

Knowledge, Attitude & Practice of Health Care Workers on COVID-19 in Babylon Governorate, Iraq 2020

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To cite this article:

Tamara Abdulhussein, Ammar Saaed, Rafaat Abbas, Ali Aljebbawi. Knowledge, Attitude & Practice of Health Care Workers on COVID-19 in Babylon Governorate, Iraq 2020. *Science Journal of Public Health*. Vol. 9, No. 6, 2021, pp. 198-203. doi: 10.11648/j.sjph.20210906.13

Received: October 30, 2021; **Accepted:** November 15, 2021; **Published:** November 25, 2021

Abstract: During the last month of 2019 a highly contagious infectious disease caused by a corona virus known as COVID-19 that identified in Wuhan/China, then the WHO declared the outbreak to be a public health emergency of international concern, after two months the disease entered our country with the international travelers and started its rapid spread in our society. The level of knowledge of health care workers about COVID-19 is one of the key factors in the battle against COVID-19 infection. The objectives of this study are to assess Knowledge, attitude, and practice of HCWs at primary health care centres regarding COVID-19 infection, also to assess the possible association with the sociodemographic factors of the study sample. Method: A cross sectional study was conducted in Babylon governorate/Iraq during the period of lockdown (from 15-march to 15-may 2020) to assess the level of knowledge, attitude and practice of health care workers at the level of primary health care centers, by doing a multistage sampling; fifteen primary healthcare centers were selected randomly involving specialized and non-specialized family health care centers, a self-administered questionnaire with four aspects was prepared (knowledge, attitude, practice and source of information) then distributed to 403 participant. Results: Most frequent age group was 30-40 years 141 (35.0%), the study group included 94 (23.3%) physicians & 309 (76.7%) other medical staff. means of knowledge, attitude and practice score were (88.5±9.4 SD), (69.2±28.9 SD), (91.5±8.1 SD) respectively, there was a positive correlation between knowledge and practice scores ($r=0.196$, $p=0.000$). working in specialized family health care centers was found to have a high knowledge score (90.1±9.5 SD, $p=0.00$), while gender didn't have significant difference in knowledge score. Knowledge about clinical symptoms of COVID-19 was of high percentage (96.3%). Regarding attitude (36.7%) of participants agreed that herbals and garlic are beneficial in prevention of the disease. Wearing gloves during the work was the most common practice reported (94.3%) followed by wearing face mask during work (91.6%), while (88.1%) performing washing hands regularly for 20 seconds. Conclusion: Good knowledge and practice but ordinary attitude among health care workers working in primary health care centers, this reflects the rapid spread of information's through TV, radios, websites and social medias after the announcement of WHO that this new infectious disease is a pandemic.

Keywords: KAP, Knowledge, Attitude, Practice, COVID-19, Corona Virus, Health Care Workers, Cross Sectional Survey, Primary Health Care

1. Introduction

Since December 2019, a new type of coronavirus called novel coronavirus (2019-nCoV, or COVID-19) was identified in Wuhan, China. The COVID-19 has then rapidly spread to all over China and the world [1]. On 30 January 2020, World Health Organization (WHO) officially declared the COVID-

19 epidemic as a public health emergency of international concern [2]. The novel coronavirus 2019-nCoV is highly contagious as compared to SARS-CoV and MERS-CoV. Although, fatality rate of MERS-CoV was higher than SARS-CoV and 2019-nCoV; however, in a small period of time, the 2019-nCoV affected more people worldwide compared to SARS-CoV and MERS-CoV [3].

COVID-19 cause severe respiratory tract infections in

humans, the most common symptoms at the onset of illness are fever, cough, fatigue, dyspnea and headache. The median incubation period was 6.7 days [4].

In Iraq, the first confirmed case reported in 25/2/2020 [5]. On 1/3/2020 the Iraqi governorate declared lockdown all over the country to limit the spread of this sudden pandemic. At time of writing this study unfortunately; total confirmed cases in our country is (27352) case, with daily increase of (1635) confirmed case/day [6].

Health care workers (HCWs) are at the front line of the COVID-19 outbreak response and as such are exposed to hazards that put them at risk of infection [7]. HCWs were not well-prepared for this sudden coronavirus outbreak, especially in departments other than infectious diseases [8]. Knowledge of a disease can influence HCWs' attitudes and practices, and incorrect attitudes and practices directly increase the risk of infection [9]. Understanding HCWs' knowledge, attitudes, and practices (KAP) and possible risk factors helps to predict the outcomes of planned behavior [10].

Because of the lockdown that instituted by the governorate authorities; people prefer to go to the PHCC for health issues instead of going to hospitals, so this increase the burden on HCWs there, the level of knowledge about COVID-19 is one of the key factors in the battle against the disease, to our knowledge no prior studies have examined this topic in our settings.

So, the objectives of this study are to assess Knowledge, attitude, and practice of HCWs at primary health care centres regarding COVID-19 infection, also to assess the possible association with the sociodemographic factors of the study sample.

2. Methods

2.1. Study Design & Settings

A cross sectional study have been conducted to assess the knowledge, attitude and practice of health care workers (physicians and other health care workers) at primary health care centers in Babylon governorate/Iraq towards corona virus pandemic from (15-march to 15-may 2020) during the period of lockdown.

2.2. Sampling Method and Sample Size

The study sample is selected by multistage sampling. The first stage done by random selection of three out of five primary health care sectors in Babylon governorate, and the second stage involves simple random selection of five PHCC from each sector. Every HCWs in the selected PHCC is eligible to enter the study except those who refused to participate and those with incomplete filling of the questionnaire.

The minimal sample size was calculated to be 150 (according to the cross sectional sample size calculator considering alpha error 5% and beta error 5%) [11].

2.3. Measurements

A standardized questionnaire was developed and prepared by the researchers according to the WHO and CDC guidelines about COVID-19 [12–14]. The questionnaire was initially designed in English and then translated into Arabic language. Then a pilot study was done to test the questionnaire on 15 HCWs who are not included among the study participants to determine its acceptability, validity and the clarity of the questions, then we modified it accordingly.

The questionnaire consisted of three parts demographics, KAP and source of information (appendix 1). Demographic variables included (age, gender, education, occupation, Place of residence, type of PHCC and source of information). Knowledge part included nine questions, the correct answer was assigned 2 points, the unknown answer was assigned 1 point, and the incorrect answer was assigned 0 point. The total knowledge score ranged from 0 to 18 then corrected to 100%. The attitude part includes two questions regarding agreement with use of herbals and garlic in prevention of infection and attitude toward those who don't appreciate the risk of the disease, don't take protective measures and not respond to quarantine. The disagree option was going with the WHO recommendations and assigned two points for the respondents, one point for neutral option and zero point for the agree option. Regarding practice section six questions that cover the infection prevention measurements and practice, and health promotion advices to patients. Two points were assigned to those who perform the correct practice option, one point to the (sometimes) option and zero point to those who don't do the correct practice. Regarding source of information questions participant able to choose more than one choice, Then the questionnaires were distributed and completed by all participants inside their health care centers.

2.4. Statistical Analyses

The data were analyzed to evaluate demographic variables, knowledge, attitude and practice questions as well as source of information. The categorical variables were presented as frequencies and percentages. The calculated knowledge, attitude and practices scores (continuous variable) are described by Mean \pm SD. The means of the subgroups are compared for significance by independent sample t test & ANOVA test accordingly. The *p* value is considered significant if it is less than 0.05. The data were analyzed by SPSS program version 20.

2.5. Ethical Consideration

Ethical approval was obtained from the ethics and research committee of Babylon health directorate, verbal consent was obtained from all participants.

3. Results

Out of total 15 PHCCs randomly selected, 7 were specialized family health care centers and 8 non specialized

family health care centers.

Of the study population, a total of 410 HCWs participants filled the questionnaire, 7 participants were excluded because of incomplete data, and the final sample was 403 participants.

Among this final sample, the more frequent age group was 30-40 years 141 (35.0%). About 285 (70.7%) were females & 118 (29.3%) were males. The study group included 94 (23.3%) physicians & 309 (76.7%) other medical staff, as shown in (Table 1).

Table 2 shows the calculated knowledge, attitude and practice score of the study group which have a mean of (88.5±9.4 SD), (69.2±28.9 SD), (91.5±8.1 SD) respectively.

Regarding the distribution of knowledge score across the sociodemographic factors, the highest Knowledge score was in those with age of >50 years old (91.4±7.9 SD, $p=.029$), physicians (90.1±8.6 SD, $p=.044$), participants with higher academic level (92.9±8.4SD, $p=.007$).

Interestingly, working in specialized family health care centers was found to have a high knowledge score (90.1±9.5 SD, $p=0.00$), while gender didn't have significant difference in knowledge score as shown in (Table 1).

As demonstrated in (Table 3), High percentage of knowledge about clinical symptoms of COVID-19 (96.3%) was found while the lowest percentage (64.5%) with chlorine solution inactivity 24 hours after its preparation.

Attitude section as shown in (Table 4), Most of participants (83.6%) disagree with those who don't appreciate the risk of the disease, don't take protective measures and not respond to quarantine, while nearly equal percentage of responses regarding attitude about the use of herbals and garlic as preventive measures.

Wearing gloves during the work was the most common practice reported (94.3%) followed by wearing face mask during work (91.6%), while (88.1%) performing washing hands regularly for 20 seconds (Table 5).

Table 6 highlights that there was a positive correlation between knowledge and practice scores ($r=.196$, $p=.000$).

It can be seen in (Figure 1) the distribution of the source of information. The main sources of COVID-19 information were from the official Internet websites (Iraqi ministry of health, WHO, CDC) with a percentage of (84.6%).

4. Discussion

As COVID-19 infection grows up all over the world and in our Iraqi community, it became a hot topic for social media and TV. The Iraqi health ministry and its related health directorates in all over the country initiate intensified health campaigns and educating materials about this rapidly spreading disease.

As stated in the introduction, the research was carried out in order to assess Knowledge, attitude, and practice of HCWs at primary health care centres regarding COVID-19 infection, the overall knowledge score of the study sample was good (88.5±9.4 SD) corrected to 100% and this reflect good interest of HCWs about the subject due its seriousness and rapid spread all over the world, this was consistent with

previous result by Zhou M. *et al* (89%) [10].

The predominant gender in our sample was female (70.7%) but the knowledge score wasn't differing significantly from male ($p=.339$), this may reflect the education equality in our community. Doctors showed higher Knowledge score (90.1±8.6 SD, $p=.044$), and this goes with a study done in Henan/China [10].

Interestingly, knowledge score of HCWs who work in a specialized family health care centres was significantly higher than those who work in non-specialized centres ($p=.000$), this due to good training programs and intensified CME activities, in addition to presence of board and diploma certified doctors in these centers.

The typical symptoms of COVID-19 are fever, sore throat, fatigue, cough or dyspnea [15], the vast majority of the participant (96.3%) had good knowledge about the clinical features of the disease, this matches previous findings by Zhong *et al.* (96.4%); who also reported that (94.0%) of his study sample knows that there is no special medication but supportive management [16], which concurred with our finding (90.6%).

Most COVID-19 cases in children are not severe, serious COVID-19 illness resulting in hospitalization still occurs in this age group. Social distancing and everyday preventive behaviors remain important for all age groups as patients with less serious illness and those without symptoms likely play an important role in disease transmission [17–19], in our study (83.4%) reported (NO) answer to the question (K8; children & young peoples should not take the protective measures), and this was lower than what was found by Zhong *et al.* [16].

Chlorine solutions will gradually lose strength, so fresh solutions must be prepared frequently, and diluted solutions should be replaced after 24 hours as documented by WHO [20, 21], More than half of participants (64.5%) knew that diluted chlorine solution is not active after 24 hours of preparation.

In spite of wide spread of herbals and garlic use in our society [22], nearly one third of participants (36.7%) agreed that herbals and garlic are beneficial in prevention of the disease, this was less than what was reported by Alzoubi *et al.* (42.7%) from Jordan [23]. The WHO was considered the use of garlic and herbals as myth, and responded against this misinformation and rumours through 'myth busting' on WHO's social media and its website [24–26].

Most of participants (83.6%) disagreed with those who don't respond to the protective measures and quarantine, quarantine (with maintenance of dignity, human rights and fundamental freedom of people) is an important measure in delaying the peak of the epidemic in the region where local transmission is going on.

The study resulted in an overall good practice in infection control and prevention of the disease and health education to patients attending PHCs (practice score=91.5±8.1 SD) corrected to 100%.

Most of health care workers followed the WHO recommendations in infection control and prevention regarding

wearing face masks (91.6%), gloves (94.3%) and hand washing (88.1%), although they are not in the frontline but they are still at risk of exposure to asymptomatic or mild COVID-19 cases, and still have a role in disease transmission.

Regarding washing clothes after returning home from work (77.4%) of participant do washing while (15.9%) do it sometimes, researchers found that the virus can remain on some surfaces for up to 72 hours, thus clothes may contain hard surfaces like buttons and zippers where the virus might linger or HCW may got too close for too long or someone coughed near his/her cloths making fabrics a way of transmission of the virus.

The correlation between knowledge and practice scores was interesting ($r=.196$, $p=.000$), that's indicate the more knowledge about the disease, the more performance of right practice, while our study revealed no significant statistical correlation between knowledge and attitude, ($r=.074$, $p=.138$), this may be due to the attitude score is dependent on the question of (herbal & garlic), and even whom with high knowledge score may have positive attitude toward it, making their attitude score low.

Source of information is an important issue in getting the right knowledge, (71.20%) of participants got information from social media and this high percentage is of concern because of internet is a possible source for spread of misinformation and fake news.

5. Strength

By performing multistage sampling and taking large sample size we try to ensure good external validity (generalizability to Babylon governorate), our findings may

be useful when planning health education programs about this emerging infectious disease.

6. Limitations

Our research may have some limitations: the study done in one governorate (Babylon), so we can't generalize it all over Iraq, another limitation is the measurement of KAP may not cover enough aspects due to the limited number of items.

7. Recommendation

First, a well-prepared Iraqi guideline that depend on WHO and CDC guidelines to be published and available on official websites that help HCWs to get the updated and right knowledge and to do optimal practice in controlling the human-to-human spread of this infectious disease, in addition to health education and training programs to all HCWs; second: further studies to investigate more and different aspects of KAP towards COVID-19 infection among Iraqi people.

8. Conclusion

The evidence from this study suggests: good knowledge and practice but ordinary attitude among health care workers working in primary health care centers during the rapid rise period of the COVID-19 outbreak, this reflects the rapid spread of information through TV, radios, websites and social medias after the announcement of WHO that this new infectious disease is a pandemic.

Appendix

Table 1. Distribution of knowledge score across the Sociodemographic factors.

Sociodemographic factors		N(%)	Knowledge score Mean (\pm SD)	Significance
Age	20-30 years	105 (26.1%)	86.6 (\pm 9.9)	$p=.029$ ‡
	30-40 years	141 (35.0%)	88.7 (\pm 9.2)	
	40-50 years	108 (26.8%)	88.8 (\pm 9.6)	
	>50 years	49 (12.2%)	91.4 (\pm 7.9)	
Gender	Male	118 (29.3%)	89.2 (\pm 8.7)	$p=.339$ †
	Female	285 (70.7%)	88.2 (\pm 9.7)	
Occupation	Physicians	94 (23.3%)	90.1 (\pm 8.6)	$p=.044$ †
	other medical staff	309 (76.7%)	88.0 (\pm 9.6)	
	Nursing school	62 (15.4%)	85.7 (\pm 9.6)	
Academic level	Nursing institute	197 (48.9%)	88.3 (\pm 9.8)	$p=.007$ ‡
	College	119 (29.5%)	89.4 (\pm 8.5)	
	higher education	25 (6.2%)	92.9 (\pm 8.4)	
Place of residence	Urban area	274 (68.0%)	89.5 (\pm 9.6)	$p=.001$ †
	Rural area	129 (32.0%)	86.3 (\pm 8.8)	
Type of PHCC	Specialized Family HCC	213 (52.9%)	90.1 (\pm 9.5)	$p=.000$ †
	Non specialized Family HCC	190 (47.1%)	86.7 (\pm 9.0)	

† Independent sample T test

‡ One way ANOVA test

Table 2. The calculated knowledge attitude & practice score.

Score	Mean (\pm SD)	95% confidence interval
Knowledge	88.5 (\pm 9.4)	87.5 - 89.4
Attitude	69.2 (\pm 28.9)	66.3 - 72.0
Practice	91.5 (\pm 8.1)	90.7 - 92.2

Table 3. Knowledge Section responses.

Knowledge section questions	Correct	n=(%)
K1: The main clinical symptoms of COVID-19 are (fever, cough and dyspnea).	Yes	388 (96.3%)
K2: The disease can be transmitted via rubbing of the eyes.	Yes	366 (90.8%)
K3: The risk of transmission increase in the last 1-4 days before appearance of symptoms.	Yes	302 (74.9%)
K4: This disease is similar to influenza & the lab can do the differentiation.	Yes	328 (81.4%)
K5: There is no special medication but the supportive management.	Yes	365 (90.6%)
K6: Reinfection is possible to the previously infected person.	Yes	288 (71.5%)
K7: The diluted chlorine solution is not active after 24 hours of preparation.	Yes	260 (64.5%)
K8: The children & young peoples should not take the protective measures.	No	336 (83.4%)
K9: Do you have enough information about social isolation	Yes	372 (92.3%)

Table 4. Attitude section responses.

Attitude section questions	Agree n=(%)	Neutral n=(%)	Disagree n=(%)
A1: Do you agree with those how are using garlic and herbals for protection?	128 (31.8%)	127 (31.5%)	148 (36.7%)
A2: What's your attitude from those who don't appreciate the risk of the disease, don't take protective measures and not respond to quarantine.	47 (11.7%)	19 (4.7%)	337 (83.6%)

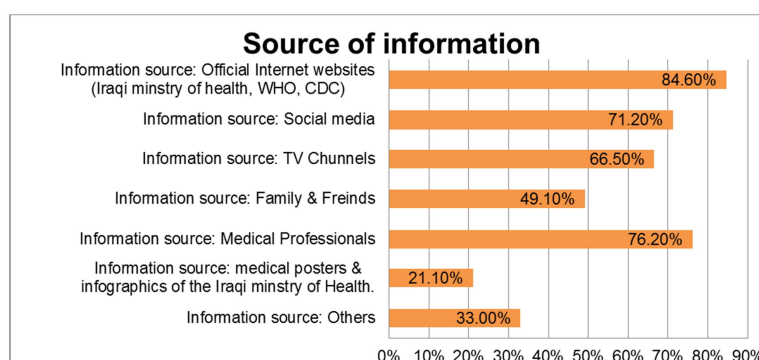
Table 5. Practice section responses.

Practice section questions	Yes n=(%)	Sometimes n=(%)	No n=(%)
P1: Do you wear face mask during your work?	369 (91.6%)	21 (5.2%)	13 (3.2%)
P2: Do you wear gloves during your work?	380 (94.3%)	12 (3.0%)	11 (2.7%)
P3: Do you wash your hands regularly for 20 seconds?	355 (88.1%)	45 (11.2%)	3 (0.7%)
P4: Do you wash your clothes after returning home from work?	312 (77.4%)	64 (15.9%)	27 (6.7%)
P5: Do you teach & instruct people about risk of the disease & the preventive measures?	351 (87.1%)	47 (11.7%)	5 (1.2%)
P6: Do you teach people about the symptoms & what to do if they have got the disease?	325 (80.6%)	53 (13.2%)	25 (6.2%)

Table 6. Correlation of the Knowledge, attitude & practice score.

Knowledge \times Attitude	Pearson (r)=.074	$p=.138$
Knowledge \times Practice	Pearson (r)=.196	$p=.000^*$

* Correlation is significant at the 0.01 level (2-tailed).

**Figure 1.** Percentage distribution of the source of information.

References

- [1] Zhu H, Wei L, Niu P. The novel coronavirus outbreak in Wuhan, China. *Global Health Research and Policy*. 2020; 5 (1): 6. doi: 10.1186/s41256-020-00135-6.
- [2] Guo Y-R, Cao Q-D, Hong Z-S, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. *Military Medical Research*. 2020; 7 (1): 11. doi: 10.1186/s40779-020-00240-0.
- [3] Meo SA, Alhowikan AM, Khilaiwi TAL, et al. Novel coronavirus 2019-nCoV: Prevalence, biological and clinical characteristics comparison with SARS-CoV and MERS-CoV. *European Review for Medical and Pharmacological Sciences*. 2020; 24 (4): 2012-2019. doi: 10.26355/eurrev_202002_20379.

- [4] Tian S, Hu N, Lou J, et al. Characteristics of COVID-19 infection in Beijing. *Journal of Infection*. 2020; 80 (4): 401-406. doi: 10.1016/j.jinf.2020.02.018.
- [5] World Health Organization. *Coronavirus Disease (COVID-19): Situation Report-36 (25/2/2020)*.; 2020. <https://apps.who.int/iris/handle/10665/331222>.
- [6] World Health Organization. *Coronavirus Disease (COVID-19): Situation Report-152 (20/6/2020)*.; 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200620-COVID-19-sitrep-152.pdf?sfvrsn=83aff8ee_4. Accessed June 21, 2020.
- [7] World Health Organisation. Rights, roles and responsibilities of health workers, including key considerations for occupational safety and health: Interim guidance. 2020; (March): 1-2.
- [8] Zhou P, Huang Z, Xiao Y, Huang X, Fan XG. Protecting Chinese Healthcare Workers while Combating the 2019 Novel Coronavirus. *Infection Control and Hospital Epidemiology*. 2020; 1-4. doi: 10.1017/ice.2020.60.
- [9] McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Meta-Analysis of the Reasoned Action Approach (RAA) to Understanding Health Behaviors. *Annals of Behavioral Medicine*. 2016; 50 (4): 592-612. doi: 10.1007/s12160-016-9798-4.
- [10] Zhou M, Tang F, Wang Y, et al. Knowledge, attitude and practice regarding COVID-19 among health care workers in Henan, China. *Journal of Hospital Infection*. 2020. doi: 10.1016/j.jhin.2020.04.012.
- [11] Charan J, Biswas T. How to calculate sample size for different study designs in medical research? *Indian Journal of Psychological Medicine*. 2013; 35 (2): 121. doi: 10.4103/0253-7176.116232.
- [12] World Health Organization. Guidance for health workers. <http://web.archive.org/web/20200419195822/https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/health-workers>. Published 2020. Accessed April 19, 2020.
- [13] World Health Organization. *Quarantine Considerations in the Context of Coronavirus Disease (COVID-19): Interim Guidance 19 March 2020*.; 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e1.htm>.
- [14] CDC. Information for Healthcare Professionals about Coronavirus (COVID-19). <https://web.archive.org/web/20200621210523/https://www.cdc.gov/coronavirus/2019-nCoV/hcp/>. Published 2020. Accessed June 22, 2020.
- [15] Zhai P, Ding Y, Wu X, Long J, Zhong Y, Li Y. The epidemiology, diagnosis and treatment of COVID-19. *International Journal of Antimicrobial Agents*. 2020; (January): 105955. doi: 10.1016/j.ijantimicag.2020.105955
- [16] Zhong B, Luo W, Li H, et al. Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. 2020; 16. doi: 10.7150/ijbs.45221.
- [17] CDC COVID-19 Response Team. Coronavirus Disease 2019 in Children - United States, February 12-April 2, 2020. *MMWR Morbidity and mortality weekly report*. 2020; 69 (14): 422-426. doi: 10.15585/mmwr.mm6914e4.
- [18] Wei WE, Li Z, Chiew CJ, Yong SE, Toh MP, Lee VJ. Presymptomatic Transmission of SARS-CoV-2 — Singapore, January 23–March 16, 2020. *MMWR Morbidity and Mortality Weekly Report*. 2020; 69 (14): 411-415. doi: 10.15585/mmwr.mm6914e1.
- [19] Hoehl S, Rabenau H, Berger A, et al. Evidence of SARS-CoV-2 Infection in Returning Travelers from Wuhan, China. *New England Journal of Medicine*. 2020; 382 (13): 1278-1280. doi: 10.1056/NEJMc2001899.
- [20] World Health Organization. *Infection Prevention and Control of Epidemic- and Pandemic-Prone Acute Respiratory Infections in Health Care*.; 2014.
- [21] Anderson E, Li J, Center for Research on Ingredient Safety. COVID-19 – Disinfecting with Bleach. <http://web.archive.org/web/20200618203639/https://www.canr.msu.edu/news/COVID-19-disinfecting-with-bleach>. Published 2020. Accessed June 18, 2020.
- [22] The National Center for Complementary and Integrative Health. In the News: Coronavirus and “Alternative” Treatments. <http://web.archive.org/web/20200412221550/http://www.nccih.nih.gov/health/in-the-news-coronavirus-and-alternative-treatments>. Published 2020. Accessed April 13, 2020.
- [23] Kadhim K, Abbas A, Hussain S. Use of herbal drugs as alternative medicine: Experience of Iraqi patients. *Spatula DD - Peer Reviewed Journal on Complementary Medicine and Drug Discovery*. 2015; 5 (4): 219. doi: 10.5455/spatula.20160313010203.
- [24] Alzoubi H, Alnawaiseh N, Al-Mnayyis A, Abu-Lubad M, Aql A, Al-Shagahin H. COVID-19 - Knowledge, attitude and practice among medical and non-medical university students in Jordan. *Journal of Pure and Applied Microbiology*. 2020; 14 (1): 17-24. doi: 10.22207/JPAM.14.1.04.
- [25] World Health Organization. *Novel Coronavirus (2019-nCoV): Situation Report- 11 (31/1/2020)*. World Health Organization; 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-sitrep-11-ncov.pdf?sfvrsn=de7c0f7_4.
- [26] World Health Organization. Myth busters. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters#garlic>. Published 2020. Accessed June 21, 2020.