibitor and an AAK1 inhibitor, has been proposed as a possible candidate for COVID-19 therapy, taking into account its relative safety and high affinities. Treatment dose of either 2 mg or 4 mg once daily was adequate to achieve inhibition plasma concentration [14].The biggest concern about JAK inhibitors, however, as described above, is that it can inhibit a number of inflammatory cytokines like INF-a, which plays an important role in curbing virus activity. More clinical trials and thorough research to validate their efficacy are needed.

Other suggested treatments

❖ **A blood pressure drug**

Losartan is a generic blood-pressure medication that some scientists are hoping could help patients with COVID-19. The University of Minnesota has launched two clinical trials using the inexpensive, generic drug. The first would evaluate whether Losartan can prevent multi-organ failure in those hospitalized with COVID-19 pneumonia. The second would evaluate if the drug can prevent hospitalizations in the first place, Reuters reported. Losartan works by blocking a receptor, or doorway into cells that the chemical called angiotensin II uses to enter the cells and raise blood pressure. SARS-CoV-2 binds to the angiotensin-converting enzyme 2 (ACE2) receptor, and it's possible, the thinking goes, that because Losartan might block those receptors, it may prevent the virus from infecting cells. Complicating things, a paper published March 11 in the journal The Lancet has raised the possibility that common drugs for hypertension, such as ACE inhibitors and so-called angiotensin II receptor blockers (ARBs), which includes Losartan, might actually spur the body to make more ACE2, thereby increasing the ability of the virus to infiltrate cells. A recent study of 355 COVID-19 patients in Italy . found that three-quarters of the patients who died had hypertension, and the authors propose this is one reason for their increased susceptibility (15)

❖ **Convalescent Plasma therapy in severe COVID-19 patients**

10 severe patients who were confirmed by a real-time viral RNA test in the future were enrolled in the future. A single dose of 200 ml of convalescent plasma (CP) derived from newly recovered donors with an antibody titer above 1: 640 was transferred to patients as an addition to the maximum supportive care and antiviral agents. The primary endpoint was the safety of the CP transfer. The second endpoints were the improvement of clinical symptoms and laboratory parameters within 3 d after CP transfer. The median period from the onset of the disease to the

transfer of CP was 16.5 d. After CP transfer, the level of the antibody equivalent increased rapidly up to 1: 640 in five cases, while the other four cases maintained a high level (1: 640). Clinical symptoms were significantly improved with increased hemoglobin saturation during 3 d. Many parameters tend to improve compared to pre-transport, including increased number of lymphocytes and decreased C-reactive protein. Radiological examinations showed varying degrees of absorption of lung lesions during 7 d. Viral pregnancy was undetectable after blood transfusion in seven patients who had a previous Fermi. No severe negative effects were observed. This study showed that CP treatment was well tolerated and could improve clinical outcomes by neutralizing Fermi in severe COVID-19 cases. The optimum dose and time point, as well as the clinical benefit of CP therapy, need further research in larger, well-controlled trials (16).

❖ **Continuous renal replacement therapy (CRRT)**

CRRT will support organ function for critical patients, may cytokine storms and maintain healthy internal environment, Three clinical trials found that the incidence of AKI in COVID-19 patients was 3% to 7%, and CRRT was treated at 7% to 9.0%. In intensive care unit ICU, the CRRT application rate in patients with Acute kidney injury AKI was 5.6 percent to 23.0 percent and reached as high as 66.7 percent to 100 percent [17].In patients with AKI 6 Coronavirus disease 2019 (COVID-19), CRRT is recommended: clinical improvement indications (hyperkalemia, acidosis, pulmonary edema, extreme sodium ion disorders) or chronic kidney deseae CKD patients without hemodialysis. CRRT can effectively eliminate inflammatory mediators during septic shock, and enhance hemodynamics significantly. When Acute respiratory distress syndrome ARDS appears in combination with multiple organ dysfunction syndrome (MODS), it is recommended to have early CRRT [18]. CRRT combined with Extracorporeal membrane oxygenation ECMO treatment can remove cytokines, decrease macrophage and monocyte activity and better preserve lung parenchyma.

❖ **Interferon beta**

The UK biotech firm Synairgen has been given fast-track approval to trial a lung-disease drug in Covid-19 sufferers. The compound, interferon beta, forms part of the lung's natural defence system against viruses and was originally developed for patients with chronic obstructive pulmonary disorder, or COPD. The hope is that administering interferon beta boosts the body's ability to fight the virus, especially in those who have weakened immune systems. It was identified in February by the WHO as the only therapy in phase-2 trials that can be inhaled, meaning patients can administer it themselves through a small battery-operated nebulizer (19).

❖ **Ivermectin**

Researchers at Monash University have performed lab tests that indicate Ivermectinan, an anti-parasitic drug already approved by the FDA and available around the world, kills COVID-19 within 48 hours. During tests, a single dose of the drug stopped the SARS-CoV-2 virus from growing in cell culture. Monash's Kylie Wagstaff, who led the study, said the mechanism by which Ivermectin works on the virus is not known; however, it is likely, based on its action in other viruses like dengue, HIV and Zika, that it works to stop the virus "dampening down" the

host cells' ability to clear it. (20) Wagstaff said the next step is to determine the correct human dosage to ensure the doses shown to effectively treat the virus *in vitro* are safe for humans, as well. "The use of Ivermectin to combat COVID-19 would depend on the results of further pre-clinical testing and ultimately clinical trials, with funding urgently required to keep progressing the work.

conclusion

1- In the absence of final management protocols, many treatment regimens were explored in the treatment of COVID-19. Some of these treatments may have been tried out of despair, and among them, some have shown an initial promise. However, it is too early to see any results from the publication of rigorous clinical trials, and therefore, relying on the body's immunity, taking the necessary health measures and adhering to quarantine is still the shortest way to avoid the spread of this disease (prevention is better than treatment).

2- We understand the fear of COVID-19 and the desire to find a quick solution. "However, until now there have been no approved COVID-19 preventive drugs in humans, and no one should be affected by improper drug use." Staying home, washing hands frequently, wearing a homemade mask when going out, coughing and sneezing are the best ways to slow the spread of the deadly virus.

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Preparedness and fast response to COVID-19 pandemic in different world countries: Italy and Greece as examples

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Abstract

Coronavirus disease 2019 (COVID-19) or severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a global pandemic that infected 1,614,405 people with 96,789 deaths around the world, according to the world meter website. These calculations were until 12:51PM Baghdad local time, April 10, 2020; however, these numbers are momentarily rising. Countries such as Italy which has seen too many infections and deaths, 143,626 and 18,279, respectively, while countries like Greece, suffered low numbers of infections and deaths, 1,955 and 87, respectively, according to the same above source. The sophisticated health system didn't enhance in lowering these numbers in Italy unlike with what has happened in the humble health system that Greece has. Fortunately, Greece had taken strict and rapid measures to control the pandemic before it occurred in the first case that came from Italy to Greece. While Italy had let the infection numbers increase before the first response came to light.

Keywords: COVID-19, SARS-CoV-2

Introduction

The global pandemic of SARS-CoV-2, started in December, 2019, in wet markets, Wuhan City, Hubei province, China, has left the world in a miserable situation. The disease has been initiated as currently believed due to eating Chinese bat ()1; 2(). The life of people has stopped at different aspects such work and entertainment. The world most business sectors have shut down in exception to those with demands including health equipment and consumables like medical gloves and masks, sanitizers and disinfectants, and respirator which are heavily needed to fight the pandemic. Actually, some large car and fashion design manufacturers in the United States have been ordered to use their assembly lines and factories to fulfil increasingly demands on respirators required by the health facilities in different states (3). In response to the pandemic, several measures such as community lockdowns, isolations, quarantines, and disinfections of public areas have been taken to fight and control the rising numbers of infections and deaths around the world; however, these practices either came late or have not been applied in adequate ways due to political, economic, scientific opinions which have led to health crises due to pandemic as seen in Spain and Italy (4).

Although some countries with setbacks in response to COVID-19 pandemic, countries like Greece have taken drastic measures to respond to the disease even before it has occurred.

COVID-19 response measures in Italy

Throughout the first instance, the true risk of COVID-19 throughout Europe undoubtedly was unsuccessfully released due to premature relaxation. The outbreak was somewhat close to that seen with SARS and MERS. The main focal point was fought in all of these epidemics. In fact, in more than 25 countries the first line of protection was ensured– all sick persons were detected, their connections monitored and separated. In the case of COVID-19 it was already apparent by the end of February 2020 that its primary focal point, Wuhan, was succeeded. The first line of defense in some other 30 Chinese provinces was also halted. The first figures of death levels were then released on 28 February, suggesting a disease with a mortality risk slightly smaller than SARS and MERS. At the time the outbreak might soon be ended was fair. As a result, a pandemic announcement was postponed by the World Health Organization (WHO) to later date of March 11th. The stock prices worldwide rose by about 10% from February 27th to March the 3rd. But excessive relaxation, as seen later with COVID-19, is very harmful to some novel viruses ()5;)6(; 7().

Many factors may have increased the incidences in the Italy such as many Chinese tourists and immigrants were let to enter Italy even with presence of fever. Moreover, even with presence of such situation in China, Italians were not prevented to spend times in the northern Italian resorts where the crises began. Lockdowns and social distances were not on ground only until increases in infections and deaths were seen. All these have helped in developing a drastic situation in Italy (6).

COVID-19 response measures in Greece

High health professionals in Greece had decided to take superior actions in monitoring the development of COVID-19 pandemic in Europe. They had prepared several containment plans even before the disease hit the Greek mainland. The first case occurred in Greece was a Greek woman came from Italy that showed COVID-19 symptoms. Later, the lady son's school were all placed in isolation with complete tracking of those of contacts. All public activities were locked down only essentials such as food shopping and pharmacies. Complete strategies of disinfection to the public places and facilities were applied which might all have helped in developing less critical situations than what have happened in Greece's neighbor countries ()8; 9 ().

Conclusions and recommendations

Health systems around the world are now under hard challenges due to the COVID-19 pandemics. This would have not happened if world countries such as Italy and Spain and many more had taken several proper plans to contain the outbreak before the occurrence in their countries. Relying on certain old opinion of the "herd immunity" or premature relaxation may only provide substantial crises especially with newly emerged viruses such as novel coronavirus responsible of COVID-19.

There is some unconfirmed information that some of Italian politics had refused to encourage people in Italy to commit to certain measures such as lockdowns in response to COVID-19 occurrence. This might have been due to political or economic points of view by these politicians.

Unlike Italy, Greece governmental officials completely followed the recommendations and fears of suspected crises that had been informed by Prof. Sotirios Tsiodras. These crises might have happened in Greece if these measures had not been followed by these officials. According to these, low numbers of infections and deaths were seen in Greece at the time of the current article.

In conclusion, waiting until the first case to hit the mainland in any country to plan for a control measure is not a unique way to deal with infectious agents especially those with unknown information.

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الخلاصة

مـــرض فيروس كورونا 2019 (كوفيد 19) او المتلازمة التنفسية الحادة الوخيمة ,وباء كورونا 2(سارس كوفيد2) , وباء عالمياً اصاب 1,614,405 شخصاً مع 96,789 حالة وفاة حول العالم وفقاً للموقع الالكتروني للمتر العالمي وكانت هذ ه الحسابات حتى الساعة 12:51 مساءاً بتوقيت بغداد المحلي ليوم 10 ابريل 2020 , مع ذلك فان هذة الارقام ترتفع كل لحظة. دولة مثل ايطاليا التي شهدت عددا كبير من الاصابات والوفيات 626,143 و279,18 على التوالي .بينما عانت دولة مثل اليونا ن اعداد منخفضة من الاصابات والاوفيات1,955 و87 على التوالي وفقا للمصدر اعلاه .لـــــم يعزز النظام الصحي المعقد في خفض الاعداد في ايطاليا على العكس ماحدث في النظام الصحي المتواضع الموجود في اليونان , لحسن الحظ اتخذت الي ونان اجراءات صارمة وسريعة لسيطرة على الوباء قبل حدوثة في الحالة الاولـــــى التي جاءت مـــن ايطاليا الى اليونان فـــي حين سمحت ايطاليا بزيادة عدد الاصابات قبـــل ظهور الاستجابـــــة الاولى

الكلمات المفتاحية :كوفيد19 ,سارس كوفيد2

Covid 2019 and important details about it

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Abstract

The rapid and global spread of COVID 2019, made it a very serious epidemic disease, and urged scientists and specialists to make great efforts to find appropriate treatments and vaccines to save the world from such an epidemic. However, despite the efforts made, all the data obtained confirm that what has been achieved is only temporary solutions, and it takes almost a year to clinically apply. Data shows that compliance with prevention and quarantine instructions is the most effective solution among them.

Key words: Covid2019, classification, gene structure, symptoms, therapeutics, the vaccine

Introduction

Corona virus responsible for causing Coronavirus disease 2019 (Corvid 2019), which is a respiratory disease spreading through a person to anothers . The agent that causes COVID-19 is a novel Coronavirus firstly identified during the outbreak of virus disease in Wuhan, Chinahttps://www.cdc.gov/coronavirus/2019-ncov/about/transmission.html#geographic. Today seven types from this virus recognize by the doctors,which can infect humans. The strains,which can caus that cause very intense complicat include MERS-CoV, that reasons for the respiratory syndrome of the Middle East (MERS), and SARS-CoV, the virus answerable for severe SARS. In 2019 SARS-CoV-2 the new dangerous strain causing the disease COVID-19[1]. So far, no precise details have been reached on this virus, such as its origin and ability to spread between humans or its spread from the animal to human, however, what is available from previous information about both SARS and MERSA, provided information on how it is transmitted between humans or how it transforms from animal to human. The increase in the number of infected people is a result of the transmission of the virus between humans. The research is limited on how the HCoV spreads among humans. However, they believe between the researchers that viruses spread by the fluid in the respiratory system, such as saliva. The infection by this virus can come from different ways ; Coughing and sneezing , shaking or touching with the person hasing the virus,and touching the surfaces containing the virus and then touching the nose, eye or mouth [1]. The emergence of infections with this virus and its transformation into a pandemic situation has become a "global" threat, as such an outbreak may

not be avoided in the future as a result of changes in the environment and climate and to increase human interactions with animals and as a consequence, there is a crucial necessity to develop both treatments and vaccines for such epidemics[2].

Classification of Coronavirus

Coronavirus related to the family of Coronaviridae (subfamily Coronavirinae) [3], four genera included within this family : Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus[2]. Coronavirus located within the Beta genera, that capable of infecting a wide range of mammalians, the virus soecies like SARS-CoV, HCoV-OC43, HCoV-HKU1 can inficted mice and human, and MERS-CoV, Murine coronavirus (MHV) and Bovine Coronavirus (BCoV) [4].The classification of Coronaviruses depending on different factors including: the organization of the genome, genomic sequence similarity, the viral protein antigenic properties, replication strategies,viron structural characteristics,Pathogenicity, cytopathogenic and physicochemical properties[5]

The genome structure of Coronavirus

Coronaviruses (CoVs) are a group of enveloped viruses containing crown-shape peplomers with 80-160 nM in size ,the virus is non segmented positive-sense, single-stranded RNA viruses (~30 kb) one of the largest among RNA viruses[6], with 5′ cap structure and 3′poly-A tail, means the RNA sequence of the virus can translate to protein directly(need for viral replication). Recombination rates of CoVs are very high because of constantly developing transcription errors and RNA Dependent RNA Polymerase (RdRP) jumps[7]. Two-thirds of Coronavirus RNA encodes the viral polymerase (RdRp), RNA synthesis materials, and two large nonstructural polyproteins that are not involved in modifying the host response (ORF1a-ORF1b). The last third of the genome encodes into four synthetic proteins (spike (S), envelope (E), membrane (M) , (E) glycoproteins, Hemagglutinin Esterase (HE) and Nucleocapsid (N) protein(Figure 1) (Luk et al., 2019 and Tok & Tatar, 2017). The number of accessory proteins and their function is unique depending on the specific coronavirus https://en.wikipedia.org/wiki/Coronavirus.

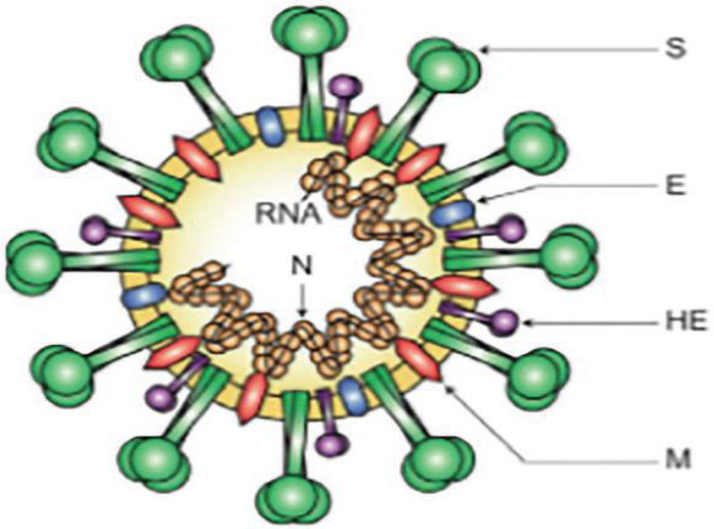

Figure 2: The structures of coronavirus explain structural proteins : Spike protein(S), Membrane protein(M), Hemagglutinin-Esterase(HE) and E: Envelope protein(E) [10]

COVID-19 Symptoms

Diagnosed cases around the world reported similar symptoms, which included the following symptoms, fever, cough, muscle aches and tiredness.Most cases suffered from pneumonia and some of the acute and killer respirational disease [11].

Diagnosis

After the World Health Organization announced the spread of the Corona epidemic, there is concern in the international community and an urgent need to find ways to quickly diagnose and detect vaccines to combat the disease.

Among the many diagnostic methods available, RT-PCR is the most approved one for diagnosing the Corona virus [12]. The time and type of sample gathered have major role in the diagnosis of COVID-2019 using RT-PCR. The main benefit of using RT-PCR in the diagnosis is the exclusion of false positive results, that As both expansion and analysis are concurrent "within a closed system.Different molecular targets within the sigle stranded RNA genome of Coronaviruses can be targeting throughout the PCR assays, these target parts include synthetic proteinst, as envelope glycoproteins spike (S), envelope (E), transmembrane (M), helicase (Hel), and nucleocapsid[13]. In addition to the genes that encode stractural proteins, there are special secondary genes for each species that are necessary in the reproduction of virus, A polymerase (RdRp), hemagglutinin-esterase (HE), and open reading frames ORF1a and ORF1b. WHO recommends first line screening with the E gene assay followed by a confirmatory assay using the RdRp gene.

In the early stage of infection the serum specimens shows negative test for the virus ,while the respiratory speciemns how positive test,this is indicted to the fact that within the first week of the initial symptoms, patients verified rise in viral loads in their superior and poorer respiratory tract[14] . At this stage, it is usually recommended to approve smears from the nasopharyngeal (NP) and/or an oropharyngeal (OP) for scanning or diagnosis,with preferring NP as it more tolerate by patient and safe to the operater in addition it can extent the right position to be tested in the nasal cavity[13]. early infection. It was also confirmed that in the first days of the disease, although the symptoms were mild, the patient carries high levels of virus (Junxiong Pang , Min XianWang , Ian Yi Han Ang et al., 2020).In the late detection with pneumonia patient the seputum and bronchoalveolar lavage should be depended.

Analytical issues

Assay selection

Using immunoassay, this is considered lateral flow assay has rapid diagnosis, thus saving time and low cost. These methods were developed to confirm the antigenic response towered SARS-CoV-2 virus or for confirming the presence antibodies (IgM and IgG] after COVID-19 infections, however, these tests have proven to be inaccurate, depending on "experiments used to detect influenza (Flu) viruses[15]. Monoclonal antibodies generated against SARS- CoV-2 fall within the list of established diagnostic methods (https://www.medrxiv.org/content/10.1101/2020.03.07.20032524v1.

Serological tests can be used to confirm advanced cases of infection with the Coronavirus, and to detecting health provider immunity system efficiency , as it takes a long time to formulate specific responses from immune globulins IgG and IgM.

Cure and Infectivity tested

There are tests that the recovering patient must undergo, and through which results it is possible to determine whether the recovered person must continue in the home quarantine or not. The sample in this period must depend on positive/negative RT-PCR of rectal sample

The potential of therapeutics

1. **Treatment**

Regardless of the socio-economic damage caused by the spread of the Covid 2019, and with the possibility of serious epidemic diseases caused by new strains of this virus, there are no strategies available to provide antivirals to treat such epidemics or to prevent their spread in the future is not available till this moment.. Till now the WHO doesn’t recommend to any antiviral or antibacterial drug to treat the patient with COVID 2019 and consider the most effective treatment to this viral outbreak is the taking the right measures to control COVID-19. Numerous studies have confirmed the absence of a definitive treatment for Coronavirus, and confirmed that the treatments used are only supportive. Both of recombinant IFN and ribavirin have restricted effects versus CoVs infection[6]. Efforts have been made to develop targeted new antivirals after

the occurance of SARS and MERS epidemics, these novel antivirals targeting CoVs proteases, polymerases, MTases, and entry proteins, however, it has not been proven effective in clinical trials [16]. Currently, a new therapeutic trend is being made with the use of plasma and antibodies from convalescent patients [17]. After the outbreak of COVOID2019 during this year, scientists try to find assistant drug to the patient with sever pneumonia :Gao, Tian, & Yang, (2020) investigated that the anti-viral and anti-inflammatory activities of chloroquine may account for its potent efficacy in treating patients with COVID-19 pneumonia. [19] reported their cases patients in the Zhejiang province received treatment with corticosteroid (40-80 mg/day) and gamma globulin (15-20 g/day) for 3-5 days. Rosa & Santos, (2020) identified 24 clinical trials, involving more than 20 medicines, such as human immunoglobulin, interferons, chloroquine, hydroxychloroquine, arbidol, remdesivir, favipiravir, lopinavir, ritonavir, oseltamivir, methylprednisolone, bevacizumab, and traditional Chinese medicines (TCM). There are many anti-coronavirus agents, most of which have not undergone clinical tests. Some of these agents fall within the experiences of the third trials stageare for COVID-19, including remdesivir, oseltamivir, ASC09F (HIV protease inhibitor), lopinavir, ritonavir, darunavir, and cobicistat[3].

Vaccination

Since the diagnosis of global cases of Coronavirus infection until today, there are 15 types of vaccines that are under study as they carry the possibility of application as a universal vaccine for this virus. The scientific principle in applying these vaccines depends on many techniques (such as messenger RNA, DNA-based, nanoparticle, synthetic and modified virus-like particle), These globally recommended vaccines "need about a year to start the first stage of clinical trials. In the meantime, repurposing existing and safe vaccines that induce non-specific immune benefits may be an additional tool.[21] Whereas, the vaccine developed by the BGI was approved in China after the approval of the National Medical Products Administration, and currently it is used in Chinese clinics and observation centers[22]. Mechanistic evidence exists to suggest that vaccination with Bacillus Calmette-Guérin (BCG), can have protective effects against viral infection [21].

Prevention and control

In view of the lack of a vaccine for Covid2019, there are many recommendations that have been adopted worldwide to limit the spread of this disease. The best methods to prevent the spread of infection with this virus are as follows :It is recommendeds to use a face cap and avoids touching the face area with hands, use the elbow arm to cover coughing or sneezing, or it is imperative to use tissue paper that must be disposed of properly, caring for hand hygiene by repeatedly washing it with soap and water for 20 seconds or replacing washing with alcohol sterilization with the use of 60% diluted alcohol, It is also advised to avoid contact with infected people and to keep a distance of not less than 1-2 meters between them.

Conflict of interest

The author confirms that there is no conflict of interest

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الخلاصة

ان الانتشار السريع والعالمي لمرض كورونا واللذي جعل منه مرض وبائي عالمي حث الباحثين والمختصين لبذل الجهد الحثيث لايجاد العلاج اللقاح المناسبين لحفظ العالم من هكذا وباء . الا انه وبالرغم من تلك الجهود الحثيثة الا ان جميع النتائج المستحصلة تؤكد ان جميع ماتم التوصل اليه ماهو الا مجرد حلول مؤقته وان تطبيقها سريريا يحتاج الى مايقارب السنة وبذلك يكون التزام الحجر المنزلي والالتزام بتعليمات الوقاية الصحية هو الحل الانسب من بينها

Biosensors an Alternative Method for Viruses Detection and Diagnosis

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Abstract

Numerous diseases that have killed millions of people were remain undetectable yet, despite the existence of several mechanisms of diagnoses and detection. So, this was not enough, because of the large number of viruses that have not been diagnosed, which led to an urgent need to develop traditional detection devices. in order to make effecting detection, the most important methods of detection is that depend on the biosensors which complained the physical and chemical sensing techniques that can gave effective and important role in diagnosing diseases. There are several types of biosensors can be divided to electrochemical, electrostatic, piezoelectric, and optical fibre sensors. Among them the electrochemical biosensor was fabricated from nanomaterials the best, which represent a typical platform for building the vital sensors to detect the nucleic acid. The review also discussed the future usage to make portability and rapid response times to the small amounts of viruses.

Keywords: Biosensor; Nano biosensor; Viruses detection; Optical biosensor

1.1 Introduction

Yearly global economy bleeding because of viral infections and those diseases spread rapidly which lead to death millions of humans and animals through contamination of water and air. Ebola, AIDS, SARS, MARS and several of other types and finally the COVID-19 are the example for the dangerous disease which comes from viruses. Nowadays, all of these medical issues are not explained yet and need more studies. Hence, the rapid and accurate detection is a significant way especially for those countries have fragile medical systems.

In 1898, the scientist Martinus Begirinc was able to perform the experiments of slaughterers, where he discovered that there is an extremely small factor that can cross through the filters, where he noticed that this factor grows in divided cells and regains its full strength after each time the plant infects the infection and concluded that it must be a living microbe and was The first to coin the name (virus), which is a Latin name meaning poison or poison for an animal or glutinous fluid[1].

The viruses are particles of genetic material surrounds by a protein cover that and protects there , or as the famous immunologist Sir Peter Medawar called it "a bad protein-wrapped news" that structure is called "Verion" [2, 3]. The virion size range is ~10–400 nm in diameter and most viruses cannot be seen under optical microscope it must be viewed with an electron microscope in addition all viruses contain a nucleocapsid which is composed of nucleic acid (DNA or RNA) and a protein coat (capsid), some viruses consist only of a nucleocapsid, but others have additional components, all components are enclosed in envelopes [4-6]. Classifying viruses into families based on genome structure, life cycle, morphology and genetic relatedness [7, 8].

This review is discussed the principles and types of biosensors then discussed extensively the latest findings and new technologies of biosensor that agreement with research of the medical applications to diagnosis viruses.

1.2 Virus type and classification

There are two types of classification that are reliable for classifying viruses the first is ICTV classification which depends on the general information like rank (virales), family (-viridae), under the platoon (-virinae) and type (-virus) [9-12].

The second is Baltimore Classification which invented by David Baltimore, a Nobel Prize winner. The ICV classification system is used in parallel with the Baltimore classification in the modern virus classification [13]. The Baltimore classification system depended on the method for making messenger RNA, as illustrate in fig.1 [14].

(Fig.1)

1.3 Virus detection techniques

Gnarly the indirect methods to detect and identifying the viruses reduces that difficulties to identify the virus and the relation to the disease observed. Furthermore no need to conduct a retrospective study of a population to determine exposure to a virus or the response to a vaccine. So, just measure the antibody that represents the response to the virus of interest which gives full information about the dices. Several methods exist for this purpose. A few of the most commonly used methods include [15].

1.3.1 Virus neutralization (VN)

The virus neutralization (VN) test is depending on the existing of antibody in the tested sample has the virus by observing the cell culture or cytopathic effect, (CPE). If the samples contain antibodies, it will prevent the virus from growing in the cell culture and no CPE can be observed as shown (Fig2) [16].

(Fig.2)

1.3.2 Hemagglutination inhibition (HI)

Certain viruses have a protein on their surface that interacts with red blood cells and is able to attach to them. This property is called hemagglutination and the surface protein of the virus is hemagglutinin.

The inhibition or blocking of this activity is the basis of the hemagglutination inhibition (HI) test Fig. 3. The most well-known virus with this property is the influenza virus [17, 18]. the sample is preparing as presented in (VN) test, by incubated the serum of patients' withe virus and adding the red blood cells. If antibodies are present, the hemagglutination activity will be blocked; if no antibodies are present the virus will agglutinate (bind together).. In this case the red blood cells are the indicator.

(Fig.3)

1.3.3 Enzyme linked immunosorbent assay (ELISA)

"The enzyme-linked immunosorbent assay ELISA is a very popular technique due to the ease of use and low cost" [19]. The ELISA consists of plastic wells coated with either the antigen (virus) of interest or a protein specific to the antigen (virus) of interest. The unknown sample (serum) is allowed to bind to the coated well, an antibody labelled with an enzyme is applied, an indicator is added, and then a colour change is observed[17].The presence of colour indicates to the antibodies and the absence colour is indicates to negative resolute as shown Fig.4[20].

(Fig.4)

1.3.4 Agar-Gel Immunodiffusions (AGID)

The agar-gel immunodiffusion (AGID), also referred to as an agar gel precipitin (AGP) test, involves the diffusion of virus and antibody through an agar (gelatine-like substance), which will form a line of identity where the antigen-antibody complexes form the principles of that detection shows in Fig. 5 [18].

(Fig. 5)

2. Biosensors

The word "sensor" find its origin from the Latin word "sentire "which basically means 'to identify' anything and bio is come from biology. The first and oldest the sensors that we know are basic five human senses: ophthalmoception, audioception, gustaoception, olfacception and tactioception. The working mechanism of these senses is generalized as (a) reception of input signal by the sensory cells because of external stimuli (b) conduction of data towards the brain for interpretation as neurological impulses (c) receptors respond to the stimulus as per instructed by the interoperating centre.With this brief explanation of sense, more methodical and technical definition for sensor could be established which is as follows; it is advice that obtains and responds to stimulus and signals originated from the environment [21-23].

Biological sensor is a device that consists of three main units which are a biometric sensor, a transducer and a digital detector [24-27]. Initially the biosensor interacts with the analyser in one of the physical / chemical reaction methods or other methods, then the transducer converts the reaction into measurable signals in the digital detector [28-30] .[25-27] Biometric sensors provide exceptional performance, easy operation, rapid response, high sensitivity and specificity, portability, relatively small size and real-time analysis (present-day). The clasefecation of biosensor is presented in Fig.6.

(Fig.6)

2.1. Electrochemical biosensors

This type of biosensor works on the basis of redox reactions to quantify the amount of an analytic and produce an electrical current through the system or the potential difference between the electrodes as a result of the oxidation and reduction reactions involving the analytic are using for its quantification in the sample. They have more stable, sensitivity, fast response and lesser interferences as shown Fig. 7 [30, 31].

(Fig. 7)

Electrochemical biosensors have been utilized for a long time to reach a wide range of applications which include nanosemiconductors or nanometal oxide and screen printed electrodes [31, 32]. Briefly, these biosensors monitor any alterations in dielectric properties, dimension, shape, and charge distribution while the antibody–antigen complex is formed on the electrode surface. They can be classified into four major groups including potentiometric, amperometric, cyclic voltammetry, and impedimetric transducers[33] [31]. These biosensors have been employed to detect a variety of biological targets, including proteins, cancer biomarker, nucleic acid, and so on[34-36] [32-34].

2.2. Mass-sensitive sensor (Piezoelectric sensors)

The piezoelectric effect is producing an electric signal as a result to the mechanical forces or after variation the mass of crystal as shows in Fig.8. Commonly piezoelectric material using in sensors is the quartz crystals or some types of ceramic. In these sensors, the crystals are made to vibrate at a specific frequency by the application of electric signal. The oscillation frequency of the crystal depends on the applied frequency[37, 38] [35-38]. For sensing application, a 'bio-

capture' layer is introduced on the surface of the crystal. It consists of a biomolecule that will exhibit specific binding with the analytic. Generally, antibodies are the most commonly employed bio-capture molecules and such sensors are referred to as piezoelectric immunosensors [39-42].

(Fig.8)

2.3. Surface Plasmon resonance

Surface Plasmon resonance (SPR) based sensor yet, depends on the Plasmon oscillates at a particular frequency characteristic of the material. Surface Plasmon's are those species of Plasmon whose oscillations are confined to the surface of the material [43]. Generally, gold and silver surfaces are preferable in SPR biosensors. When electromagnetic radiation hit a metal surface (gold or silver), at a particular angle of incidence the frequency of the electromagnetic radiation matches the frequency of the vibrations resulting in resonance (and hence the name, surface plasmon resonance) as presents in Fig. 9[44].

(Fig.9)

2.4. Optical fibre biosensor

Optical fibre biosensors measures some biomolecules such as proteins, nucleic acids etc.) Because of the attractive properties of fibre optic biosensor such as low cost, efficiency, accuracy, these take place of literature and they are preferred in many applications [45-47].

The basic system of a fibber optic biosensor consists of a light source, an optical fibre, sensing material and a detector. An optical fibre transmits the light and also acts as the substrate for the sensing material [48]. Detector measures the output signal as illustrates in Fig.10. When the reaction occurs between sensing element and the analytic, there is a change in both of physical-chemical and optical properties. This transduction mechanism, generates optical signals, is related with analytic concentration. To measure the optical signals, the difference between incident and output light is determined at the location where the sensing element is fixed. Output light is passing to detector throw the fibre. Collected light (reflected, emitted, absorbed light) is measured on the detector.

(Fig.10)

Optical sensors based on the use of fibre optics can be classified into two different categories (1) intrinsic sensors, where interaction with the analytic occurs within an element of the optical fibre and (2) extrinsic sensors, the optical fibre is using to couple light, usually to end from the region where the light beam is influenced by the measured. This region is external to the fibre but can be attached to it for example by fusion-splicing, gluing, or mechanical connection, that can be easily uncoupled[49].

Optical fibers because of its ability to transmit the light over a long distance and the bio-receptor no need to intimate contact with the sensor thus enabling to a wide range of non-invasive configurations. In addition the adjustment of the refractive index and ability to guide light of different wavelengths and directions at the same time enables the performance of multiple analytic in a single central unit. They can be easily miniaturized at low cost. Thus finding an application for in-vivo measurements; a light guide can carry more information than electric wire due to the temperature effects on the fiber is lower than that of electrodes [48, 50].

There are multiple optical sensors, for example optrode-based optical fibre sensors, fluctuating fibre-optic optical sensors, time fluorescence optical, echo mirror optical sensor, biological interfering sensors, and biological surface resonance sensors. Their detection window is versatile, and they feel multiple types of biomolecules from physiological and biological samples.[51, 52]

2.5. DNA Biosensors

In nucleic acid based biosensors, sensing elements are oligonucleotides, with a known sequence of bases, or a fragment of DNA or RNA. Nucleic acid biosensors are either based on the highly specific hybridization of complementary strands of DNA/RNA molecules or play the role of a highly specific receptor of biochemical/chemical species. Nucleic acid biosensors are of major interest owing to their great promise for obtaining the sequence-specific information in a faster, simpler and cheaper manner compared to the traditional ones[35, 53-55] .

(Fig.11)

1- DNA Hybridisation Biosensors: Complementary DNA base pairing is the basis for the biorecognition process in hybridization biosensors. Short, 20–40 base pair highly target-selective single-stranded DNA segments are immobilized on the electrode surface.

The DNA fragments have to be immobilized in a way that retains their stability, reactivity, accessibility to target analyse and optimal orientation as shows in Fig.11[56]. An electrical signal is produced when target DNA binds to the complementary sequence of the capture or probe DNA in a process called hybridization.

2- SPR-DNA Biosensor : Aptamers are short fragment of single-strand DNAs (ssDNAs)/ RNAs selected in vitro and can bind with a broad range of target molecules like amino acids, drugs, proteins and other molecules with high affinity and specificity. These aptamers are screened from extremely complex libraries of nucleic acids through a process called Systematic Evolution of Ligands by Exponential enrichment (SELEX). Nakamura et al [57] developed a SPR bio-sensor based on screened DNA aptamers having capability to bind micro-cystin very specifically. Screening was done by the in vitro selection method of twelve rounds and obtained a sorbent specifically suitable for micro-cystin detection. The sensitivity and precision of micro-cystin detection was not as high compared with the methods reported previously and can be further improved by using high affinity aptamers as presents in Fig.12.

(Fig.12)

3- Electrochemical DNA Biosensors: Among the various devices designed so far, electrochemical DNA Biosensors have attracted more attention due to their high sensitivity and rapid response. Electrochemical devices are very useful for sequence-specific bio-sensing of DNA [58]. The continuous development of the sensing devices led to enhancing the sensitivity and reduce the size by miniaturization technology make them excellent tool for DNA diagnostics. However, that enhancement makes the electrochemical detection of DNA hybridization more accurate for detect small currents at fixed potential. Electrical modes were developed for detection of both label-free and labelled objects (Fig.13) . The immobilization of the nucleic acid probe onto the transducer surface plays an important role in the overall performance of DNA biosensors and gene chips [59, 60].

(Fig.13)

2.6 Nanomaterials biosensors

A sensitive and continues monitoring of biological analytes, like biomolecules "(protein, lipid, DNA and RNA), and biological cells (blood cell, virus and bacteria), is essential to assess and

avoid risks for human health" [61]. the analytical by Nanobiosensors devices introduce new ways to detect the tiny changes in the bio systems from the combining the biologically sensitive element with nanostructured transducer, that make us to understand the molecular detection of biomarkers associated with diagnosis of disease and detection and detection of infectious organisms. Nanobiosensors show certain advantages over laboratory and many field methods due to their inherent specificity, simplicity and quick response [60, 62].

1-Carbon nanotube : The application of carbon nanotubes (CNTs) in nanobiosensors has become the subject of intense investigation since its discovery in 1991. Such considerable interest reflects the unique behaviour of CNT, including their high electrical conductivity, excellent biocompatibility, chemical stability and mechanical strength. CNT with the advantages of high surface area as show in Fig.14, fast heterogeneous electron transfer, and long-range electron transfer, has been widely used to develop nanobiosensors in the last decade. The first usage of CNT modified electrode for biosensing was reported in 2003 by Wang and Musameh[63-65]. Biomolecules (e.g., proteins and DNA) can also be electrostatically adsorbed onto the surface of CNTs and can be attached to

(Fig.14)

2- Optical Nanobiosensors: Due to their high sensitivity, optical transductions are one of the widely used transduction methods for biosensing. Optical biosensors utilize the principle of optical measurements [66] for example absorbance, scattering, interferometry, surface plasmon resonance (SPR), fluorescence and chemiluminescence. Most of the well-known, label-free optical nanobiosensing techniques are based on SPR, waveguide, and interferometry transduction mechanisms. The SPR phenomenon occurs when polarized light hits a metal film at the interface of media with different refractive indices. SPR technology was first demonstrated by Leidberg et al in 1983 [67]. Among label-free, optical aptamer-based nanobiosensors, SPR has shown great promise as they provide label-free detection and real-time quantitative analysis as well. In another report, Laura et al. investigated the biosensing of RNA with a DNA-triplex affinity capture method [68]. They targeted RNA sequences with secondary structures as presents in Fig.15. The approach was based on selecting DNA tail-clamps as affinity bio-receptors that have the ability of create a triplex helix with target RNA using the SPR detection method with limit of detection of 50 fmol [66, 69, 70].

(Fig.15)

3- Electrochemical Nanobiosensors : In potentiometric nanobiosensors, the ion-sensitive electrode determines changes in ionic concentrations. Many enzymatic reactions produce hydrogen ions, ammonia, water molecules, and carbon dioxide as by-products during the reaction. The most common electrode is a pH-sensitive electrode [63, 71-75] [69-75]. Similarly, CO_2-sensitive or NH3 sensitive electrodes can determine the potential difference caused due to the differences between the reference and the sensor electrode. The potential difference will be proportional to the concentration of the target molecule in the sample. Although potentiometric nanobiosensors are sensitive, the major problem is the sensitivity of the enzyme to the produced hydrogen and ammonium ion concentrations [76]. Ion-selective field effect transistors (ISEFT) are a low-cost device being used for the miniaturization of potentiometric biosensors. For example, during open-heart surgery, intramyocardial pH can be monitored using ISFET nanobiosensors as shown (Fig.16)

(Fig.16)

3. Conclusions

Through this review, we looked at the most important biological sensing techniques like biometric electrochemical, electrostatic, optical fibre and Nanoscale sensors which using to detect various types of viruses. Those biosensors were more efficient than the traditional methods and more stable, sensitivity and response. However, nanoscale biosensors were the most effective due to the high surface area relative to volume, so the nanomaterials are sensitive to small changes in surface chemistry and thus enable the sensors to achieve extremely low detection limits. That can open the door to significant applications and make us to predict how the viruses contaminate our environment.

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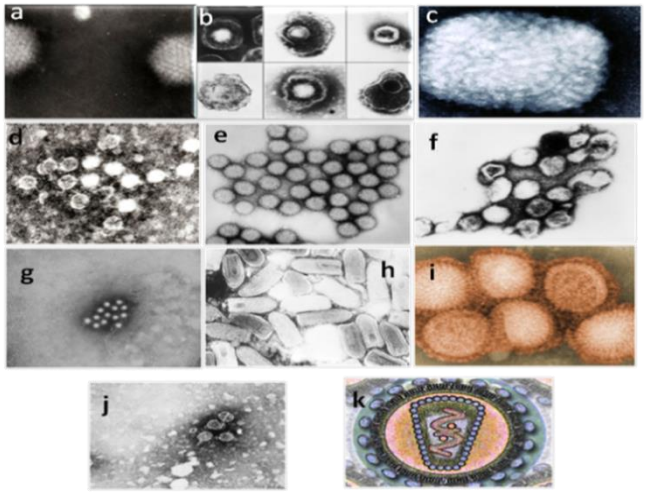

Fig.1. Baltimore Classification of viruses are classified to: 1- two-chain DNA virus (a) adenoviruses, (b) herpes viruses, (c) smallpox viruses, 2- Single-chain DNA viruses (d) small viruses) 3- two-series RNA viruses (e) criminal viruses. 4- positive single-stranded RNA viruses (f) picornavirus. (g) streptococcal viruses. 5- Single-stranded RNA viruses (h) orthomicsoviridae. (i) viral viruses. 6- MonoRNA Reverse Transcription Viruses (j) retrovirus and 7- Reverse DNA replication viruses (k) hepatic viruses.

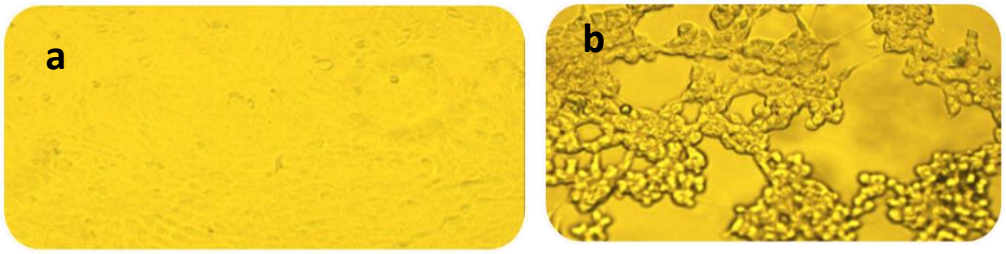

Fig. 2 . (a) Normal bovine kidney (BK) cells (b) Bovine kidney (BK) cells showing cytopathic effects (CPE) of bovine herpesvirus

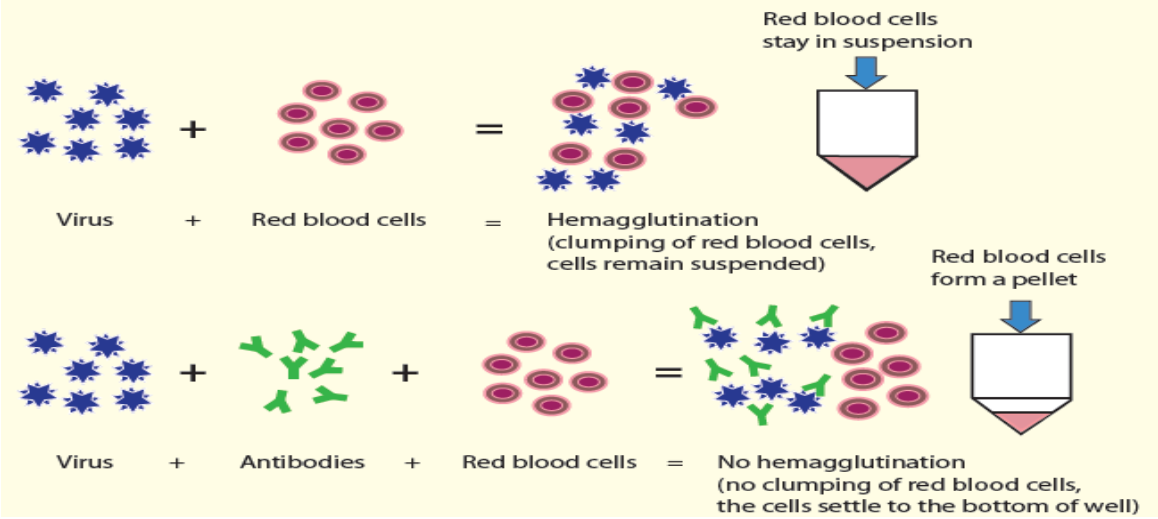

Fig.3. hemagglutination (HA) and hemagglutination inhibition (HI) test

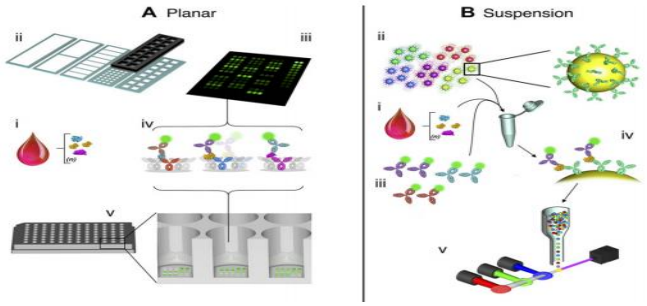

Figure 4. Enzyme linked immunosorbent assay (ELISA) / enzyme

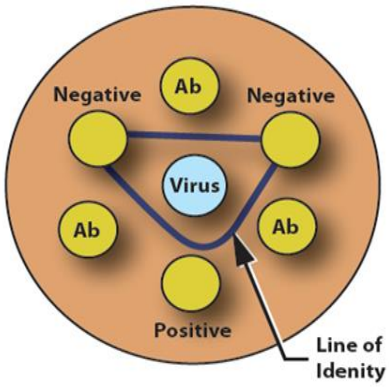

Fig.5. schematic of an agar immunodiffusion (AGID) or agar gel precipitin (AGP) test . "AB" represents a known antibody to the known virus in the middle

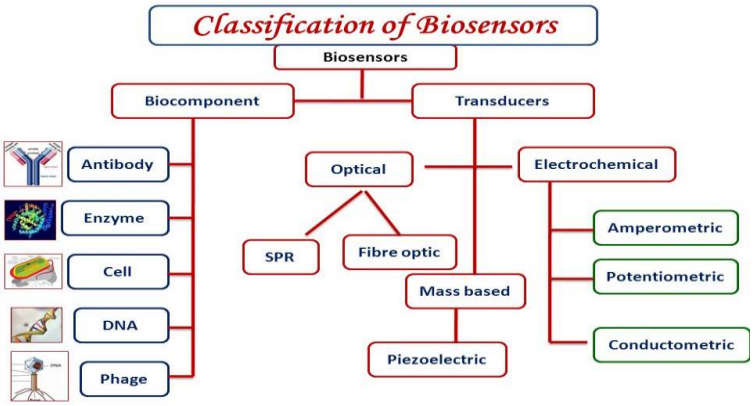

Figure 6 . Classification of Biosensors depends on the type of operation

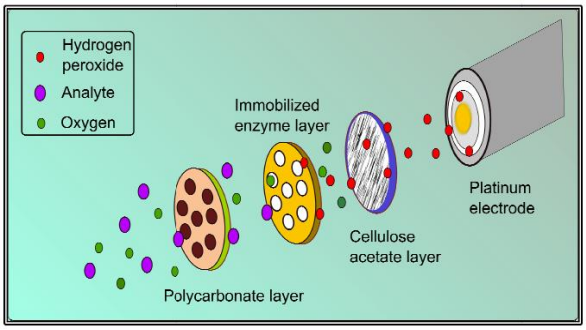

Figure 7. A schematic representation of

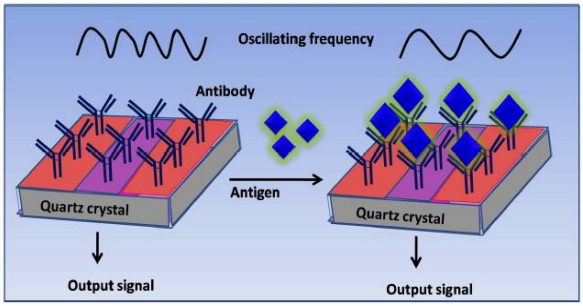

Fig.8. The principle work of piezoelectric immunosensors

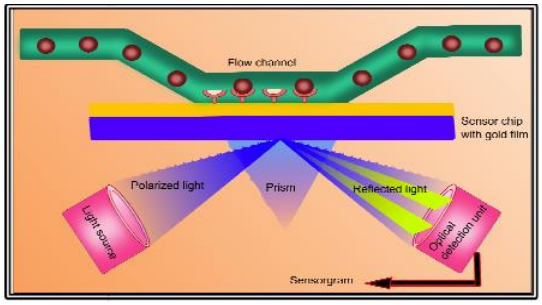

Figure 9. The Surface plasmon resonator (SPR) biosensor

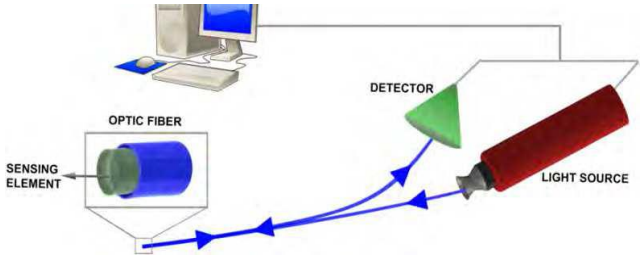

Figure 10. The Fiber Optic Biosensor shows the parts of system

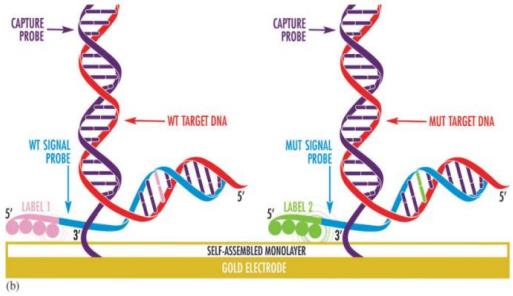

Figure11. Strand of the target DNA on the surface of biosensor.

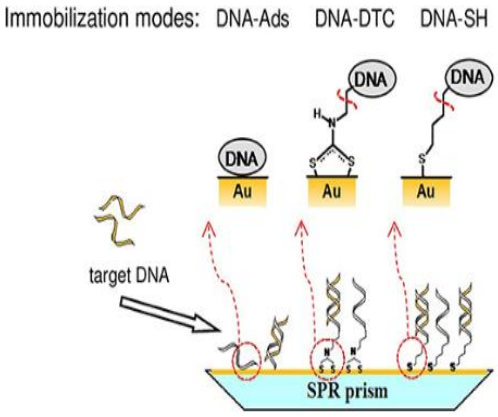

Figure12. Schematic representation of the DNA-immobilization strategies examined in the

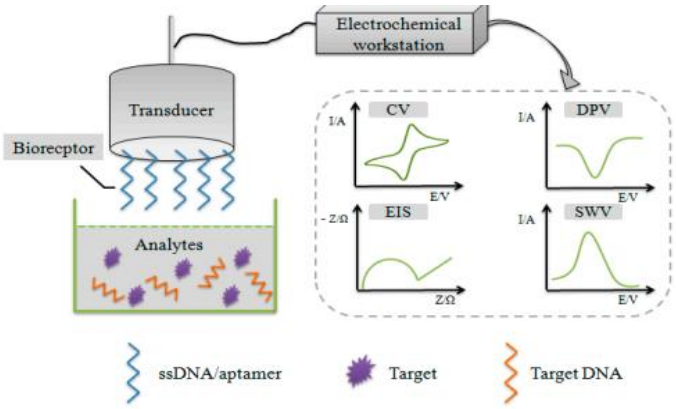

Figure13. Schematic diagram of electrochemical DNA biosensor

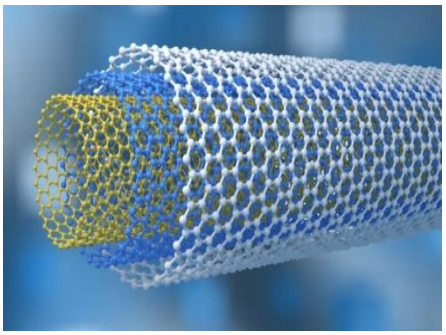

Figure14. Carbon nanotube

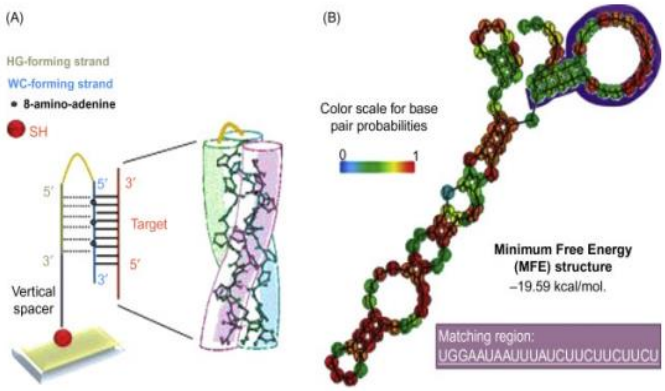

Figure 15. (A) Design of the amino-modified tail-clamp bioreceptor used in this study (B) Predicted

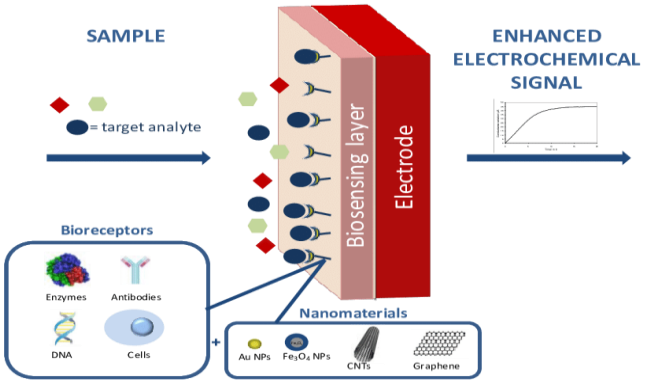

Figure 16. Main constituents of a NM-based

الخلاصة

العديد من الأمراض التي اودت بحياة الملايين من الناس لا تزال غير معروفة حتى الآن ، على الرغم من وجود العديد من آليات التشخيص المختلفة والتي لم تكن كافيةً بسبب العدد الكبير من الفيروسات التي لم يتم تشخيصها او معرفتها بعد. مما أدى إلى الحاجة الملحة لتطوير أجهزة الكشف التقليدية لاجل إجراء عمليات كشف اكثرفعالية وسرعة ، لذالك تعتبر طرق الكشف التي تعتمد على أجهزة الاستشعار الحيوية التي تستند على مزيج من التقنيات الفيزيائية والكيميائية التي من الممكن أن يكون لها دورًا فعالًا ومهمًا في تشخيص الأمراض. وعلى هذا الاساس هناك عدة أنواع من هذه المستشعرات الحيوية والتي يمكن تقسيمها إلى مستشعرات ذات اثر كهروكيميائية و كهرباء ساكن و كهروضغطي وتلك التي لها اثر ضوئي . من بين هذه الانواع تعتبر اجهزة الاستشعار البيولوجي الكهروكيميائي من أفضل المستشعرات والتي تمثل ادات نموذجية لبناء أجهزة الاستشعار الحيوية للكشف عن الحمض النووي وومختلف التاثيرات الكيميائية المرافقة للفايروسات. وهذا سيفتح الباب واسعاً لمزيد من التطويرالمستقبلي لتحسين زمن الاستجابة وجعلها اسرع واعطاء نتائج اكثر دقة ولكميات صغيرة من الفيروسات بالاضافة الى تقليل الحجم وجعلها قابلة للحمل.

الكلمات المفتاحية: مستشعر حيوي, مستشعرحيوي نانوي, كشف الفاايروسات, المستشعرات الحيوية الضوئية

Decreasing COVID-19 effect by inhalation of some medical plants vapor

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Abstract

COVID-19 became the major problem in the world from its first reported in Wuhan, China at December 2019. Despite the international efforts to find drugs or vaccine against the COVID-19, until now there's no a clear evidence for this efforts. For this reason, in this review we focus on some specific medical plants, *Artemisia herba-alba* and *Eucalyptus globulus* that known by its properties and using traditionally in healing the respiratory system diseases. These plants were used for thousands of years in the middle east to prevention and healing from the cold diseases. Where it is possible to using the vapor of *A. herba-alba* and *E. globulus* by inhalation, alternately, to decreasing the acute effects of COVID-19 on the resperatory system with faster, safer and less toxicity methods.

***Key words*:** COVID-19, *Artemisia herba-alba*, *Eucalyptus globulus*, inhalation.

Introduction

A new strain of human coronavirus elicited in 2019, that known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The diseases related to this virus were first arise in Wuhan, China, in December 2019 then spread globally. The main way COVID-19 is spread to others via respiratory droplets when an infected person coughs or sneezes. This is similar to how influenza is spread (1). The common symptoms include fever, cough, shortness of breath and other less common symptoms as sore throat, muscle pain and sputum production (2).

On 30 January 2020, the World Health Organization (WHO) Director-General announced that the novel coronavirus COVID-19 outbreak became a public health emergency of international concern (1).

Despite the big attempts to find a medicines or vaccine to COVID-19, untill now according to WHO, the Centers for Disease Control and Prevention (CDC), and the U.S. Food and Drug Administration (FDA), currently there are no medications or vaccines proven to be effective for the treatment or prevention of the COVID-19 (1,2,3).

Since the nature provides another more, reliable, safer, available and cheaper source of antiviral agents, clinical research of the present era has confirmed the ability of many medicinal plants in

treating various viral diseases, while many recent scientific research have discovered the exact mechanism by which many different plants provide their therapeutic advantages (4).
Medicinal plants are important resources for the phytochemicals that have gained wide importance in the last decades, when it possess great potential in drugs discovery. However, our knowledge about the herbal drugs is compulsory for identify and select the suitable plant to handling with specific disease (5).

Inhalation has been utilized as useful method for deliver the medicines since ancient times, and the benefits of delivering medication directly to the affected site, the lungs, have been understood for more than two hundred years. There are rich history for using the inhalation thereapy during the different ages and it was being practised throughout the world. The inhalation of the vapour of black henbane is recorded in the ancient Egyptian Ebers papyrus (1,554 BC); Egyptian physicians take the plant and threw towards hot bricks, leading to that the alkaloid contents of the plant to vapourise so that the patient who cannot breath to inhale the vabor of the plant (6).

In this review we focus on some plants that can be used against the sever effects of covid-19 virus on respiratory system.

Artemisia herba-alba

Artemisia herba-alba Asso (white wormwood) this plant is also known as desert wormwood and in Arabic culture it is known as 'shih' (7). Its commonly grows on the dry places of the mediterranean, Western Asia and Southwestern Europe. It commonly used in a herbal medicine as antiseptic and antispasmodic. For long times this plant has been used by the local inhabitance of several cultures in order to prepare the folk medicines to curing diabetes and hypertension between natives people (8). Shih is an aromatic plants known as bitter tasting leaves. Aqueous extracts obtained from aerial parts of the plant expresse anti-oxidant and anti-microbial properties (9). The herbal tea prepared from this species exhibits antibacterial, analgesic and anti-spasmodic effects. This plant is also utilized as a fodder plant for the livestock in plateau regions (10).
Also shih consider as one of the most common plants of semi-desert areas. Used as a fuel and a pasture plant, additionally the wormwood or shih, according to Bedouins the natives in deserts, can be used by inhaling the smok of the plant. The Santolina alcohol is the active component in *Artemisia herba-alba* that exhibits the antimicrobial action (11).

Eucalyptus globulus

E. globulus, also referred to as blue gum or Tasmanian blue gum tree, is one of the Myrtaceae family. These plants are evergreens that are spreading in Tasmania and southeastern Australia, and these plants growing in subtropical regions of the world including Africa, South America, Asia, southern Europe (Spain and the Black Sea region) and the U.S (12, 13).
A huge a mounts of researchs that dealing with *Eucalyptus globulus* reported the medical properties that possess the diverse pharmaceutical and medicinal characteristics due to the

presence of differents phytochemicals and volatile components. Different and diveresed properties showed by this plant include antiperiodic, antiphlogistic, antiseptic, astringent, deodorant, anthelmintic, diaphoretic expectorant, inhalant, insect repellant, rubefacient, sedative yet stimulant, suppurative, and vermifuge (14, 15).

Furthermore, the phytochemicals agents that found on the leaves of eucalyptus have been commonly used to treat acute benign bronchial disease, and to relieve nasal congestion in the common cold. Moreover, the using of eucalyptus for treating catarrh of upper respiratory and bronchitis has been reported (16). The *E. globulus* oil contain the Eucalyptol that known as anti-inflammatory propereties (17).

Additionaly the vapor from a hot water extract of the dried leaves can be inhale to retrieve symptoms related to respiratory infections, such as cold, flue and sinus congestion (18).

Conclusion

In this review, we tried to focus on same medical plants that used in folk medicine for centries without any problems. These plants and its extracts used against respiratory system diseases. By boiling the aerial part of dried *Artemesia herba-alba* in water and inhalation the vapor by patients with covid-19 and the dried leaves of *Eucalyptus globulus* can used by the same method, alternatly. The application of this method must be done under medical observation for patients and suspects persons and not allow to use of these plants by citizens to avoid any unsuspected side effects that hurt health.

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الخلاصة

اصبح المرض الناتج من فايروس كورونا المعروف بالكوفيد-19 المشكلة الرئيسية في العالم بعد منذ ان تم الابلاغ عنه في ووهان, الصين في شهر كانون الثاني 2019. وبالرغم من الجهود العالمية التي بذلت لإيجاد علاجات او لقاح لهذا الفايروس لكن حتى الان لا يوجد أي دليل واضح لهذه الجهود. ولهذا السبب, في هذه المراجعة حاولنا ان نوجه التركيز على بعض النباتات الطبية نبات الشيح *Artemisia herba-alba* و نبات الاوكالبتوس *Eucalyptus globulus* والمعروفة شعبيا بخصائصها في معالجة امراض الجهاز التنفسي. هذان النباتان تستخدمان منذ الاف السنين في الشرق الاوسط وبطرق بدائية من اجل الوقاية ومعالجة امراض البرد. حيث من الممكن استخدام بخار هذين النباتين نبات الشيح و نبات الاوكالبتوس بواسطة الاستنشاق وبالتبادل لتقليل التأثيرات الحادة للكوفيد-19 على الجهاز التنفسي بطريقة سريعة ,امنة وقليلة السمية .

الكلمات المفتاحية: كوفيد-19, نبات الشيح, نبات الاوكالبتوس, الاستنشاق .

Sterilizing of paper and metal currencies during transactions

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Abstract:

The scientific studies around the world have recently shown that viruses and bacteria can remain on paper or metal surfaces, which can be transmitted by contact between hands, clothes, and other materials during shopping and thus may be transferred to the surfaces of cash currencies. Therefore, the current research aims to find a way to sterilize currencies while shopping by designing and manufacturing a paper currency sterilizer based on the property that high temperature and ultraviolet rays can act as a sterile factor and thereby limits the presence of viruses and bacteria on the surfaces. The device does not affect the paper material of currencies because the heat and the UV rays are controlled with shortening period of time that the materials can be exposed to it. The basic design and initial manufacturing of the device were implemented with an appropriate cost and applicable mechanism to the local market. Therefore, this project represents as a way that can lead to reducing the spread of epidemics and diseases and thus leading to a healthy life free of diseases, not only in difficult times but also in the normal conditions of daily life in the future.

***Keywords*:** Coronavirus, sterilization, currencies and transactions.

1- Introduction:

There are many viruses and bacteria spread on the surfaces of different foods and objects, especially these air exposed in markets and shops. Conducting of the direct cash of commercial transactions are considered as a carrier medium for viruses and bacteria between the contaminate hands and clothes that contact the money, especially when it includes the payment and returns (knowing that the current currency in Iraq is paper only). The process of buying and paying through the card (Master Card or others) is still limited use in Iraq makes the issue more critical, as shown in Figure (1).

The World Health Organization (WHO) has indicated that the Coronavirus (COVID 19) can be transmitted through a cash transaction because the contact between contaminated hands and cash money and this leads to extending the spread of the virus [1]. Many of recent research confirms

that the Coronavirus can remain active on the paper and metallic surfaces [2,3,4,5] for a while time. That prompted researchers to suggest methods to prevent and limit the spread of the virus. Also the reports illustrate that the virus is affected by high temperature or ultraviolet radiation [6,7,8]. Therefore suggest an appropriate and healthy mechanism for conducting cash transactions between people could help to make shopping safer. Thus the current project aims to design and manufacture a device in order to sterilize the currencies (paper or metal) during the trade exchange between the seller and the buyer. Through applying the heat and ultraviolet radiation at an appropriate concentration under the property of the high temperature and ultraviolet rays are acting as sterile factors and reduce viruses and bacteria on the surfaces. This project can be expanded to include foodstuffs and devices as the heat and radiation do not affect them due to the short time that the material is exposed.

Consequently, this project represents one of the ways that can lead to reducing the spread of epidemics and diseases, leading to a healthy life free of diseases, not only in difficult times but also in the normal daily life in the future.

The first stage of accomplishing the research project included the theoretical framework and initial design of the device. The second stage will be the carry out of the experimental work by manufacturing a prototype of the device with all parts and accessories. As for the third stage, it is represented by conducting biological tests, including bacterial or viral examination of a group of paper and metallic surfaces before and after entering the device, in the purpose of applying in the local markets.

2- The effect of temperature and ultraviolet radiation on the virus life and its period stay life on the surfaces

It is not known certainty how long the virus that causes COVID-19 can remain alive on the surfaces. However according to preliminary information, it appears to be similar to other corona-viruses, studies indicate that corona-viruses can stay active in a few hours or for several days depends on different conditions such as surface type, temperature, or environmental humidity. Also, the risks of infection with the virus that causes COVID-19 disease by expelling transport and shipping that exposure to various conditions and temperatures are minimal risks [1]. Due to the novelty of the subject of the coronavirus epidemic, most studies are represented by articles based on the available data and most of them have a converged result regarding the period of virus lifetime on different surfaces, as shown in Figure.(2)

Some studies showed that the coronavirus could live below 27 heat degree on surfaces and objects. When the temperature increased, the virus life is significantly decreasing. Moreover, when the temperature exceeds 55 degree, the virus dies immediately, even some recommended using hair accessories at home to eliminate the virus at once, as shown in Figure (3).

Some studies also indicate that the ultraviolet rays (UV) can disrupt previous coronaviruses such as SARS and respiratory syndrome in the Middle East. Therefore it is reasonable to expect that these factors could have a similar effect on the new coronavirus, this drove companies to use the

UV rays in order to disinfect hospitals, rooms, and even face masks**.**

3- Experimental work

The new device is designed to contain a mechanical mechanism includes a motor with a conveyor belt used to pass cash (or foodstuff) and in two-way from the seller to the buyer and vice versa. That can be controlled by buttons on the side of the seller, which allows repeating the sterilization cycle many times backwards and forwards when needed. In addition, two heat sources can reach a temperature of (100 ^{o}C) with a regulator are provided. Moreover, there are two sources of ultraviolet radiation with a high concentration also with a regulator to ensure sterilization of materials to an acceptable degree. The device has many advantages, for example, the low cost of the device and the device is too easy to use and has small size. All these features allow the device to be manufactured in large numbers and thus can be distributed to the maximum possible number of places that using commercial cash transactions, as shown in Figure (4).

4- Obstacles to applying in real life

It is expected that there will be some obstacles when applying the device in practical life, and this is normal for applying any new idea. For example; there is a difficulty of convincing sellers because it not usual to use such a device and also some people do not take the spread of the disease seriously. In addition, the process could cause a delay in trade transactions although the process takes a few seconds. Moreover, there is a limitation of the use of the device by street vendors because of the location and continuous movement.

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Figure (1): The process of direct cash transactions in commercial transactions in Iraq, and touch the money to hands and clothes.

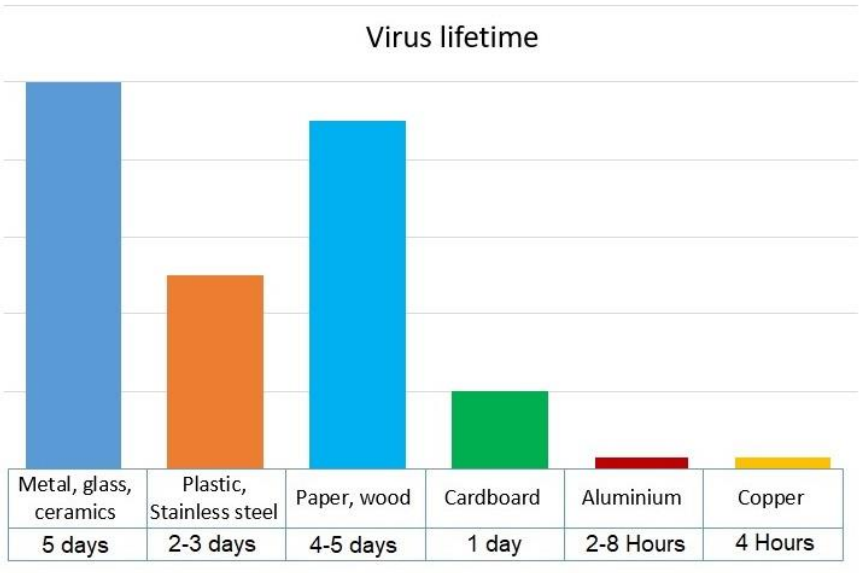

Figure (2): The period that the coronavirus can stay on different surfaces [2,3,4,5].

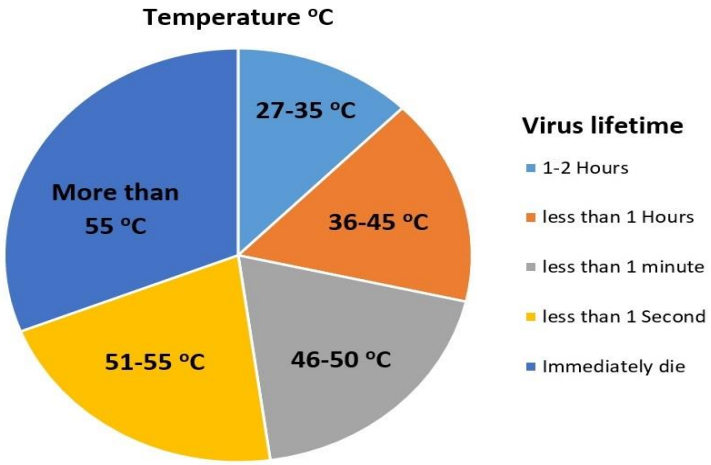

Figure (3): Influence of temperature on Coronavirus lifetime [6,7,8].

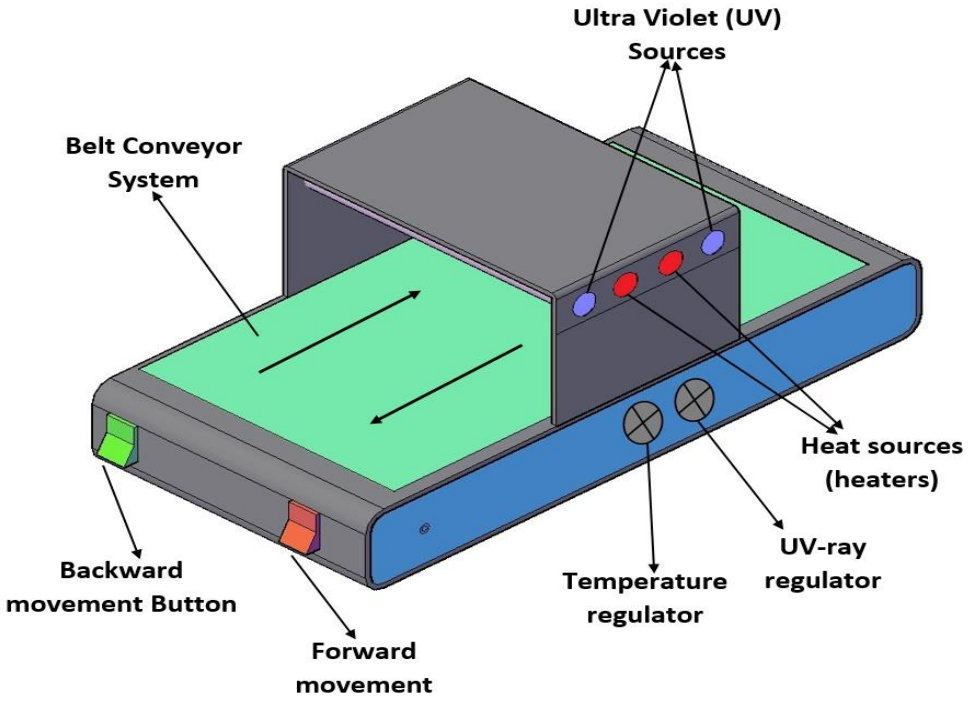

Figure (4): The essential design of the new currency sterilization device.

تعقيم العملات الورقية والمعدنية خلال التعامل التجاري

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الخلاصة:

اوضحت الدراسات العلمية مؤخرا بان الفيروسات والبكتريا ممكن ان تبقى موجودة على السطوح الورقية اوالمعدنية، والتي ممكن ان تنتقل عن طريق التلامس بين الايدي والملابس والمواد الاخرى اثناء التسوق وبالتالي ممكن ان تتنتقل الى سطوح العملات النقدية. لذلك يهدف البحث الحالي الى ايجاد وسيلة لتعقيم العملات اثناء التسوق وذلك عن طريق تصميم وتصنيع جهاز تعقيم العملات الورقية بالاعتماد على خاصية ان الحرارة العالية والاشعة فوق البنفسجية تعمل كعوامل معقمة وتحد من وجود الفيروسات والبكتريا على الاسطح. الجهاز لا يؤثر على المادة الورقية للعملات بسبب الحرارة والاشعة المسلطة لاتؤثرعليها بسبب قصر الفترة الزمنية التي ممكن ان تتعرض اليها المواد.

تم تنفيذ التصميم الاساسي والتصنيع الاولي للجهاز وبكلفة مناسبة والية قابلة للتطبيق في الاسواق المحلية. ولذا فان هذا المشروع يمثل احدى الطرق التي يمكن ان تؤدي الى الحد من انتشار الاوبئة والامراض وصولا الى حياة صحية خالية من الامراض ليس في اوقات الصعبة فحسب وانما في الظروف الاعتيادية للحياة اليومية مستقبلا.

الكلمات الدالة: فيروس كورونا، تعقيم، العملات الورقية

The role of bioactive compounds and functional foods to enhance the immune system and fight off viral diseases

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Abstract

Viral infections role in human diseases are critical and current outbreaks in the beginning of globalization and relieve of travel have minimized their avoidance as a serious problem in conservation community health. Thus, many viruses need an appropriate vaccines and successful antiviral therapies then development in immunization and drug discoveries considered as a mandatory. According to many published studies natural products and herbal medicines are an excellent source for novel antiviral drugs discoveries due to the presence of bioactive constitutes in their contents, especially functional foods that offer valuable health properties. The COVID-19 tends to extend fast and influence people across the globe thus, it is important to discover and to understand how bioactive compounds and functional foods considered valuable in the fight against viral diseases.

Key words: Covid-19, Viral infection, antiviral therapy, Bioactive compounds

Introduction:

The available data from the epidemiological studies for COVID-19 since the time when discovered in December 2019 [1] suggested the incubation time was anticipated to be 1–14 days, while the period for consecutive interval was anticipated to be 4–8 days. The time for COVID-19 virus to double in the number of infections was estimated for about 3–7 days [2]. Recently a new published study was demonstrated that among other patients there is about 5% of severe acute respiratory syndrome coronavirus-2 with moderate influenza-like symptoms [3], mild or moderate symptoms were recognized from these patients, so during the infection they exist dynamic in the community, which supports the opportunity of continuous spread [4].

From the development in the field of nutrition, scientists may possibly separate and determine nutrients required for human survival and growth. The collaboration of sciences and the public need originates the functional food science which is the melding on food science, medicine, and nutrition as it gives sustenance that crosses between pharmaceuticals and foods. Specially, studying components of food and their health benefit effect by researchers. They calculate changes in health and homeostatic performance through the use of indicators and biomarkers in the body. Besides, there are many important issues that the food supply and food industry chain have to concentrate on in our new era. Firstly, the protection of consumer habits by adopting healthier diets and to provide a bioactive ingredients and functional foods to support their

immune system that the need for these products may increase and be critical. Also, avoiding the spread of virus between retailers, producers and clients' food safety considered as a significant issue. In addition, the food biological orders sustainability in the era of COVID-19 is another concern which should consider in order decrease related crises in the future [5]. The rapid spread of coronavirus and its capability to transmit from person to another urged scientists to find a new approaches for treatment of the coronavirus-2 (SARS-CoV-2) and to explore the food systems in this era.

Corona virus:

Among the Coronaviridae family is the corona virus which exist as a single-stranded RNA (ss-RNA) virus. The CoV family contained numerous species, attacks upper respiratory tract causing gastrointestinal infections in birds and mammals. A global threat with high mortality in 2003 was caused by the known human CoV (HCoV) which is the severe acute respiratory syndrome coronavirus (SARS-CoV) [5]. The novel coronavirus SARS-CoV-2 is a fast spread disease; Zhou et al. [6] showed that bat coronavirus and SARS-CoV-2 have a resemblance of gene sequence up to 96.2% by using sequencing technology in his research.

Natural products and herbal medicines

Herbal and Chinese medicines were helped in the cure of viral infections, for example, Astragulus membranaceus and ginseng root which are used in viral respiratory diseases prevention [7-9], whereas the active herbal remedy Pelargonium sidoides is used for the inhibition of respiratory viruses' replication [8]. Approved previous researches showed an evidence for H1N1 and SARS diseases prevention in the elevated-threat population and also mentioned that Chinese herbal formulas could be an for the obstacle of COVID-19 [7, 9]. The bioactive derivatives of plants phenolic compounds and flavonoids which isolates from litchi seeds, quercetin, and kaempferol) those are used to reduce SARS 3-chymotrypsin-like protease (3CLpro) enzymatic activity and this inhibition means a control on the replication process of SARS-CoV and thus might considered as an active cure against SARS-CoV-2 and helpful treatment agent for patients with COVID-19 [10]. Nowadays, seeking products to boost our immune system is among our top health aims globally and it could increase in the future.

Several natural products and herbal medicines proposed affecting mechanisms against corona virus:

Saikosaponins (A, B2, C, and D) are documented to possess antiviral effects against HCoV-22E9, Saikosaponins are naturally occurring triterpene glycosides isolated from medicinal plants such as Bupleurum spp., Heteromorpha spp., and Scrophularia scorodonia, [11]. The HCoV-22E9 infection early stages including viral attachment and penetration could be prevented by the use of natural compounds. In addition, Artemisia annua, Pyrrosia lingua, and Lindera aggregata extracted from Lycoris radiata showed an anti–SARS-CoV effect from a selected investigation documented using Chinese medicinal herbs [12]. Natural inhibitors such as the nsP13 helicase and 3CL protease against the SARS-CoV enzymes have also been recognized including myricetin and phenolic compounds from Isatis indigotica and Torreya nucifera. Also,

using of extracted water from Houttuynia cordata which identified to show different antiviral mechanisms against SARS-CoV [12].

Conclusions:

Various viruses still need available antiviral cure and a protective vaccine also destroying viral infections seems hard. However, natural active compounds could be the perfect source of biodiversity for finding novel antiviral drugs. Many researches showed that herbal extracts and natural products are recognized to have strong antiviral effect and their findings could aid to invent medicine and remedial leads. As numerous studies in this field are just beginnings, next investigation in distinguish the bioactive contents, defining and understand the proposed mechanisms, in addition to evaluate the efficacy and probable claim in vivo is optimistic for the reason to find effectual antiviral cures.

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الخلاصة:

تعد العدوى الفيروسية التي هي من ضمن الامراض التي يتعرض لها الانسان اثر ودور في حياتنا، كما ان تفشي الامراض مع بداية العولمة والتخفيف من القيود على السفر قللت من تفاديها كمشكلة خطيرة في الحفاظ على صحة المجتمع. وبالتالي ، تحتاج العديد من الفيروسات إلى لقاحات مناسبة وعلاجات ناجحة مضادة للفيروسات ، ثم تطوير التطعيم واكتشافات الأدوية صار يعتبر حاجة الزامية. وفقا لكثير من الدراسات المنشورة عن دور المستخلصات الطبيعية والأدوية العشبية كمصدر ممتاز لاكتشافات الأدوية المضادة للفيروسات الجديدة بسبب احتواءها على مكونات نشطة بيولوجيًا، وخاصة الأطعمة الوظيفية التي تقدم خصائص صحية قيمة. مع انتشار فيروس كورونا بصورة سريعة والتأثير على الناس في جميع أنحاء العالم وبالتالي ، من المهم اكتشاف وفهم كيف أن المركبات النشطة بيولوجيًا والأطعمة الوظيفية تعتبر ذات قيمة في مكافحة الأمراض الفيروسية

Study The Epidemiological Position On The Corona Pandemic Through The Iraqi Ministry Of Health

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Keywords: Coronavirus, COVID-19, SARS-CoV-2, Pandemic, The Iraqi Ministry Of Health.

Introduction

Coronavirus is a large group of viruses that may cause respiratory tract infections that can range from mild to lethal disease in animals and humans ،mild illnesses include some cases of the common cold , while more lethal varieties can cause SARS, MERS, and COVID-19 [1][2][3].

COVID-19 of the same family of SARS and MERS is the second most dangerous type an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) the most dangerous at all during the past 100 years [3][4] .

At the beginning of identifying in December 2019 in Wuhan, the capital of China and it has since spread globally [5][6].

The World Health Organization recently recognized that a pandemic will spread in the world at rates that may reach more than a billion people like The dangerous Spanish flu that killed 100 million people[7].

Common symptoms include fever, cough, and shortness of breath. Other symptoms such as fatigue, muscle pain, sore throat, abdominal pain, diarrhea, and loss of sense of smell [7][8][9]. The incubation period ranges from two or five days to fourteen days for symptoms to appear [8][10] While most cases lead to mild symptoms, some progress leads to viral pneumonia (severe acute respiratory syndrome coronavirus) and failure most organ, especially the lungs [11] [12].

The virus is spread mainly by infected people through coughing, sneezing or speaking. [13] [14] [15] Drops carrying the virus fall to the ground or onto surfaces. [13] [16] [17] The virus can live on surfaces for up to 72 hours. [18] The people may also become infected by touching a contaminated surface and then their face. [13] [14] Or contact with the person during the first three days after the onset of symptoms [19]

The Corona virus spread in Iraq on February 24, 2020 in the city of Najaf, when it examined a sample of an Iranian religious student of nationality. The result was positive for his infection with the Corona virus, and the Ministry of Health of Iraq confirmed the first infection recorded in Iraq. Then other cases were detected from COFEID-19.[20]

After registering infections in Iraq, the Iraqi authorities have taken extensive measures to contain the virus, including the suspension of studies in schools and universities until March 21,

the prohibition of movement between governorates, the closure of public places, such as mosques, cafes, cinemas and parks , and the banning of foreign arrivals from 13 countries, and preventing Iraqis from travel to it [21].

Corona virus cases have been confirmed in all nineteen Iraqi governorates until March 27[22]

The total number of confirmed cases in Iraq reached 1,378 cases, including 78 deaths as of April 13, 2020. The number is still increasing through the detection of new infections . [23]

The number of confirmed cases and the number of deaths from the virus, Coruna, were taken in addition to the number of people recovering from the epidemic situation announced by the Iraqi Ministry of Health , every day about the epidemiological situation of confirmed injuries and deaths, as well as those recovering by province and region, and samples are also taken from the touchers of an infected person, and they are placed in quarantine for a period of 14 days until it is confirmed that they are not infected with the virus [22].

Analyze Data Taken From The Daily Epidemiological Situation

I relied on the daily epidemiological position that is announced through the Iraqi Ministry of Health on TV or through their official pages on social media (Facebook)[22]. The injuries were distributed in different regions and governorates, but with an increase between the emergence of a new injury, recovery or death.

They used a lot of therapeutic protocols for patients in the quarantine in the hospital, the most important of which is the treatment of hydroxychloroquine with 200mg zinc and other anti-viral treatments in addition to the serum of those recovering from the virus and others.

And I made a table that includes the number of infections each day and the number of deaths from the beginning of the virus in February to the end of a month in March, as set out in Table (1).

It was observed in the graph in Figure(1)and Figure(2) by a program Statistical Analysis system (SPSS)[24], that the number of victims is gradually increasing, the death rate is low compared to it, and the rate of healing increases due to the commitment to the patient's quarantine, the Ministry of Health instructions, the closure of border and airport ports, as well as awareness through social media, including Facebook, the application of the curfew by the Iraqi authorities, and the disruption of institutions Governmental, educational, and private, in addition to medical clinics, commercial stores, and others.

The number of injuries is gradually increasing, the death rate is small compared to it, and the rate of healing increases due to the commitment to the patient's quarantine, health care for patients, Ministry of Health instructions, the closure of border and airport ports, as well as awareness through social media, including Facebook, and the application of the curfew by the Iraqi authorities, And the suspension of the permanence of governmental, educational and private institutions in addition to medical clinics, commercial stores and others.

It was noticed through the epidemiological situation announced by the Iraqi Ministry of Health that the total number of infections from the beginning of the period of the spread of the Corona virus to the end of March, the number of infections was 689 and the number of deaths 51 and the number of healing was 170, meaning that their response to the planned treatment within the quarantine hospital protocols was Successful .

It showed that the deaths were due to their arrival at the hospital in a critical condition, as well as those who were old in addition to chronic diseases such as diabetes, pressure, heart and other diseases.

This is an achievement that is calculated by the Ministry of Health in the speed of its strategic response and its adaptation to the global event, although it faces many obstacles, the most important of which is breaking the ban by citizens, which led to the spread of the virus among them ,but so far, more than 1,500 samples are being examined in the city of Medicine, as well as in Basra, as well as injuries and healing cases.

Discussion:-

There are many reasons that caused the virus to spread quickly in Iraq, due to the lack of closed border crossings, and the failure to take the necessary health precautions when entering travelers and expatriates in particular from The Islamic Republic of Iran. And failure to implement quarantine for travelers.

While returning to Iraq through the airport or other border crossings. Which resulted in the spread of the Corona virus between their families and their relatives who are in contact with them.

There is no recognized treatment by the World Health Organization. There is no vaccine for Corona virus.

Conclusion& Recommendations

In conclusion, outreach is important through media on TV and social media ,and also prevention and attention to hygiene and maintaining the body's immunity and drinking water in abundance during the day. With staying at home until the virus is eliminated.

Quarantine or contact with a patient was very important to prevent the spread of the Coronavirus. Health care for the patients was good, resulting in their healing and discharge from the hospital.

Where experts recommend the World Health Organization to do the same things that it may do to avoid influenza infection to prevent corona virus .

- Cleaning hands.
- Avoid close contact with sick people.
- Cover your mouth when coughing or sneezing.
- Cleaning and disinfecting things and surfaces.
- Strengthening the immune system.
-

Table(1) Showing the numbers of injuries , healing and deaths

History	Number of injuries	Number of healing	Number of deaths
23/2	1	0	0
25/2	4	0	0
27/2	2	0	0
28/2	1	0	0
29/2	5	0	0
1/3	6	0	0
2/3	6	0	0
3/3	5	0	0
4/3	3	0	3
5/3	5	0	0
6/3	8	1	1
7/3	9	0	0
8/3	10	0	2
9/3	6	3	1
10/3	18	0	0
11/3	2	11	1
12/3	6	9	0
13/3	10	0	1
14/3	5	2	0
15/3	14	0	0
16/3	6	6	1
17/3	21	9	1
18/3	6	2	1
19/3	27	6	2
20/3	15	0	3
21/3	7	0	0
22/3	19	8	4
23/3	33	5	3
24/3	50	0	4
25/3	30	27	2
26/3	36	16	7
27/3	76	17	4
28/3	48	9	2
29/3	41	12	0
30/3	83	9	4
31/3	65	18	4
Total	689	170	51

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Also I would like to thank all members of the biology department at the College of Basic Education / University of Wasit for their kind help, support, and standing by me .

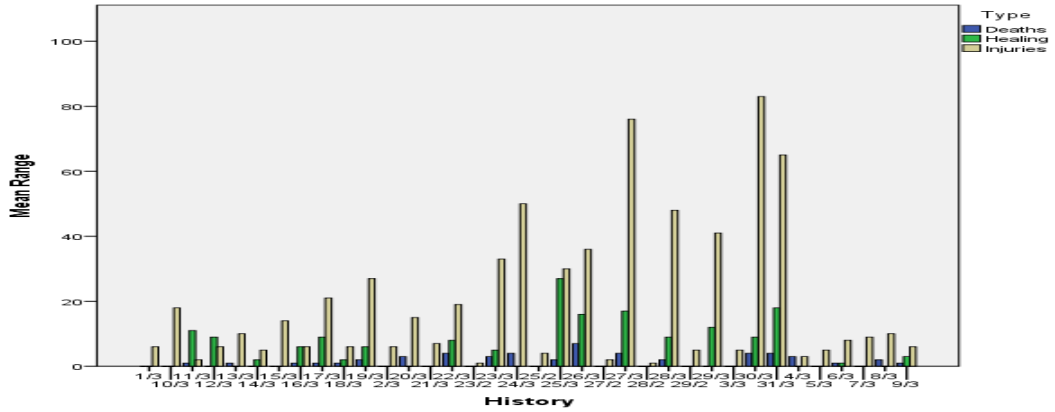

Fig.(1): Shows graph of barchat the difference reactivity for the numbers injuries ,healing &death

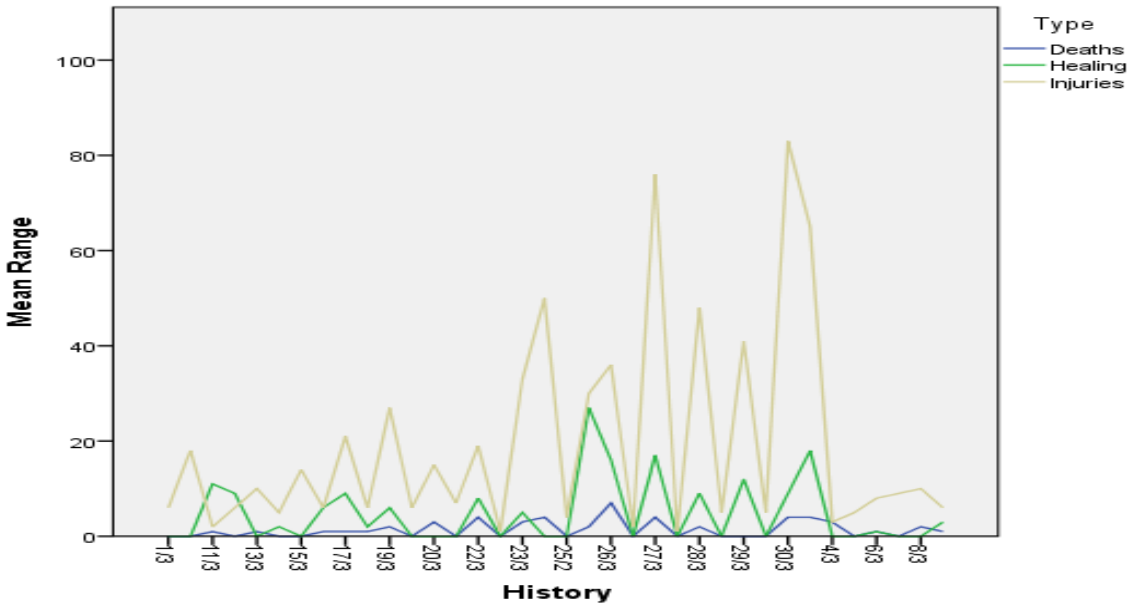

Fig.(2) Shows the line graph the difference reactivity for the numbers injuries , healing &death.

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الخلاصة

بعد الإعلان عن حالة مؤكدة من الإصابة بالفيروس كورونا في العراق ، تم تشكيل خلية الأزمة بشأن فيروس كورونا المستجد، لمراقبة ومتابعة من قبل وزارة الصحة العراقية وذلك باتخاذ التدابير وإعداد المستشفيات لاستقبال الحالات المؤكدة ووضعها في غرف خاصة (الحجرالصحي) ، وبعد ذلك ، بدأ الوعي من خلال التلفزيون و برامج التواصل الاجتماعي بالإضافة إلى شبكات الاتصال (الهاتف) التي أطلقت حملة التوعية والوقاية.

نفذت خلية الأزمة حظر التجول وحظر السفر إلى البلدان التي تحتوي على الفيروس وتعطيل الدوام في المؤسسات الحكومية والأهلية والتعليمية وإغلاق المتاجر وغيرها.

فيروس كورونا هو نوع من الفيروسات التاجية ، لكن هذا الفيروس جديد وينتشر بسرعة ، وكان يطلق عليه جائحة لأنه انتشر في جميع أنحاء العالم ولم يتم السيطرة عليه في دولة واحدة ، الصين.

الفيروس التاجي الجديد (Covid-19) هو مرض معد ينتقل بسرعة إلى البشر من قبل شخص مصاب بالفيروس.

تعلن وزارة الصحة العراقية كل يوم موقف الوبائي للإصابات المؤكدة والوفيات ، وكذلك الحالات التي تم شفاءها حسب المحافظة والمنطقة ، وايضا يتم ذكرعدد الفحوصات (العينات) المأخوذة من المصابين لكل يوم و ايضا يتم اخذ عينات من الملامسين لمصاب كما يتم وضعهم بالحجرالصحي لمدة 14 يوم حتى يتم تأكد من أنهم غير مصابين بالفيروس.

وقد تم جمع عدد الإصابات المؤكدة اليومية ، بالإضافة إلى عدد الوفيات والمتعافين ، من خلال الموقف الوبائي المعلن من خلال الوزارة الصحة العراقية من بداية انتشاره في 23شباط الى 31 اذار وتم اخذ البيانات و تحليلها بالرسم البياني باستخدام برنامج التحليل الإحصائي (SPSS) .

Treatment of Coronavirus Disease by Light

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Abstract

Coronavirus disease (COVID-19) is an infectious disease caused by a new virus. The disease causes respiratory illness (like the flu) with Different symptoms according to the sex, age and healthy states, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.

For years scientists have been experimenting with technology for combating viruses with another method by using a laser , UV irradiation, new type of surface coating and others by breaking down their cell walls.

Key words : Coronavirus , COVID-19 disease symptoms, photomethods for treatment

Introduction

Virus is a tiny particle. Virus particles are about one-millionth of an inch (17 to 1,000 nanometers) long.

A virus particle, or virion, consists of the following:

- **Nucleic acid** - set of genetic instructions, either DNA or RNA
- **Coat of protein** - surrounds the DNA or RNA to protect it
- **Lipid membrane** - surrounds the protein coat (found only in some viruses, including influenza; these types of viruses are called **enveloped** viruses as opposed to **naked** viruses)

Viruses vary widely in their shape and complexity. Some look like round popcorn balls, while others have a complicated shape that looks like a spider or the Apollo lunar lander.(1)

Unlike human cells or bacteria, viruses don't contain the chemical machinery (enzymes) needed to carry out the chemical reactions for life. Instead, viruses carry only one or two enzymes that decode their genetic instructions. So, a virus must have a **host cell** (bacteria, plant or animal) in which to live and make more viruses. Outside of a host cell, viruses cannot function. For this reason, viruses tread the fine line that separates living things from nonliving things. Most scientists agree that viruses are alive because of what happens when they infect a host cell.(2)

How a Virus Infects You?

Viruses lie around our environment all of the time just waiting for a host cell to come along. They can enter us through the nose, mouth or breaks in the skin. Once inside, they find a host

cell to infect. For example, cold and flu viruses will attack cells that line the respiratory or digestive tracts. The human immunodeficiency virus (HIV), which causes AIDS, attacks the T-cells of the immune system.(3)

Regardless of the type of host cell, viruses follow the same basic steps to replicate:

1. A virus particle attaches to a host cell.
2. The particle releases its genetic instructions into the host cell.
3. The injected genetic material recruits the host cell's enzymes.
4. The enzymes make parts for more new virus particles.
5. The new particles assemble the parts into new viruses.
6. The new particles break free from the host cell.

All viruses have some type of protein on the outside coat or envelope that "feels" or "recognizes" the proper host cell(s). This protein attaches the virus to the membrane of the host cell. Some enveloped viruses can dissolve right through the cell membrane of the host because both the virus envelope and the cell membrane are made of **lipids**.(2)

Those viruses that do not enter the cell must inject their contents (genetic instructions, enzymes) into the host cell. Those viruses that dissolve into a cell simply release their contents once inside the host. In either case, the results are the same.(3)

To reduce the risk of spreading or contacting viruses, here are things you can do:(4)

- Cover your mouth or nose when you sneeze or cough by using a tissue to cover your mouth or sneezing or coughing into your elbow.
- Wash your hands frequently, especially after going to the bathroom or preparing food. If you're not able to wash your hands, apply hand sanitizer liberally.
- Avoid contact with the bodily fluids of others.
- Consider wearing a face mask in public if you're worried about infecting others or being infected yourself.
- Don't touch your face.

How Long Can Viruses Live on Surfaces?

The length of time that viruses can live on surfaces and remain infectious varies greatly by pathogen, Dr. Alicia Kraay, postdoctoral fellow in epidemiology at Emory University, explains there are baseline differences between viruses. For example, rhinovirus — the viruses that cause the common cold — will survive for less than an hour on surfaces. However, others such as the norovirus, which is a virus that can cause vomiting and diarrhea can survive for weeks. Not surprisingly, with its ability to live this long outside of a host, norovirus can spread both through infected people and through contaminated foods and surfaces.(5)

The research into how long COVID-19 can survive on surfaces is new and ongoing. A March 13 study by researchers at the National Institutes of Health (NIH), the U.S. Centers for Disease Control and Prevention (CDC) and multiple universities compared the novel coronavirus (SARS-CoV-2) with SARS-CoV-1, the most closely related human coronavirus and the virus

responsible for the 2003 epidemic. The non-peer-reviewed study found that the two viruses have similar viability in the environment, however, the study determined the novel coronavirus could survive up to three days on stainless steel and plastic surfaces. Survival on other surfaces was lower — just one day on cardboard and four hours on copper. The results indicated that novel coronavirus can live in the air for hours and on surfaces up to days.(6)

Another research study published March 17, 2020, in the New England Journal of Medicine by the National Institute of Allergy and Infectious Diseases and Princeton University also found that the stability of novel coronavirus (SARS-CoV-2) was similar to that of SARS-CoV-1 under the experimental circumstances tested. However, novel coronavirus was more stable than SARS-CoV-1. In their experiments, SARS-CoV-2 remained viable in aerosol form for up to three hours. Viable coronavirus was and detected on plastic and stainless steel up to 72 hours after application. No viable coronavirus was measured after four hours on copper surfaces, and 24 hours on cardboard.(7)

COVID-19 disease symptoms

The severity of COVID-19 varies, the disease may take a mild course with few or no symptoms, resembling other common upper respiratory diseases such as the common cold. Mild cases typically recover within two weeks, while those with severe or critical diseases may take three to six weeks to recover. Among those who have died, the time from symptom onset to death has ranged from two to eight weeks.(8)

Children are susceptible to the disease, but are likely to have milder symptoms and a lower chance of severe disease than adults; in those younger than 50 years, the risk of death is less than 0.5%, while in those older than 70 it is more than 8%. Pregnant women may be at higher risk for severe infection with COVID-19 based on data from other similar viruses, like SARS and MERS, but data for COVID-19 is lacking. (7)

In some people, COVID-19 may affect the lungs causing pneumonia. In those most severely affected, COVID-19 may rapidly progress to acute respiratory distress syndrome (ARDS) causing respiratory failure, septic shock or multi-organ failure. Complications associated with COVID-19 include sepsis, abnormal clotting and damage to the heart, kidneys and liver. Clotting abnormalities, specifically an increase in prothrombin time, have been described in 6% of those admitted to hospital with COVID-19, while abnormal kidney function is seen in 4% of this group. Approximately 20-30% of people who present with COVID-19 demonstrate elevated liver enzymes (transaminases). Liver injury as shown by blood markers of liver damage is frequently seen in severe cases.(8)

What Factors Affect Virus Survival Rates?

If it seems like it should be a simple test to pinpoint an outside-host survival period, it's more complicated than just spraying some virus on a surface and waiting to see what happens. In fact, in the article for PBS News Hour, Griffin and Akpan wrote that there isn't a lot of "rigorous data" on how long cold and flu viruses remain infectious.(6)

"Generally, survival of pathogens on fomites [objects or materials likely to carry infection] is determined by inoculating a surface with a known quantity of virus and then sampling at various time intervals to determine the amount recovered," Kraay says. "Scientists use this information to estimate a decay curve for the pathogen on the particular surface, which can be extrapolated to longer time intervals."(8)

The NIH and CDC team who studied surface variation for coronavirus is already looking into virus viability in different matrices, as well as in varying environmental conditions.(9)

Although viruses have differing baseline rates of survival on surfaces, additional factors affect their ability to endure outside of a host. Temperature, humidity and surface properties can all affect survival.

According to Kraay "In general, viruses survive longest at lower temperatures, higher humidity and [on] non-porous surfaces (like stainless steel)," she says. "However, some viruses do well at low humidity.(8)

How Can Light Kill Viruses?

To stave off infection, there are some things you probably know you should do: wash your hands, be careful when you sneeze, gets lots of sleep, don't rub your eyes (especially after touching your nose), eat lots of fruits and vegetables. After all, a cold virus can survive on someone's hand for a couple of hours or for several days on some materials.(10)

Even those hand sanitizers that many people use don't protect against everything. And once they're in the body, viruses are quite tough to kill — antibiotics are powerless against them and vaccines for influenza and some other viruses must be changed every year to adapt to new strains. Fortunately our immune systems can fight off many viruses, but others, like Ebola or the COVID-19 coronavirus, can be deadly.(11)

For years scientists have been experimenting with technology for combating viruses with another method — by using a laser, a device which stimulates atoms and molecules to emit light and then amplifies it to create a beam of radiation.

Back in 2007, researchers at Arizona State University and Johns Hopkins University discovered that pulses of light from a low-power laser could neutralize viruses — turning them into "rubble," as Wired magazine put it at the time.(12)

In their study, the researchers blasted a virus with a quick pulse of purple laser light. The laser, which only shines for 100 femtoseconds (a femtosecond is one-millionth of a billionth of a second), causes the virus's **capsid** (its outer shell) to vibrate and become damaged. Essentially, the virus becomes "deactivated" while the area around the virus remains unharmed. The method didn't cause viruses to mutate either, which is a problem in other virus treatments and can lead to viral resistance.(12)

Since then, research on use of lasers against viruses has continued. Eventually, it might be possible to use lasers to cleanse blood samples of viruses and other pathogens, making them safer to handle. Laser therapy might also be combined with blood dialysis treatments. In that approach, blood would be cycled out of a patient's body, lasers could eliminate any pathogens in

the blood and the blood would be cycled back in. As this study, published in November 2019 by the National Institutes of Health, describes, it eventually might be possible to employ lasers to inactivate influenza viruses, so that they used to produce more effective vaccines.(13)

While many efforts to stop viruses have yet to pass beyond laboratory trials, **UV irradiation** has already found its way into many real world applications. UV irradiation works by bombarding viruses with ultraviolet light, the same light that causes humans to develop sunburns and skin cancer.(12)

Like the laser technique, UV irradiation kills viruses by breaking down their cell walls. Some ventilation and water-purification systems make use of UV irradiation to eliminate airborne or waterborne pathogens. Researchers have successfully used UV irradiation to kill foodborne pathogens, like *E. coli* bacteria, without diminishing taste or food quality. But while UV irradiation can be effective, it can also cause viruses to mutate and has the potential to damage healthy cells (as anyone who's suffered a sunburn can attest).

In March 2020, BBC News reported on the use of robots armed with bulbs that emit concentrated short-wavelength ultraviolet (UV-C) light to disinfect hospitals and reduce the chance of patients contracting infections there. There was hope that the technology would work against coronavirus, although there hadn't yet been testing to prove whether it would, according to BBC.(14)

Researchers also have explored using microwaves to destroy viruses, but the technique has so far proved ineffective. The water surrounding viruses absorbs the energy from microwaves. The virus doesn't receive enough microwave energy to be affected, much less destroyed.

In July 2018, researchers at North Carolina State University published a paper in the journal ACS Publications, in which they described a new technique for adding light-sensitive molecules to plastics. When exposed to light, the molecules reportedly have the ability to poke holes in viruses and bacteria and render them harmless, according to an account of the research on the Alliance of Advanced BioMedical Engineering website.(12)

Engineers have created a new type of surface coating that can effectively kill viruses, bacteria, and other pathogens when applied to different products. The researchers developed the surface by adding photosensitizer molecules that destroy drug-resistant microbes to polymers.

These biocidal molecules use energy from visible light to convert oxygen into “singlet” oxygen, which causes photodegradation in certain materials. In this usage, it effectively punches holes in viruses and bacteria. The new approach could help scientists develop consumer and health care products with more effective and reliable pathogen-killing surfaces.(13)

Conclusion

There are vary types of viruses infected the human with different routes and cause diseases at variation levels may be lost the life .Some of it is new with no active drug or vaccine for it as Covid-19.

Health awareness and education is very important in limited and stop the diffusion of this virus . You can protect yourself by stay at home and washing your hands frequently, avoiding touching

your face, and avoiding close contact (1 meter or 3 feet) with people who are unwell. There are new studies for using active chemicals and Techniques for treated coronovirus disease and prevent spread it.

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الخلاصة

مرض التاجية (COVID-19) هو مرض معد يسببه فيروس جديد. يتسبب المرض في أمراض الجهاز التنفسي (مثل الأنفلونزا) بأعراض مختلفة حسب الجنس والعمر والحالات الصحية ، ولا توجد لقاحات أو علاجات محددة لـ COVID-19. ومع ذلك ، هناك العديد من التجارب السريرية الجارية لتقييم العلاجات المحتملة. ستواصل منظمة الصحة العالمية تقديم معلومات محدثة بمجرد توفر النتائج السريرية.

لسنوات ، كان العلماء يجربون تكنولوجيا مكافحة الفيروسات بطريقة أخرى باستخدام الليزر ، والأشعة فوق البنفسجية ، ونوع جديد من طلاء السطح وغيرها عن طريق تحطيم جدران الفايروس.

الكلمات المفتاحية: الفيروس التاجي ، أعراض مرض COVID-19 ، الطرق الضوئية للعلاج

A Comparative study between students perceptions of pharmacy and nursing departments regarding the role of hospitals and medical staffs in controlling and prevention of Corona virus

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Abstract

Backgrounds :

Corona viruses as defined by World Health Organization (WHO), a family of viruses that cause diseases ranging from the common cold(flue) to more severe illness such as severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS).

Aim of the study :

The study was aimed to compare both pharmacy and nursing students perceptions regarding the role of hospitals and medical staff in controlling and prevention of Corona virus during the period from 1st January till 30th March / 2020 according to special time table which has been prepared by the investigator.

Methods :

A descriptive study was conducted among health students in pharmacy and nursing dept. with a randomly selected sample from 100 students included in the study (50 students from both departments) .

A special questionnaire form was distributed electronically to them after receiving their verbal consent from them and the data was collected by direct interviewing after complete explanation of the study aim .

Results

The study show that 29.1% of pharmacy students agree with the role of hospitals in commitment towards maintenance of surveillance in comparison to 34.6% of nursing students agree with the systemic development for identification of infection sources with a P value =0.152

On the other hand both dept. students disagree with the role of hospitals in reviewing and updating infection control guide lines (42.1%, 52.4%) respectively with a P value=0.605

Recommendation

Further intended specific expanded studies among large population to determine the role of health sector in out break infection .

***Key words* : Perception , Newly doctors , Traditional school , Tikrit**

Introduction

Corona virus disease (COVID-19) is defined an contagious disease caused by a newly discovered virus. Most people infected with the COVID-19 virus will presents mild to moderate respiratory disease and recover without requiring special treatment. Older people, and those with chronic respiratory disease , diabetes , and patients with underlying medical problems such as cardiac disease and cancer are more likely to develop serious infection . [1, 2].

The COVID-19 virus spreads mainly through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, [3].

The outbreak pandemic of **2019–20 corona virus** was identified in Wuhan, China, in December 2019 caused by severe acute respiratory syndrome corona virus 2 **(SARS-CoV-2).**

The World Health Organization published on 30 January 2020 that out break of corona virus become a major public health emergency condition of international concern and documented it as an pandemic on 11 March 2020. [4, 5].

The main strategies for preventing disease transmission include:

a- Maintaining overall good personal hygiene like washing hands, avoiding touching the mouth, nose and eyes

b- Sneezing and coughing into a disposable tissue

c-Safety physical distance for about 2 meter distance to prevent disease transmission.

d- Surgical mask should be wear in public for a patients who are already have the infection.

e-Standard precautions and eye protection should be recommended for health staff [6, 7].

Many countries and governments have restricted their unnecessary travel to prevent and control further spread of the disease to other areas affected by the outbreak [8,9].

WHO reported that there is a fundamental outbreak response measure for elevating capacity and maintaining the healthcare needs for COVID-19 patients . The European regional office prescribed a certain guidelines and standard precautions for hospitals and related primary healthcare services for shifting of resources at multiple levels, which are :

1- Testing COVID-19 at certain laboratories .

2- Adapting specific elective procedures whenever possible

3- COVID-19 positive patients should be isolated and separated from others to prevent spread of the disease .

4- Training personnel should be increased especially in intensive care unites and the number of available beds and ventilators should be present in adequate number .[10, 11].

The aim of the study

The study was aimed to compare both pharmacy and nursing students perceptions regarding the role of hospitals and medical staff in controlling and prevention of Corona virus

Methodology :-

1- A administrative agreement

Official permission was taken from (pharmacy and nursing departments) in Kirkuk technical institute and a verbal consent was taken before establishing the study .

2- Study setting :-

The study was carried out in Kirkuk technical institute .

3- Study sample and sampling method :-

A descriptive cross – sectional study was conducted among health students in pharmacy and nursing dept. A randomly selected sample and 100 students were included in the study (50 students from both departments) .

A special questionnaire form was distributed to them after receiving their agreements for participation in the study and the data was collected by interviewing with them after complete explanation of the study aim .

4- Study period :

The study was conducted during the period from 1st January till 30th March / 2020 according to special time table which has been designed by the researchers

5- Data collection tool :

A special qualified questionnaire form has been prepared utilizing available updated related books to the questionnaire item included for main parts :-

Part-1-Demographic characteristics including (age, gender, study stage , residence)

Part-2-Students perceptions about the role of hospitals in preventing Corona virus .

Part-3-Students perceptions about the role of medical staff in controlling Corona virus .

Part-4-Students perceptions regarding the main beneficial health sector in outbreak infection .

Inclusion criteria :

All the students from both departments .

6- Statistical analysis of data :-

All the statements with yes and no answer , number and percent was calculated .

A statistical test was used (Chi- square test) was used to study the relation between the variables and P value was considered significant at the level of 0.05 . .

Results :

Table 1 show that majority of study students are female (78.0%), aging between 20-22 years (70.0%), from the second stage (54.0%), and living in urban area (73.0%).

Table 2 show that 29.1% of pharmacy students agree with the role of hospital in commitment towards maintenance of surveillance in comparison to 34.6% of nursing students agree with the systemic development for identification of infection sources with a P value = 0.152

On the other hand both dept. students disagree with the role of hospitals in reviewing and updating infection control guide lines (42.1%, 52.4%) respectively with a P value = 0.605

Table- 3 presents that 42.8% of pharmacy student agree with the role of medical staff in conducting a precautions and local containment in comparison to 48.7% of nursing students who agreed with the treatment and prophylaxis role of them with a P value = 0.009.

On the other aspect both students from two departments disagree with the role of them in calibrating with the public health unite (45.5%, 45.4%) respectively with a P value = 0.856.

Table 4 show that 54.0% of pharmacy students go with the role of medical staff in emergency and critical out break infection in comparison to 72.0% of nursing students go with the role of health staff with P value =0.000.

Discussion :-

Regarding the role of hospitals , the majority of students agreed with the role of them in commitment towards maintenance of surveillance and regular systemic development and implementation for identification of infection sources in out break infection .

A similar study was done in Saudi Arabia [12] to determine the practices, knowledge , and attitudes regarding disaster and infection control guidelines during emergency situation among working staff in emergency department (ED) by doing a cross- sectional study at Kingdom of Saudi Arabia./ Central Riyadh / at tertiary health care hospital .

They found that correct responses of knowledge towards outbreak infection and emergency preparation score was 6.2±2.5. Study sample with more than 5-years of experience had a statistically significant (p=0.009.

They recommended in their study that the main pandemic and infection control measures is the responsibility roles of hospitals during emergency and critical situation is by continuous regular monitoring and identification of new cases with daily follow up in cooperation with public health unite to develop a guide lines strategies methods to prevent further transmission of the disease .

They further mentioned that future expanded studies to cheek up the health services provided by the hospitals and tertiary health centers belong to them for better improvement .

Concerning the role of medical staff in emergency conditions in prevention and controlling the viral infection , the current study revealed that precautions and local containment role of medical staff with the treatment and prophylaxis role are the main agreed perceptions of study students .

A research study was done by Farahnaz *etal* [13] to verify the health information technology (HIT) practice, attitude, and knowledge among students and health care professionals in teaching hospitals in Tehran, Iran during 2016.

They introducing 250 staffs of 5 different teaching hospitals classified into three subgroups of 70 medical doctors , 46 medical students and 134 health record staff .

They found that good knowledge was 15.6%, 35.0%, and 32.3% among the study staff and poor knowledge was also observed in 46.9%, 25.0%, and 38.7% of doctors, students, and staff, respectively with (p value = 0.309) regarding the role of working health staff in the hospital in the needed emergency conditions .

Regarding the practice habits and attitude , 31.2% of doctors, 50.0% of students, and 42.0% of staff had good attitude and practice habits, during critical situation while poor attitude and practice habits was obtained in 25.4%, 31.2%, and 5.0%, respectively among working staff with (p = 0.168)in association with their role in providing health services during out break infection .

They reported that the main responsibilities of medical staff was to carry and follow up the newly occurrence cases with regular maintenance of the health situation during the pandemic

For the main beneficial heath sector during the out break , study students agree with the role of both medical and health staff .

A study was done by Lestari *etal* [14] to investigate the following:

1) the members of health care faculty , attitudes toward interprofessional collaboration (IPC)

2) The main factors affecting the perceptions of faculty members' toward health services

3) The main perceptions of health care professionals' toward factors that affecting the quality of these services by taking 17 different institutions Indonesia / Central Java Province,.

They found that the total response rate was 74.1%. The nurses' mean scores for attitudes toward health services were much higher than those of other health care professionals.

They explained that the main problems and obstacles of delivering a good qualified health services in their situations are :

a) The different perceptions need s of the patients among professionals.

b) The decision-making is unequal between participants .

c) There was a lack of direct face-to-face interaction.

d) The roles and responsibilities are overlapping .

So for the above reasons they mentioned that the health sector consist from different team groups of medical, Health and other necessary needed professional to provide a adequate health services to the public .

Recommendations :

1- Large big study sample on different populations to assess the roles and responsibilities of hospitals and health staff in out break and emergency infection .

2-More financial resources to support these programs and studies with the need for Collage assistance .

3- Hospital – based training through out the study students period is very much effective and give a good results for future preparedness in these critical situations to support the medical staff in their work .

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Table 1: Frequency distribution of study students according to their socio demographic characteristics

Socio demographic parameter		Pharmacy students N=50	Nursing students N=50	Total N= 100	
		No.	No.	No.	%
Gender	Male	13	9	22	22.0%
	female	37	41	78	**78.0%**
Age group (in years)	≥ 20 years	12	10	22	22.0%
	20-22 years	33	37	70	**70.0%**
	> 22 years	5	3	8	8.0%
Study stage	First stage	19	27	46	46.0%
	Second stage	31	23	54	**54.0%**
Residence	Rural	13	14	27	27.0%
	Urban	37	36	73	**73.0%**

Table 2: Roles of hospitals towards Corona virus prevention

Roles of hospitals in Corona prevention	Study students								P* Value
	Pharmacy students N=50				Nursing students N=50				
	Agree N= 31		Disagree N=19		Agree N=29		Disagree N=21		
	No.	%	No.	%	No.	%	No.	%	
Commitment towards maintenance of surveillance	**9**	**29.1**	2	10.5	4	13.7	1	4.7	**0.152**
Development of a system for identification , reporting , analyzing , investigation of infection	6	19.3	2	10.5	**10**	**34.6**	1	4.7	**0.185**
Advices to health staff about the proper usage of antibiotics	4	12.9	4	21.2	**3**	**10.3**	3	14.4	**0.758**

Review and update hospital infection control guide lines	7	22.6	**8**	**42.1**	**5**	**17.2**	**11**	**52.4**	**0.605**
Help to provide employee health education regarding the infection control measures	5	16.1	3	15.7	**7**	**24.2**	5	23.8	**0.438**

***χ^2 – test was used**

Table 3: Role of medical staff in Corona virus controlling measure

Roles of medical staff in Corona virus control	**Study students**								P* Value
	Pharmacy students N=50				**Nursing students N=50**				
	Agree N=28		**Disagree N=22**		**Agree N=39**		**Disagree N=11**		
	No.	%	No.	%	No.	%	No.	%	
Treatment and prophylaxis only	**5**	**17.9**	**2**	**9.1**	**19**	**48.7**	**2**	**18.2**	**0.009**
Proper reporting and monitoring of the cases	**4**	**14.3**	**8**	**36.3**	**5**	**12.8**	**3**	**27.3**	**0.862**
Calibrating with public health unite	**7**	**25.0**	**10**	**45.5**	**9**	**23.1**	**5**	**45.4**	**0.856**
Precautions and local containment	**12**	**42.8**	**2**	**9.1**	**6**	**15.4**	**1**	**9.1**	**0.012**

***χ^2 – test was used**

Table 4 : :Distribution of study students according to their perception regarding the main beneficial health sector for Corona virus prevention

The main beneficial health sector for Corona virus prevention	**Pharmacy students N=50**	**Nursing students N=50**	**Total %**	**P* Value**
Medical staff (doctors)	**27 54.0%**	**12 24.0%**	**39 39.0%**	**0.000**
Health staff (Nurses , Lab technician)	**11 22.0%**	**36 72.0%**	**47 47.0%**	**0.000**
Allied health staff (pharmacist , physiotherapist)	**12 24.0%**	**2 4.0%**	**14 14.0%**	**0.004**

χ^2 – test was used

الخلاصة :

تعتبر فيروسات كرونا حسب تعريف منظمة الصحة العالمية على أنها عائلة من الفيروسات التي تسبب الإمراض التي تتراوح من نزلات برد شائعة إلى إمراض خطيرة كمتلازمة التهاب الجهاز التنفسي الحاد ومتلازمة التهابات الجاهز التنفسي لمنظفة الشرق الأوسط

هدف الدراسة : هدفت الدراسة لمقرنة وجهات نظر طلاب قسمي التمريض والصيدلة حول دور المستشفيات والكادر الطبي في السيطرة ومكافحة فيروس كورونا خلا الفترة الممتدة بين الأول من شهر كانون الثاني لغاية 30 من شهر آذار لسنة 2020 حسب جدول زمني تم ترتيبه من قبل الباحثين

Questionnaire To Know The Health Awareness of the Iraqi Community With The Emerging Coronavirus COVID-19

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Introduction

Coronavirus disease 2019 is discovered in Wuhan in December 2019, which is the capital of Hubei province in China. When the outbreak occurred in China and then this disease spreading across the world, and the numbers of the cases increase in the affected countries with the confirmed cases and infection related casas also increased. The updating data are published daily on the websites of European Centers for Disease Control and Prevention ECDC, US Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) [1,2,3].

the World Health Organization (WHO) announced that the outbreak of COVID-19 constituted a Public Health Emergency of International Concern (PHEIC) on 30 of January 2020 [4]. Due to severity of COVID-19 and the high level of global spread the WHO declared the COVID-19 outbreak a pandemic on 11 March 2020 [5]. COVID-19 is an acute respiratory disease occurred due to newly emerged zoonotic coronavirus. A positive-sense enveloped single-stranded RNA virus, named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), has been found in patient with pneumonia, and related to the cluster of acute respiratory illness cases from Wuhan, and genetic analysis has found that it is closely connected to SARS-CoV and genetically clusters within the genus Betacoronavirus ,subgenus Sarbecovirus [6]. The Coronavirus disease (COVID-2019) is transmitted from human to human by droplets during cough or exhaling from infected persons, and by touching droplet-contaminated objects or surfaces and then touching the eyes, nose or mouth [1,7].

The clinical reported symptoms in laboratory confirmed cases mostly is fever (88%), then followed by dry cough (68%), while fatigue occur in about (38%) of cases, then sputum production (33%), while sore throat (14%), followed by headache (14%) and arthralgia (15%) [8]. There are symptoms which are less common like diarrhea and vomiting. In China about 80% of cases had mild to moderate disease and about (13.8%) of reported cases had sever disease,

while only (6.1%) have critical symptoms like respiratory failure, septic shock and multiple organ failure) [9,10,11]. There are many cases reported to be asymptomatic COVID 19 virus infection [12,13,14,15,16].

Aim of study

The study aimed to:

1- Knowing the level of awareness of society about (the new Corona epidemic) in terms of transmission methods, methods of prevention and the most vulnerable groups and the measures taken to limit the spread of the disease.

2- Knowing the most important way to receive health information in order to follow the developments of the epidemiological situation of the disease.

3- Knowing the individuals awareness of the importance of quarantine, and their commitment to the curfew.

4- Determine the most important matters that need to intensify efforts in awareness and education, and appropriate media to communicate information and knowledge.

Method and Material

Study Method: The study targeted different categories of Iraqi society where they were published through social media, using Google's models. A set of questions were used that were fully answered and 1609 was collected within 72 hours ending on 15 April 2020, with results limited to a limited time period and a quick time period, with SPSS being used to analyze the results.

Result

Results high response was obtained in participation and within a short period of time, a broad idea was given by indicators and study objectives and the beneficiaries of the study results were identified in the objective of the priorities of dealing with the disease and its societal consequences, although the sample was not represented by the population of the community. The majority of them responded to the 26-35-year-old group, with close proportions of respondents to 1609, working in different and different occupations, but the majority were from the government sector, which was 61.5%. It is remarkable that the majority is well informed about the transportation methods, 88% and the prevention methods of the disease and above the good. While knowledge of the risk of infection on the elderly and chronic pathogens was greater, and 72.2%, knowledge that quarantine was very effective and 70.9% were fully prepared to abide by the ban, among those who were responding.

Conclusion

The study found that most of the community groups have enough knowledge about the methods of transportation of the virus Corona and the ways of prevention, the importance of the curfew, and the importance of the commitment to the curfew. Social media, especially the application of Facebook, are among the most important means of transport and receiving information about the methods of spreading and preventing the virus Corona and the prevention

of the virus epidemic is not limited to the spread of the virus Health and government bodies, but all groups of society.

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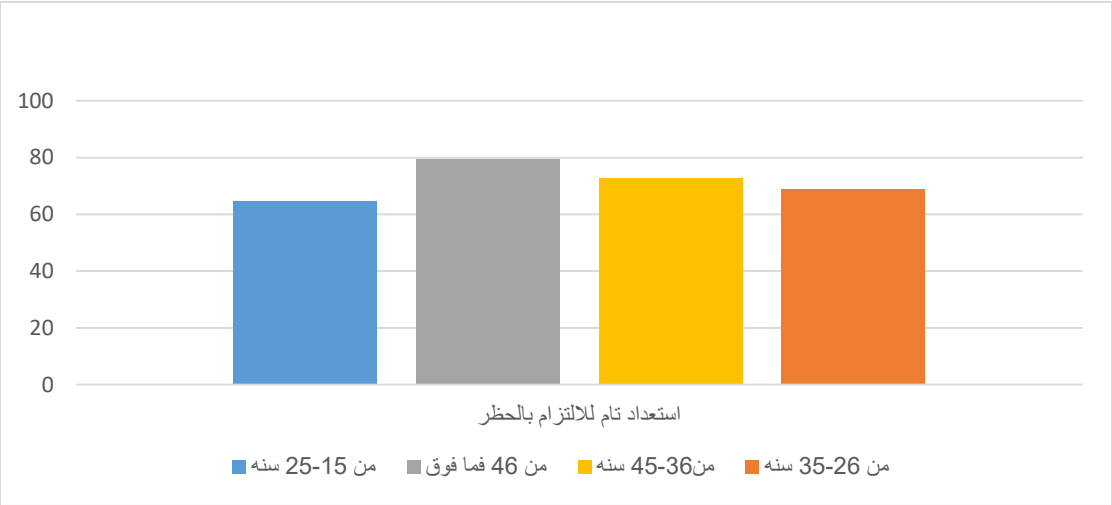
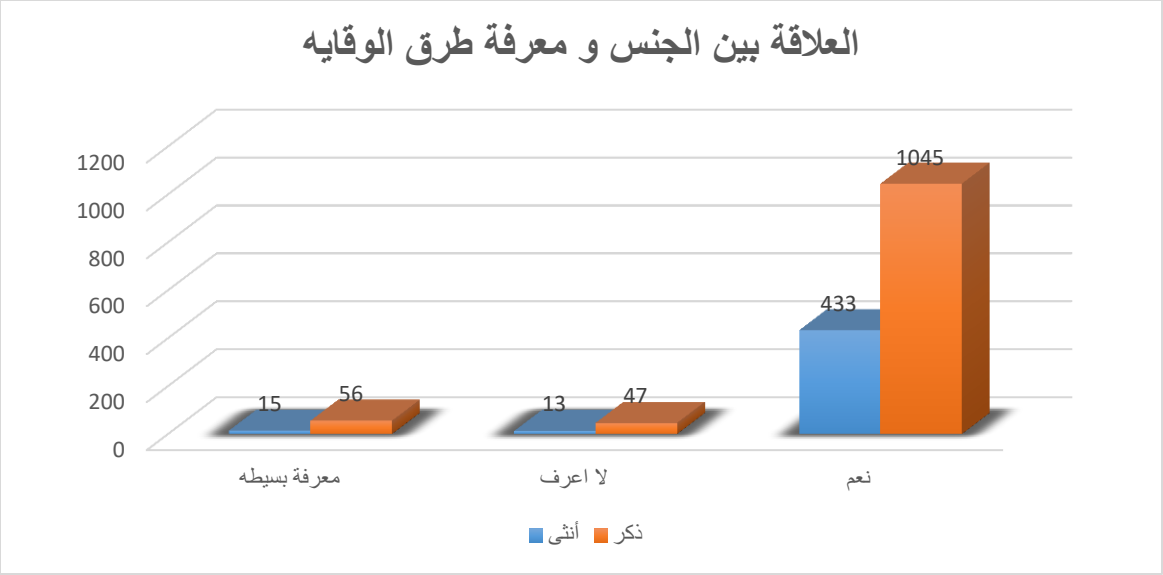


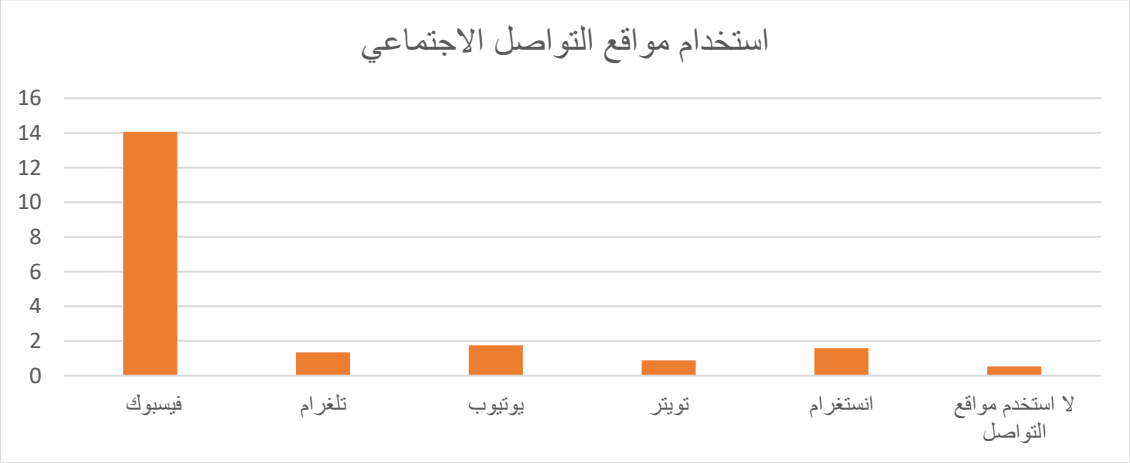
شكل رقم (1) مقارنة الاستعداد للالتزام بالحظر حسب الاعمار

(1)This figure shows according to Age group about curfew



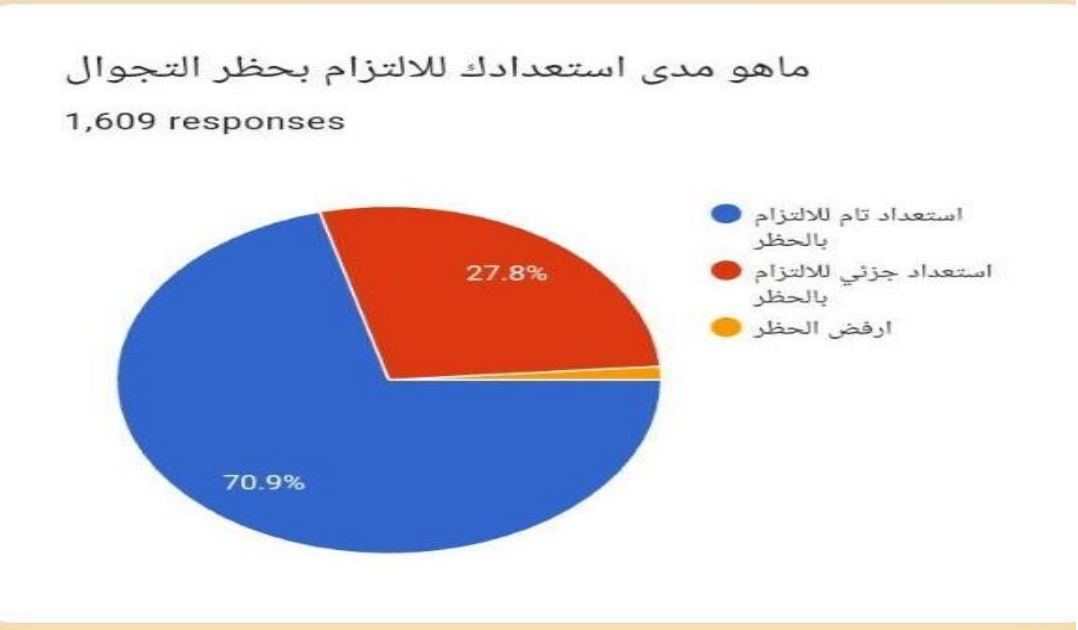
شكل رقم (2) العلاقة بين الجنس ومعرفة طرق الوقاية

(2) The figure shows the relation between the gender and prevention method



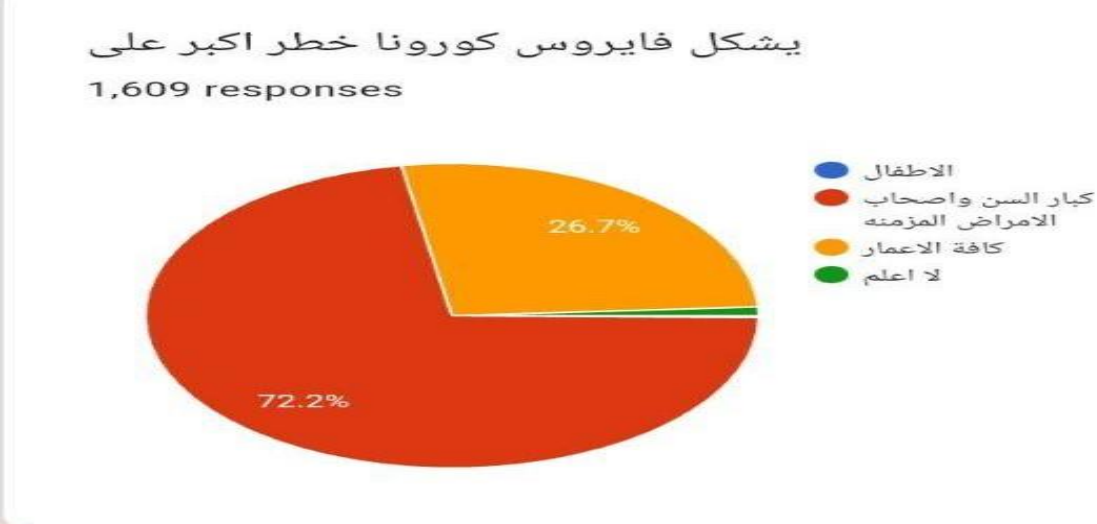
شكل رقم (3) مقارنة استخدام أي من مواقع التواصل الاجتماعي لنقل المعلومات عن فايروس كورونا

(3) the figure shows type of social media applications high follow up and give information about Covid-19



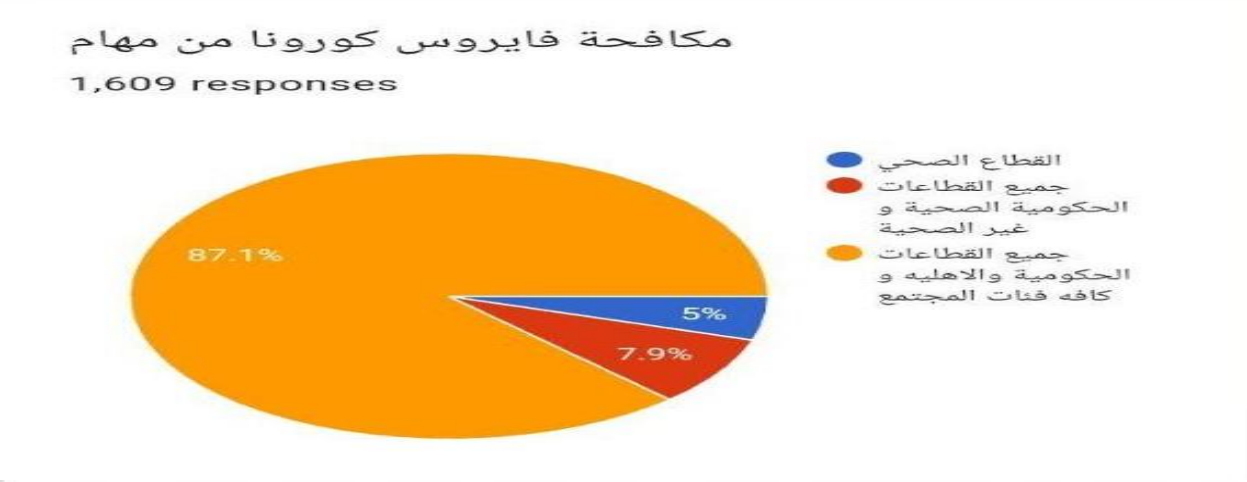
شكل رقم (4) الاستعداد للالتزام بحظر التجوال

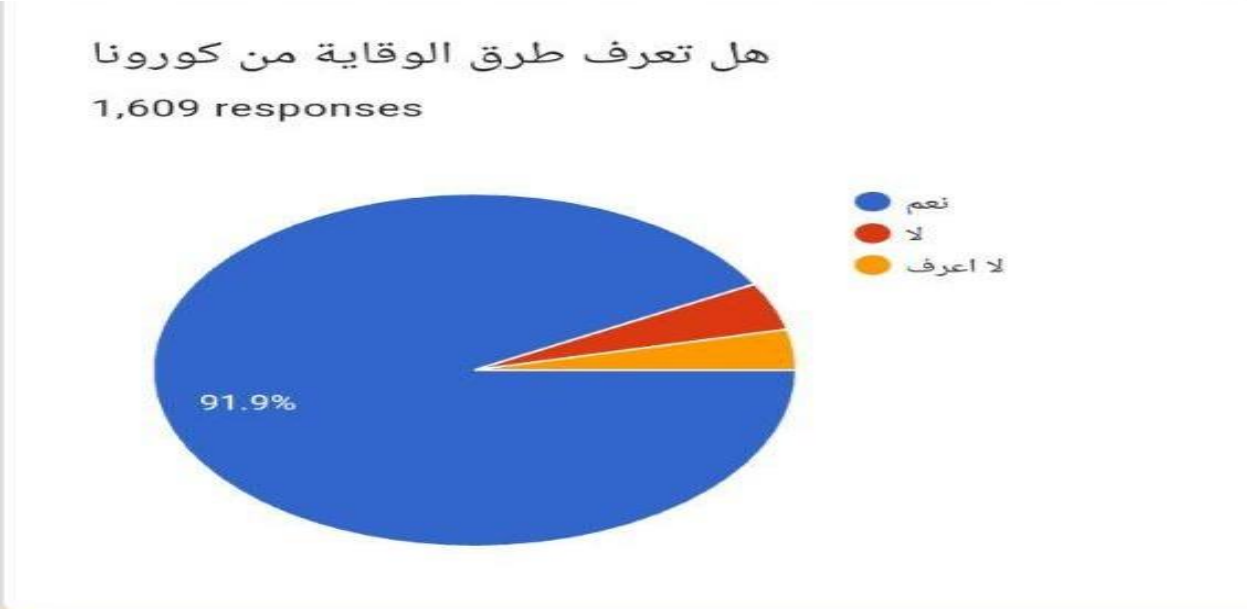
(4) this figure shows how community ready to apply curfew



شكل رقم (5) هل يشكل فايروس كورونا الخطر الأكبر على الفئات العمرية المدرجة

(5) this figure shows the risk of Covid-19 according to Age





شكل رقم (6) المعرفة بطرق الوقاية من كورونا

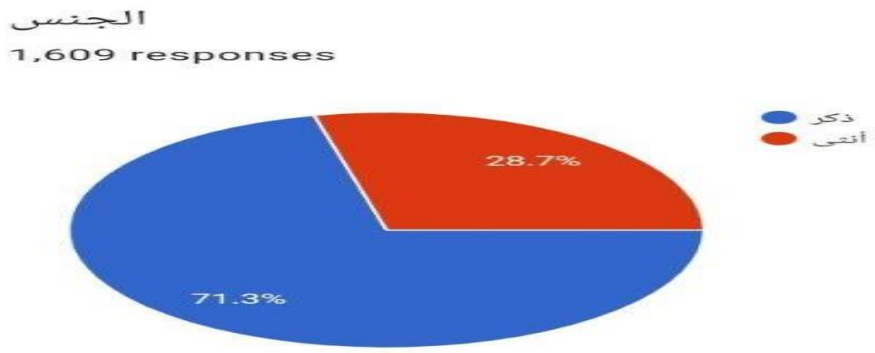
(6) this figure show the knowing about the prevention methods from Covid-19

شكل رقم (7) مكافحة مرض كورونا من مهام أي من القطاعات

(7) this figure shows on which level the responsibility to prevent infection in Covid-19

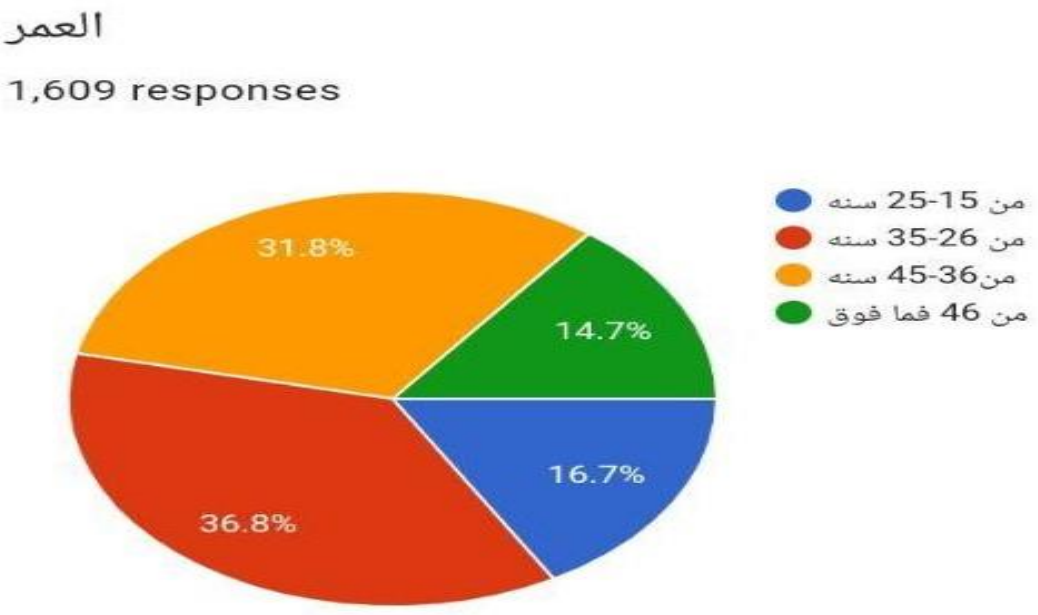
شكل رقم (8) مقارنة الاعمار للمشاركين بالاستبانة

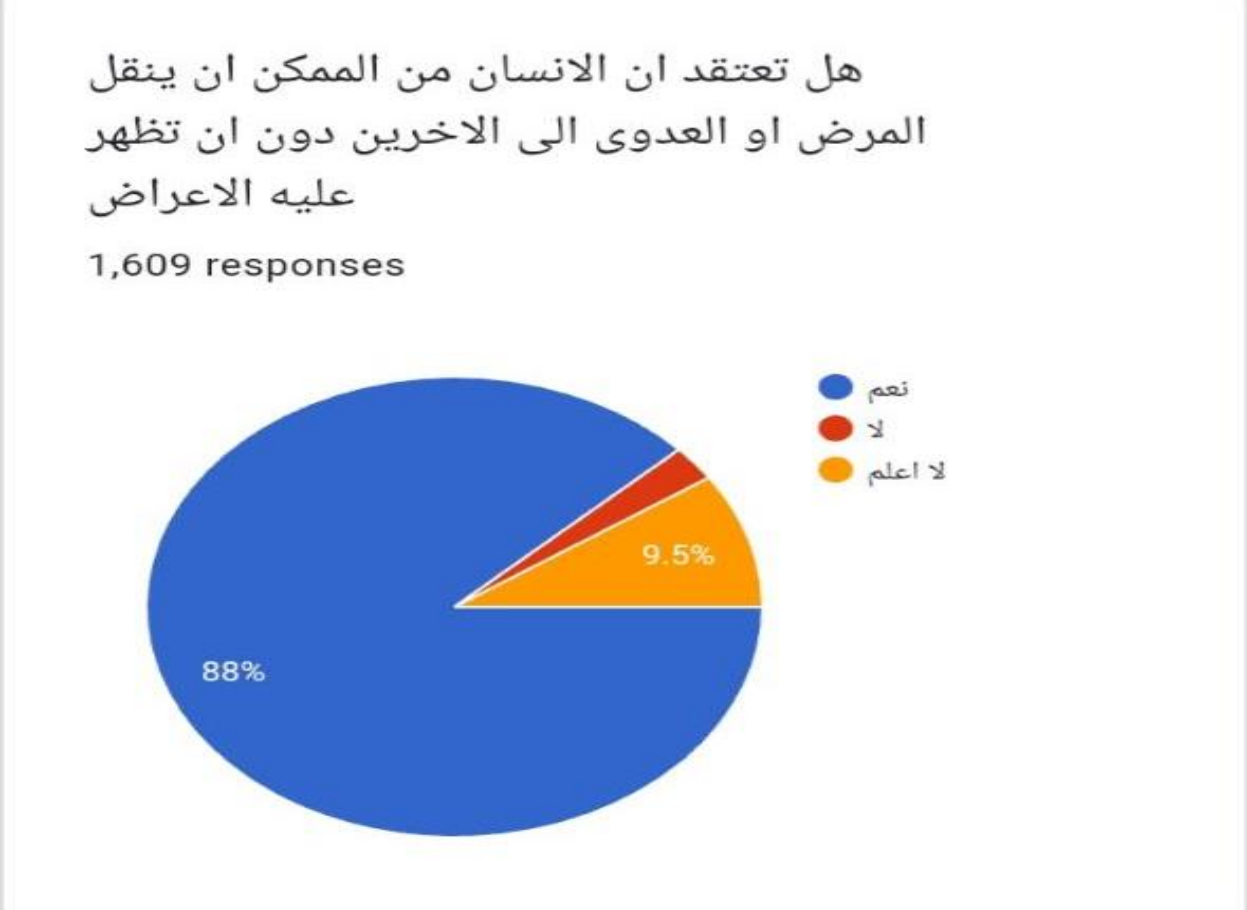
(8) this figure shows type of Age that take part in this questioner



شكل رقم (9) مقارنة الاعمار المشاركة بالاستبانة

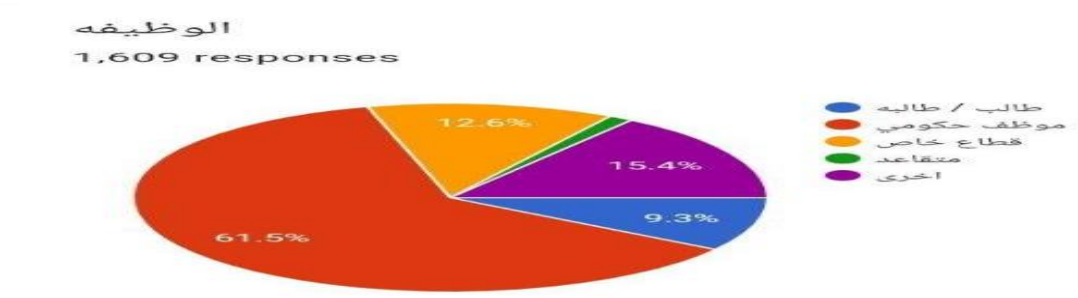
(9) this figure shows Gender that take part in this questioner





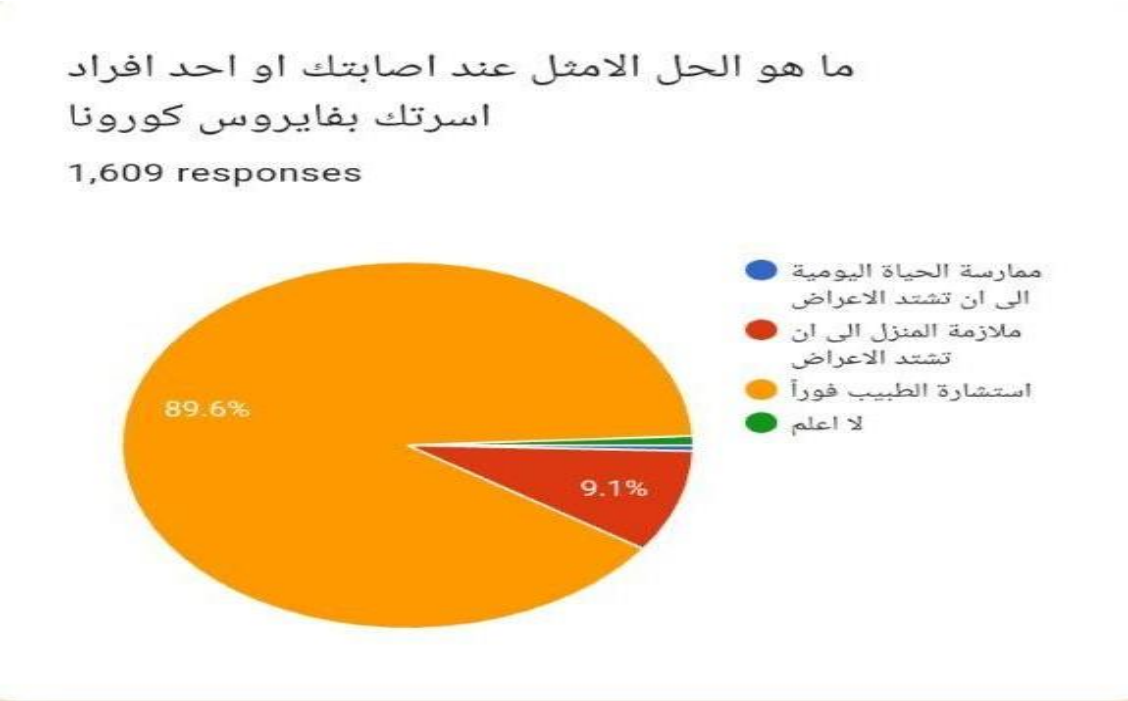
شكل رقم (10) هل تعتقد ان الانسان ممكن ان ينقل العدوى للأخرين دون ان تظهر عليه العلامات السريرية

(10) this figure shows did the human can transfer infection of covid-19 this human have No sign of infection



شكل رقم (11) أنواع الوظيف للمشاركين بالاستبانة

(11) this figure shows type of job that take part in this questioner

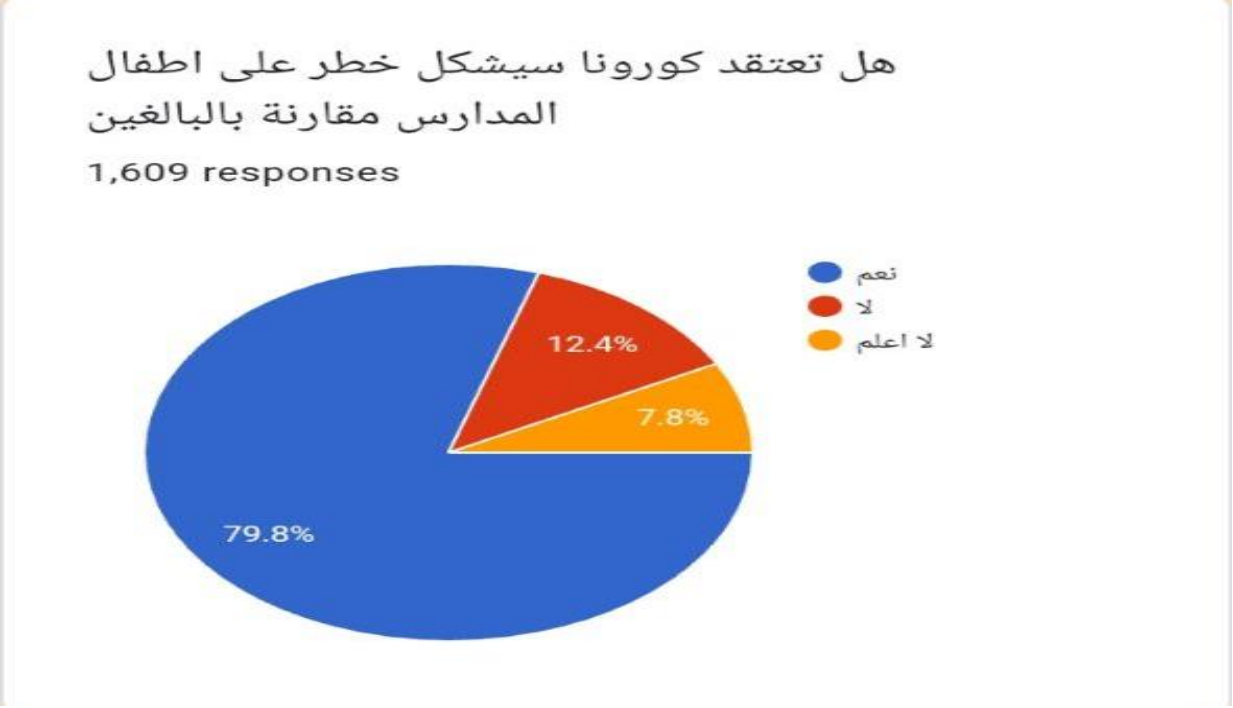


شكل رقم (12) ما هو الحل الأمثل عند اصابتك او احد افراد اسرتك بفايروس كورونا

(12) this figure shows about what you do if you or one of your family have infection with Covid-19

شكل رقم (13) مقارنة مدى القلق والخوف من الإصابة بالمرض عند المصابين بالأمراض المزمنة وغير المصابين

(13) this figure shows the fearing from covid-19 among 4 group



شكل رقم (14) هل تعتقد كورونا سيشكل خطر على أطفال المدارس مقارنة بالبالغين .

(14) this figure shows the risk infection covid-19 of school students as compare with adults