RESEARCH ARTICLE

## Public engagement in government officials' posts on social media during coronavirus lockdown

#### Ahmed Omar Bali<sup>1</sup>, Hussam Al Halbusi<sup>2</sup>, Araz Ramazan Ahmad<sup>3,4</sup>, Ka Yiu Lee<sup>5,6</sup>\*

 Diplomacy and Public Relations Department, University of Human Development, Sulaymaniah, Iraq,
Ahmed Bin Mohammed Military College, Doha, Qatar, 3 Department of Administration, College of Humanities, University of Raparin, Ranya, Iraq, 4 Department of International Relations & Diplomacy, Faculty of Administrative Sciences and Economics, Tishk International University, Erbil, Iraq, 5 Department of People and Society, Swedish University of Agricultural Sciences, Alnarp, Sweden, 6 Department of Health Sciences, Swedish Winter Sports Research Centre, Mid Sweden University, Östersund, Sweden

\* kaee0001@stud.slu.se

## Abstract

#### Background

Social media has been a common platform to disseminate health information by government officials during the COVID-19 pandemic. However, little is known about the determinants of public engagement in officials' posts on social media, especially during lockdown.

#### Objectives

This study aims to investigate how the public engages in officials' posts about COVID-19 on social media and to identify factors influencing the levels of engagement.

#### Methods

A total of 511 adults aged 18 or over completed an online questionnaire during lockdown in Iraq. Levels of engagement in officials' posts on social media, trust in officials and compliance of government instructions were assessed.

#### Results

Fear of COVID-19 and trust in officials were positively associated with compliance of government instructions. Trust in officials was also associated with active engagement in officials' posts on social media, including commenting, posting and sharing of the posts.

#### Conclusions

Trust in government has been established during the COVID-19 pandemic. Public engagement in officials' posts is crucial to reinforce health policies and disseminate health information.



### G OPEN ACCESS

**Citation:** Bali AO, Halbusi HA, Ahmad AR, Lee KY (2023) Public engagement in government officials' posts on social media during coronavirus lockdown. PLoS ONE 18(1): e0280889. https://doi.org/10.1371/journal.pone.0280889

**Editor:** Luigi Lavorgna, Universita degli Studi della Campania Luigi Vanvitelli, ITALY

Received: March 14, 2022

Accepted: January 10, 2023

Published: January 23, 2023

**Copyright:** © 2023 Bali et al. This is an open access article distributed under the terms of the <u>Creative</u> Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Data Availability Statement:** All relevant data are within the paper and its Supporting Information files.

**Funding:** The author(s) received no specific funding for this work.

**Competing interests:** The authors have declared that no competing interests exist.

#### Introduction

When the first case of coronavirus (COVID-19) was identified in Iraq on February 24, 2020 [1], government officials started to raise public awareness through social media and provide information and instructions about social distancing and hygienic practices [2]. One of the key features of social media is a two-way communication which allows government officials to deliver messages and to receive feedbacks from the public. Public confidence and trust could be gained in this process [3,4].

During the COVID-19 pandemic, people were encouraged to engage in officials' posts on social media which may help raise health awareness of people [5]. In fact, social media has been shown to play a vital role on the outbreak of Zika [6–8], H1N1 [9], and Ebola [10]. Previous studies also found a positive role of social media on providing important health information [11–17]. In contrast, social media may also spread misinformation and trigger panics [18–25]. The participation of health care professionals on social media can reduce the possibility of fake news because they provide relevant and necessary information on medications, symptoms [26], disease management and diagnoses [27,28]. In addition, the input from health professionals can reduce fake news [29].

Social media has been found to connect people with government authorities in several studies with different approaches of analysis, including a descriptive content analysis of posts [6], social network analysis [9], thematic analysis [30], and comparative studies of countries in relation to health authorities [2]. However, there is a lack of research examining public engagement in officials' posts about COVID-19 on social media, including reports, texts, pictures, videos, and interviews which are displayed by government officials.

Public engagement has become the center of attention in marketing, business, and communication technologies [31,32] which facilitate social interactions between parties during the crisis [33]. Social media offers two-way communication and encourages interactions among users through posting and sharing of texts, comments, pictures, and videos with a large audience anywhere at anytime [34]. Hwang and Thorn [35] categorized the public engagement into psychological and behavioral aspects. Psychological engagement refers to personal and internal involvement in posted texts, videos, and data in a specific context. Behavioral engagement is achieved when the users click "like", write comments and posts, or share a text, picture, or video with the public or with a close group on social media [33].

Several studies revealed that that people engage more with social media during health crises and pandemics [36]. For example, the majority of Chinese were engaged in social media during lockdown [37,38]. Deng et al. [24] explained that the "online engagement and psychological distance" are the reasons people engaging in social media during the crisis. Social media also raises awareness of crisis and helps connection with family and friends. Liu, et al [39] explained the importance of "psychological distance" through analyzing the behaviors of internet users and found that quarantine policies increase the public anxiety due to social distancing. Few studies, however, examine the levels of fear of COVID-19 during lockdown period and the relationship with public engagement in social media [40,41].

Social media enables users to receive immediate information which can be shared and discussed among friends and relatives [42,43]. It is expected that information exchange between people will increase during the crisis, particularly during lockdown when people lose physical interactions. However, there is a lack of research examining the determinants of public engagement in officials' posts during lockdown. This study, therefore, serves to fill in the above research gaps.

#### Methods

This is a cross-sectional study conducted through a self-administered online questionnaire targeting adults aged 18 years or above in Iraq. The questionnaire measures levels of public trust in government officials, engagement in officials' posts on social media and other health behaviours based on a binary scale (Yes/No) or a 3-point scale (Yes/To somewhat/No). The online questionnaire was distributed using social media, including Facebook, Viber, Instagram and WhatsApp. Data collection was carried out during the lockdown period in Iraq starting from the first week of March until the mid of April 2020. Informed consent was obtained from participants and approval to conduct this study was obtained from the University of Raparin.

#### Statistical analysis

Descriptive statistics of key variables were presented as frequency and percentage. Spearman correlation tests were conducted to examine the association between public engagement in social media, trust in government officials and other health behaviours. Chi-square tests were used to determine the frequency of categorical variables. All data analyses were conducted using IBM SPSS version 22.

#### Results

A total of 511 participants completed the questionnaire, of which 313 (61.3%) participants were male. Over 61% (n = 314) participants were 18–35 years old, whilst about 30% (n = 154) participants were 36–50 years old.

#### Public trust in government officials

The majority of participants (62.1%) indicated that they somewhat trust the national healthcare, whilst 12.7% participants indicated their distrust. A total of 71.8% participants indicated their trust in the instructions given by officials on social media and over 95% participants believed in government strategies to prevent spreading of COVID-19, such as social distancing and mask wearing. Most participants (65.9%) indicated that they somewhat fear of COVID-19 (Table 1).

Table 1. Public trust in national healthcare, instructions given by officials on social media, government strategies
to prevent spreading of COVID-19, and fear of COVID-19 among 511 participants.

Variables	N (%)
Public trust in national healthcare	
No	56 (12.7)
To somewhat	312 (62.1)
Yes	132 (26.2)
Public trust in the instructions pres	ented on social media by government officials
No	54 (10.6)
To somewhat	90 (17.6)
Yes	367 (71.8)
Believing in government strategies t	to prevent spreading of COVID-19 (Mask wearing, social distancing, etc.)
No	23 (4.5)
Yes	488 (95.5)
Fear of COVID-19	
No	70 (13.7)
To somewhat	337 (65.9)
Yes	104 (20.4)

https://doi.org/10.1371/journal.pone.0280889.t001

#### Public engagement in officials' posts and behavioural change

The majority of participants (61.1%) indicated that they somewhat wrote comments and clicked like on the officials' posts about COVID-19 on social media, while about one-fifth of the participants did not react to the officials' posts. Similarly, over half of the participants indicated that they somewhat posted and shared officials' posts, whilst about 38% participants did not. Over 55% participants investigated the information about COVID-19 on social media according to the information from international sources, whilst nearly 84% participants changed their behaviours in response to officials' posts about COVID-19 (Table 2).

#### Public engagements in officials' posts between sexes and age groups

More male participants than female indicated that they clicked like or commented on the officials' posts on social media ( $X^2 = 7.79$ , p < .05). Similarly, more male participants shared officials' posts ( $X^2 = 11.54$ , p < .05) (Table 3). More participants in younger age group (18–35 years old) had somewhat clicked like or commented on officials' posts ( $X^2 = 20.38$ , p < .05), whilst more participants in older age group indicated that they shared the officials' posts ( $X^2 = 19.23$ , p < .05).

# Fear of COVID-19, compliance of government instructions and public engagement in officials' posts on social media

There was significant association between fear of COVID-19 and compliance of government instructions (rho = .183, p < .000). There was also significant association between trust in officials' posts and compliance of government instructions (rho = .294, p < .000), clicking like and/or writing comments (rho = 0.181, p < .000), and sharing the officials' posts (rho = .129, p < .003), indicating that trust in government helps disseminate health information and reinforce health policies.

#### Discussion

Iraqi government has lost public trust due to corruption [44] and insufficient public health services [31]. In addition, the media is monopolized by certain political parties with different

Variables	N (%)
Writing comments and clicking like	in officials' posts about COVID-19 on social media
No	112 (21.9)
To somewhat	312 (61.1)
Yes	87 (17.0)
Posting and/or sharing officials' pos	ts about COVID-19 on social media
No	191 (38.2)
To somewhat	271 (53.0)
Yes	45 (8.8)
Investigating the information about international sources	COVID-19 on social media according to the information from
No	228 (44.6)
Yes	283 (55.4)
Changing behaviour in response to	officials' posts about COVID-19 on social media
No	81 (15.9)
Yes	430 (84.1)

Table 2. Public engagement in officials' posts about COVID-19 on social media and behavioural change in response to officials' posts among 511 participants.

Gender	Levels of Engagement	X <sup>2</sup>	p-value	No (N (%))	To some what (N (%))	Yes (N (%))
Male	Liking or commenting on a post	7.79	.005	61(19.5)	187(59.7)	65(20.8)
Female				51(25.8)	125(61.3)	22(11.1)
Male	Sharing of a post	11.54	.003	102 (32.6)	178 (59.9)	33 (10.5)
Female				93 (47)	93 (47)	12(6.1)
Age (years)						
18–35	Liking or commenting on a post	20.38	.000	54(17.2)	213(67.8)	47(15)
36–50				42(27.3)	83(53.9)	29(18.8)
51 or above				16(37.2)	16(37.2)	11(25.6)
18–35	Sharing of a post	19.23	.001	118(37.6)	155(49.4)	41(13.1)
36–50				59(38.3)	91(59.1)	4(2.6)
51 or above				18(14.9)	25(58.1)	0 (0)

Table 3. Differences in public engagements in officials'	posts between sexes and age groups $(N = 511)$ .
--	--

https://doi.org/10.1371/journal.pone.0280889.t003

ethnic and religious groups, causing public polarization [34,45]. The government officials tend to be acceptable only among a certain group [46,47], and they have been under criticism when publishing posts on social media, especially from the opposition groups who do not often use social media. However, during the COVID-19 pandemic, particularly during the lockdown, government officials were viewed as active members and the public engagement in officials' posts on social media was positive. In this study, the young male group showed more engagement in officials' posts. It was also found that the majority of the public trusted the officials' posts about COVID-19 on social media. We revealed that the fear of COVID-19 had changed their perception of the government authorities. Natural crisis can be a good opportunity for restoring public confidence and trust in government and creating relationships between the public and officials. Our results found that constructive dialogues between the public and officials can facilitate the interaction and play a role in mitigating the crisis. In this context, our study found that the majority of participants clicked like and wrote comments on the officials' posts about COVID-19 on social media, whilst less participants posted and shared the officials' posts. This indicates that sharing of a post involves a more complex cognitive process [32]. Social distancing is a factor of active engagement in social media as the need to interact with others surges during the lockdown [36-39]. It is worth noticing that only 26.2% of the participants indicated that they trust the national healthcare. This could be explained by the fact that Iraqi health system is not updated and corrupted. In addition, medical and academic professionals are not financially supported by the government [48–52]. In summary, public engagement in the media context includes the communication and understanding between specialists and professionals and the ordinary public, which contributes to building up a scientifically literate society [53], particularly in the developing world [54] through increasing their health awareness. In addition, it helps the health sectors and officials in decision-making regarding outbreak management [55].

#### Limitations

Although internet access was free of charge during the data collection period, younger and more educated groups are more likely to access to internet and participate in this study, causing certain extent of sampling bias. The cross-section study design implies that no causal relationship can be drawn. In addition, this study relied on self-report data which could be subjected to recall bias.

#### Conclusion

This study found that public trust in government authority was regained during the COVID-19 pandemic. There were correlations between fear of COVID-19, compliance of government instructions and public engagement in officials' posts on social media. Public engagement in officials' posts has played a role in disseminating health information and preventing the spread of COVID-19.

#### Supporting information

S1 File. (SAV)

#### **Author Contributions**

Conceptualization: Ahmed Omar Bali.

Formal analysis: Ahmed Omar Bali, Hussam Al Halbusi, Araz Ramazan Ahmad, Ka Yiu Lee.

Methodology: Ahmed Omar Bali, Hussam Al Halbusi, Araz Ramazan Ahmad, Ka Yiu Lee.

Supervision: Ka Yiu Lee.

Writing - original draft: Ahmed Omar Bali.

Writing – review & editing: Ahmed Omar Bali, Hussam Al Halbusi, Araz Ramazan Ahmad, Ka Yiu Lee.

#### References

- 1. <References>. Sarhan AR, Flaih MH, Hussein TA, Hussein KR. Novel coronavirus (COVID-19) Outbreak in Iraq: The First Wave and Future Scenario. medRxiv. 2020 Jan 1.
- 2. Sesagiri Raamkumar A, Tan S, Wee H. Measuring the outreach efforts of public health authorities and the public response on Facebook during the COVID-19 pandemic in early 2020: cross-country comparison. J Med Internet Res 2020 May 19; 22(5):e19334. https://doi.org/10.2196/19334 PMID: 32401219
- Holmes BJ. Communicating about emerging infectious disease: the importance of research. Health Risk Soc 2008 Aug; 10(4):349–360.
- Vaughan E, Tinker T. Effective health risk communication about pandemic influenza for vulnerable populations. Am J Public Health 2009 Oct; 99(S2):S324–S332. https://doi.org/10.2105/AJPH.2009.162537 PMID: 19797744
- 5. Nejad MY, Delghandi MS, Bali AO, Hosseinzadeh M. Using Twitter to raise the profile of childhood cancer awareness month. Network Modeling Analysis in Health Informatics and Bioinformatics. 2020 Dec 1; 9(1):3.
- Vijaykumar S, Meurzec R, Jayasundar K, Pagliari C, Fernandopulle Y. What's buzzing on your feed? Health authorities' use of Facebook to combat Zika in Singapore. J Am Med Informatics Assoc 2017; 24 (6):1159. https://doi.org/10.1093/jamia/ocx028 PMID: 28449047
- Lwin M, Lu J, Sheldenkar A, Schulz P. Strategic uses of Facebook in Zika outbreak communication: implications for the crisis and emergency risk communication model. Int J Environ Res Public Health 2018 Sep 10; 15(9):1974. https://doi.org/10.3390/ijerph15091974 PMID: 30201929
- Mamidi R, Miller M, Banerjee T, Romine W, Sheth A. Identifying key topics bearing negative sentiment on Twitter: insights concerning the 2015–2016 Zika epidemic. JMIR Public Health Surveill 2019 Jun 04; 5(2):e11036. https://doi.org/10.2196/11036 PMID: 31165711
- 9. de Araujo DHM, de Carvalho EA, da Motta CLR, da Silva Borges MR, Gomes JO, de Carvalho PVR. Social networks applied to Zika and H1N1 epidemics: a systematic review. Springer, Cham 2019: 679.
- Strekalova YA. Health risk information engagement and amplification on social media. Health Educ Behav 2017 Apr; 44(2):332–339. https://doi.org/10.1177/1090198116660310 PMID: 27413028
- Stefanidis A, Vraga E, Lamprianidis G, Radzikowski J, Delamater PL, Jacobsen KH, et al. Zika in Twitter: Temporal Variations of Locations, Actors, and Concepts. JMIR Public Health Surveill 2017 Apr 20; 3(2):e22. https://doi.org/10.2196/publichealth.6925 PMID: 28428164

- Du J, Tang L, Xiang Y, Zhi D, Xu J, Song H, et al. Public Perception Analysis of Tweets During the 2015 Measles Outbreak: Comparative Study Using Convolutional Neural Network Models. J Med Internet Res 2018 Jul 09; 20(7):e236. https://doi.org/10.2196/jmir.9413 PMID: 29986843
- 13. Achrekar H, Gandhe A, Lazarus R, Yu S, Liu B. Twitter improves seasonal influenza prediction. Healthinf 2012 Feb:61–70.
- Ni MY, Yang L, Leung CMC, Li N, Yao XI, Wang Y, et al. Mental Health, Risk Factors, and Social Media Use During the COVID-19 Epidemic and Cordon Sanitaire Among the Community and Health Professionals in Wuhan, China: Cross-Sectional Survey. JMIR Ment Health 2020 May 12; 7(5):e19009. https://doi.org/10.2196/19009 PMID: 32365044
- Fagherazzi G, Goetzinger C, Rashid MA, Aguayo GA, Huiart L. Digital Health Strategies to Fight COVID-19 Worldwide: Challenges, Recommendations, and a Call for Papers. Journal of Medical Internet Research 2020; 22(6):e19284. https://doi.org/10.2196/19284 PMID: 32501804
- Hart M, Stetten NE, Islam S, Pizarro K. Twitter and public health (part 1): how individual public health professionals use Twitter for professional development. JMIR Public Health Surveill 2017 Sep 20; 3(3): e60. https://doi.org/10.2196/publichealth.6795 PMID: 28931499
- Chen E, Lerman K, Ferrara E. Tracking Social Media Discourse About the COVID-19 Pandemic: Development of a Public Coronavirus Twitter Data Set. JMIR Public Health and Surveillance 2020; 6(2): e19273. https://doi.org/10.2196/19273 PMID: 32427106
- Ahmad A.R. and Murad H.R., 2020. The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: online questionnaire study. *Journal of Medical Internet Research*, 22(5), p. e19556.
- 19. Strekalova YA. Health risk information engagement and amplification on social media: News about an emerging pandemic on Facebook. Health Education & Behavior. 2017 Apr; 44(2):332–9.
- Vraga EK, Bode L. Using expert sources to correct health misinformation in social media. Science Communication. 2017 Oct; 39(5):621–45.
- 21. Depoux A, Martin S, Karafillakis E, Preet R, Wilder-Smith A, Larson H. The pandemic of social media panic travels faster than the COVID-19 outbreak.
- Farooq A, Laato S, Islam AN. Impact of online information on self-isolation intention during the COVID-19 pandemic: cross-sectional study. Journal of medical Internet research. 2020; 22(5):e19128. <a href="https://doi.org/10.2196/19128">https://doi.org/10.2196/19128</a> PMID: 32330115
- Ali K, Zain-ul-abdin K, Li C, Johns L, Ali AA, Carcioppolo N. Viruses Going Viral: Impact of Fear-Arousing Sensationalist Social Media Messages on User Engagement. Science Communication. 2019 Jun; 41(3):314–38.
- Deng Q, Liu Y, Liu X, Zhang H, Deng X. Social media usage during disasters: exploring the impact of location and distance on online engagement. Disaster medicine and public health preparedness. 2020 Apr; 14(2):183–91. https://doi.org/10.1017/dmp.2019.36 PMID: 31366419
- Kervyn N, Fiske ST, Malone C. Brands as intentional agents framework: How perceived intentions and ability can map brand perception. Journal of Consumer Psychology. 2012 Apr 1; 22(2):166–76. <a href="https://doi.org/10.1016/j.jcps.2011.09.006">https://doi.org/10.1016/j.jcps.2011.09.006</a> PMID: 24403815
- Fernandez-Luque L, Elahi N, Grajales FJ. An analysis of personal medical information disclosed in You-Tube videos created by patients with multiple sclerosis. Stud Health Technol Inform 2009; 150:292– 296. PMID: 19745316
- Farmer AD, Bruckner Holt CE, Cook MJ, Hearing SD. Social networking sites: a novel portal for communication. Postgrad Med J 2009 Sep; 85(1007):455–459. https://doi.org/10.1136/pgmj.2008.074674
  PMID: 19734511
- Anne Moorhead, S., Hazlett Diane E., Laura Harrison, Carroll Jennifer K., Anthea Irwin, and Ciska Hoving. "A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication." *Journal of medical Internet research* 15, no. 4 (2013): e1933.
- Lavorgna L. M. D. S., De Stefano M., Sparaco M., Moccia M., Abbadessa G., Montella P., Buonanno D. et al. "Fake news, influencers and health-related professional participation on the Web: A pilot study on a social-network of people with Multiple Sclerosis." *Multiple sclerosis and related disorders* 25 (2018): 175–178.
- Vijaykumar S, Nowak G, Himelboim I, Jin Y. Virtual Zika transmission after the first U.S. case: who said what and how it spread on Twitter. Am J Infect Control 2018 May; 46(5):549–557. <u>https://doi.org/10.1016/j.ajic.2017.10.015 PMID: 29306490</u>
- Bali A. Communication tools to fight bureaucratic corruption in Iraqi Kurdistan: A case study. SAGE Open. 2018 Nov; 8(4):2158244018811185.

- Bali A, Karim MS, Rached K. Public diplomacy effort across facebook: A comparative analysis of the US consulate in Erbil and the Kurdistan Representation in Washington. SAGE Open. 2018 Feb; 8 (1):2158244018758835.
- Di Gangi PM, Wasko MM. Social media engagement theory: Exploring the influence of user engagement on social media usage. Journal of Organizational and End User Computing (JOEUC). 2016 Apr 1; 28(2):53–73.
- Bali A, Jabar S, Jalal H, Sofi-Karim M. Iraqi media entrepreneurs across social media: Factors and challenges. Journal of Digital Media & Policy. https://doi.org/10.1386/jdmp\_00024\_1.
- **35.** Hwang M.I. and Thorn R.G., 1999. The effect of user engagement on system success: a meta-analytical integration of research findings. *Information & Management*, 35(4), pp.229–236.
- Medich M, Swendeman DT, Comulada WS, Kao UH, Myers JJ, Brooks RA. Promising approaches for engaging youth and young adults living with HIV in HIV primary care using social media and mobile technology interventions: protocol for the SPNS social media initiative. JMIR Res Protoc 2019 Jan 31; 8 (1):e10681. https://doi.org/10.2196/10681 PMID: 30702434
- Li C, Chen LJ, Chen X, Zhang M, Pang CP, Chen H. Retrospective analysis of the possibility of predicting the COVID-19 outbreak from Internet searches and social media data, China, 2020. Eurosurveillance. 2020 Mar 12; 25(10):2000199. <u>https://doi.org/10.2807/1560-7917.ES.2020.25.10.2000199</u> PMID: 32183935
- 38. Depoux A., Martin S., Karafillakis E., Preet R., Wilder-Smith A. and Larson H., 2020. The pandemic of social media panic travels faster than the COVID-19 outbreak.
- Liu Y, Wang B, Wu B, Shang S, Zhang Y, Shi C. Characterizing super-spreading in microblog: An epidemic-based information propagation model. Physica A: Statistical Mechanics and its Applications. 2016 Dec 1; 463:202–18. https://doi.org/10.1016/j.physa.2016.07.022 PMID: 32288102
- 40. Coco Lo, Gianluca Ambra Gentile, Bosnar Ksenija, Ivana Milovanović Antonino Bianco, et al. "A crosscountry examination on the fear of COVID-19 and the sense of loneliness during the first wave of COVID-19 outbreak." International journal of environmental research and public health 18, no. 5 (2021): 2586. https://doi.org/10.3390/ijerph18052586 PMID: 33807549
- **41.** Ahmad Araz Ramazan, and Hersh Rasool Murad. "The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: online questionnaire study." *Journal of medical Internet research* 22, no. 5 (2020): e19556.
- **42.** Shadroo S, Yoosefi Nejad M, Bali AO, Hosseinzadeh M, Delghandi MS. A comparison and analysis of the Twitter discourse related to weight loss and fitness. Network Modeling Analysis in Health Informatics and Bioinformatics. 2020 Dec; 9:1–2.
- Kim S, Liu BF. Are all crises opportunities? A comparison of how corporate and government organizations responded to the 2009 flu pandemic. Journal of Public Relations Research. 2012 Jan 1; 24(1):69– 85.
- 44. Kim C, Yang S. Like, comment, and share on Facebook: how each behavior differs from the other. Public Relations Rev 2017 Jun; 43(2):441–449.
- 45. Wang J, Calder B. Media engagement and advertising: transportation, matching, transference and intrusion. J Consumer Psychol 2009 Jul; 19(3):546–555.
- Kim C, Yang S. Like, comment, and share on Facebook: how each behavior differs from the other. Public Relations Rev 2017 Jun; 43(2):441–449.
- Xu Z, Yang Q. Analyzing user retweet behavior on twitter. 2013 Feb Presented at: 2012 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining; August 2012; Istanbul, Turkey p. 46–50.
- Al-Mosawi Aamir Jalal. "Iraq healthcare system: An update." Lupine Online Journal of Medical Sciences (ISSN: 2641-1725) 4, no. 3 (2020): 404–411.
- 49. Al-Mosawi Aamir. Iraq healthcare system before covid-19 pandemic. Scholars' Press, 2021.
- Al-Hamadani Ashraf S., Jaff Dilshad, and Edwards Mark. "The factors impeding health system reform in Iraqi Kurdistan region." *Medicine, Conflict and Survival* 35, no. 1 (2019): 80–102. <u>https://doi.org/10.1080/13623699.2018.1552239</u> PMID: 30522353
- 51. Hussein Alaa Nory. "The Repercussions of the Corona Virus on the Iraqi Economy, Opportunities and Challenges." *Webology* 19, no. 1 (2022).
- 52. Tamimi Naqa Saleh Mahdi, and Abdulraheem Abduljalil Wali. "Health problems of Iraqi police dogs referred to Baghdad Veterinary Hospital during 2015–2017." *Veterinary World* 12, no. 7 (2019): 1046. https://doi.org/10.14202/vetworld.2019.1046-1051 PMID: 31528031
- Lavorgna Luigi, Brigo Francesco, Esposito Sabrina, Abbadessa Gianmarco, Sparaco Maddalena, et al. "Public engagement and neurology: An update." *Brain Sciences* 11, no. 4 (2021): 429. https://doi.org/ 10.3390/brainsci11040429 PMID: 33800571

- 54. Cohen Emma RM, Masum Hassan, Berndtson Kathryn, Saunders Vicki, Hadfield Tom, et al. "Public engagement on global health challenges." *BMC Public Health* 8, no. 1 (2008): 1–8. <u>https://doi.org/10.1186/1471-2458-8-168 PMID: 18492256</u>
- Kemper Sophie, Bongers M. E. J., Slok E. N. E., Schoonmade L. J., Kupper J. F. H., and Timen A. "Patient and public engagement in decision-making regarding infectious disease outbreak management: an integrative review." *BMJ global health* 6, no. 11 (2021): e007340. https://doi.org/10.1136/ bmjgh-2021-007340 PMID: 34824137