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Review Article

ROLES OF PHARMACISTS: AS AWARENESS SOURCE OF COVID-19

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ABSTRACT

Coronavirus infection disease, it may Cause illness in animal or humans. coronavirus which infects humans and bats. Common human coronaviruses are 229E (alpha coronavirus),NL63 (alpha coronavirus), OC43 (beta coronavirus), HKU1 (beta coronavirus) and other are MERS-CoV, SARS-CoV, SARS-CoV 2 (COVID-19).MERS-CoV was first identified in a patient from the Kingdom of Saudi Arabia in June 2012 and was originally named human coronavirus-EMC, as in Erasmus Medical Center.Severe acute respiratory syndrome (SARS) is a viral respiratory disease caused by a SARS-associated coronavirus. It was first identified at the end of February 2003 during an outbreak that emerged in China and spread to 4 other countries**.** COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first identified in December 2019 in Wuhan, Hubei, China, and has resulted in an ongoing pandemic. Treatment of SARS is mainly supportive with antipyretics, supplemental oxygen and mechanical ventilation as needed.COVID-19 can affect the upper respiratory tract (sinuses, nose, and throat) and the lower respiratory tract (windpipe and lungs). No pharmaceutical products have yet been shown to be safe and effective for the treatment of COVID-19.

Key words: COVID-19, Pharmacists, Awareness.

INTRODUCTION:

Pharmacists" the word itself speak everything- the persons who are the expert of drugs/medicines. They are the backbone of the healthcare systems. Pharmacist knows what is the pharmacodynamics & pharmacokinetics of any drug, what is the right formulation, dose and time to take that medicines, also what are the expected adverse effects, drug interactions, contraindications and much more. Pharmacists are the person who are available everywhere from discovery and manufacturing of drug to dispensing it. So, in this way Pharmacists are the first contact person between the patients and health care systems so pharmacist is a important source for the awareness of any diseases.

Corona viruses are named for the crown-like spikes on their surface. There are four main sub-groupings of coronaviruses, known as alpha, beta, gamma, and delta (Visacri et al., 2021). Human coronaviruses were first identified in the mid-1960s. The seven coronaviruses that can infect people are:Corona viruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19 (Mukattash et al., 2020). COVID-19 is the infectious disease caused by the most recently discovered corona virus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019.There are hundreds of coronaviruses, most of which circulate in animals. Only seven of these viruses infect humans and four of them cause symptoms of the common cold. But, three times in the last 20 years, a coronavirus has jumped from animals to humans to cause severe diseases (Pharmacy right to me).

Common human coronaviruses.

1. 229E (alpha coronavirus)
2. NL63 (alpha coronavirus)
3. OC43 (beta coronavirus)
4. HKU1 (beta coronavirus)

Other human coronaviruses

1. MERS-CoV (the beta coronavirus that causes Middle East Respiratory Syndrome, or MERS).
2. SARS-CoV (the beta coronavirus that causes severe acute respiratory syndrome, or SARS).
3. SARS-CoV-2 (the novel coronavirus that causes coronavirus disease 2019, or COVID-19.

COVID-19 (SAARS-CoV-2)

Coronavirus disease 2019 (COVID-19), also known as the coronavirus, or COVID, is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic (Mallhi et al., 2020).

Sign & Symptoms

Most common symptoms:

- Fever
- Dry cough
- Tiredness

Less common symptoms:

- Aches and pains

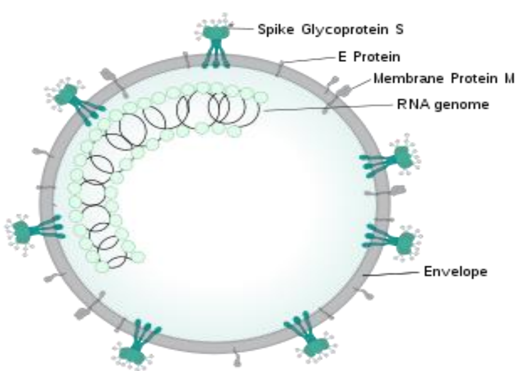
- Sore throat
- Diarrhoea
- Conjunctivitis
- Headache
- Loss of taste or smell
- A rash on skin, or discolouration of fingers or toes

Serious symptoms:

- difficulty breathing or shortness of breath
- chest pain or pressure
- loss of speech or movement

Transmission

OVID-19 spreads primarily when people are in close contact and one person inhales small droplets produced by an infected person (symptomatic or not) coughing, sneezing, talking, or singing. The WHO recommends 1 metre (3 ft) of social distance; the US Canters for Disease Control and Prevention (CDC) recommends 2 metres (6 ft) (Wick*et al*., 1957).



Virology

The causative agent of COVID-19, the SARS-CoV-2 virus is a positive-strand RNA virus that causes severe respiratory syndrome in humans. The mature SARS-CoV-2 contains 4 structural proteins: Envelope (E), Membrane (M), Nucleocapsid (N), and the Spike protein (S). E and M proteins help in viral assembly and N protein is needed for RNA synthesis. Additionally, SARS-CoV-2 is reported to use the angiotensin converting enzyme 2 (ACE2) receptor for host cell entry along with the nuclear transport factor, known as importin. Please note that the recommended reagents mentioned here are for research use only and not for use in diagnostic procedures (Pelicano et al., 2006).

Pathogenesis of COVID-19

Pathogenesis of COVID-19 from a cell biology perspective

Stage 1: Asymptomatic state (initial 1-2 days of infection)

The inhaled virus SARS-CoV-2 likely binds to epithelial cells in the nasal cavity and starts replicating. ACE2 is the main receptor for both SARS-CoV2 and SARS-CoV. In vitro data with SARS-CoV indicate that the ciliated cells are primary cells infected in the conducting airways. However, this concept might need some revision, since single-cell RNA indicates low level of ACE2 expression in conducting airway cells and no obvious cell type preference. There is local propagation of the virus but a limited innate immune response. At this stage the virus can be detected by nasal swabs. Although the viral burden may be low, these individuals are infectious. The RT-PCR value for the viral RNA might be useful to predict the viral load and the subsequent infectivity and clinical course. Perhaps super spreaders could be detected by these studies. For the RT-PCR cycle number to be useful, the sample collection procedure would have to be standardised. Nasal swabs might be more sensitive than throat swabs (Ralser et al., 2008).

Stage 2:Upper airway and conducting airway response (next few days).

The virus propagates and migrates down the respiratory tract along the conducting airways, and a more robust innate immune response is triggered. Nasal swabs or sputum should yield the virus (SARS-CoV-2) as well as early markers of the innate immune response. At this time, the disease COVID-19 is clinically manifest. The level of CXCL10 (or some other innate response cytokine) may be predictive of the subsequent clinical course. Viral infected epithelial cells are a major source of beta and lambda interferons. CXCL10 is an interferon responsive gene that has an excellent signal to noise ratio in the alveolar type II cell response to both SARS-CoV and influenza. CXCL10 has also been reported to be useful as disease marker in SARS. Determining the host innate immune response might improve predictions on the subsequent course of the disease and need for more aggressive monitoring (Kurtoglu et al., 2007; Xi et al., 2010; Defenouillère et al., 2019).

For about 80% of the infected patients, the disease will be mild and mostly restricted to the upper and conducting airways. These individuals may be monitored at home with conservative symptomatic therapy(Kovar et al., 2009).

Stage 3:Hypoxia, ground glass infiltrates, and progression to ARDS.

Unfortunately, about 20% of the infected patients will progress to stage 3 diseases and will develop pulmonary infiltrates and some of these will develop very severe disease. Initial estimates of the fatality rate are around 2%, but this varies markedly with age. The fatality and morbidity rates may be revised once the prevalence of mild and asymptomatic cases is better defined. The virus now reaches the gas exchange units of the lung and infects alveolar type II cells. Both SARS-CoV and influenza preferentially infect type II cells compared to type I cells. The infected alveolar units tend to be peripheral and subpleural. SARS-CoV propagates within type II cells, large number of viral particles are released, and the cells undergo apoptosis and die (Cheng et al., 2006) The end result is likely a self-replicating pulmonary toxin as the released viral particles infect type II cells in adjacent units. I suspect areas of the lung will likely lose most of their type II cells, and secondary pathway for epithelial regeneration will be triggered. Normally, type II cells are the precursor cells for type I cells [ET Online, 2021]. This postulated sequence of events has been shown in the murine model of influenza pneumonia. The pathological result of SARS and COVID-19 is diffuse alveolar damage with fibrin rich hyaline membranes and a few multinucleated giant cells. The aberrant wound healing may lead to more severe scarring and fibrosis than other forms of ARDS. Recovery will require a vigorous innate and acquired immune response and epithelial regeneration. From my perspective, similar to influenza, administrating epithelial growth factors such as KGF might be detrimental and might increase the viral load by producing more ACE2 expressing cells. Elderly individuals are particularly at risk because of their diminished immune response and reduced ability to repair the damaged epithelium. The elderly also has reduced mucociliary clearance, and this may allow the virus to spread to the gas exchange units of the lung more readily (DGCI, 2021).

Diagnosis

The WHO has published several testing protocols for the disease.

Rapid and accurate detection of COVID-19 is crucial to control outbreaks in the community and in hospitals. TrueNat system also use to the diagnosed COVID-19.

Current diagnostic tests for coronavirus include reverse-transcription polymerase chain reaction (RT-PCR), real-time RT-PCR (Rrt-PCR), and reverse transcription loopmediated isothermal amplification (RT-LAMP).

Pharmacists in Public Health

Pharmacists who practice in hospitals and health systems (health-system pharmacists) play a vital role in maintaining and promoting public health. The American Society of Health-System Pharmacists (ASHP) believes that all health-system pharmacists have a responsibility to participate in global, national, state, regional, and institutional efforts to promote public health and to integrate the goals of those initiatives into their practices. Furthermore, health-system pharmacists have a responsibility to work with public health planners to ensure their involvement in public health policy decision-making and in the planning, development, and implementation of public health efforts (Ronak, 2021).

The primary objectives of this statement are to:

(1) Increase awareness of health-system pharmacists' contributions to public health,

(2) Describe the role of health-system pharmacists in public health planning and promotion, and

(3) Identify new opportunities for health-system pharmacists' involvement in future public health initiatives. This statement does not provide an exhaustive review of health system pharmacists' public health activities. Its intent is to stimulate dialogue about the that health-system pharmacists can play in providing care that improves public health in the United States.

Public health has been defined simply as "what we as a society do to assure the conditions in which people can be healthy."1 In contrast to medicine, public health initiatives "emphasize the prevention of disease and the health needs of the population as a whole."2 Public health services have been characterized as oc-curring on two levels: the planning ("macro") level and the implementation ("micro" or "provider") level (smith and finchem, 2021).

Macro-level public health services focus on the well-being of the population as a whole and emphasize the assessment and prioritization of a community's health-related needs as well as planning to address those needs. Such services include working with community representatives in identifying health-related community problems; setting community health priorities; formulating community health programs and policies; managing, administering, and evaluating community health promotion programs; educating the community in ways that promote public health; and researching, presenting, and publishing information about public health activities.3 These macro-level activities are carried out by public health professionals with varying backgrounds, degrees, and interests (Chemicals, 1994).

Micro-level public health services all the activities required to implement public health initiatives. Many of these services are performed on a provider-to-patient or a program-to-population basis, usually with a specific health-related outcome in mind (Roberts et al., 2003).

Public health efforts on the macro and micro levels can fall anywhere along the prevention spectrum and can reinforce each other. For example, Healthy People 2010 (a macro-level public health policy) aims to reduce the number of hospital admissions attributable to drug therapy management problems (primary prevention) (Hogue et al., 2003).

Policies implemented by hospitals (on the micro level) will allow clinicians to quickly identify such adverse drug events (ADEs) and prevent them from worsening (secondary prevention), as well as treat the affected patients (tertiary prevention). Pooling and evaluating these clinical experiences can lead to the development of dispensing guidelines or utilization studies that could be used as a primary prevention tool on the macro level (Wiedenmayer et al., 2006).

The health-system pharmacist's role in public health, and the distinction between individualized patient care and public health efforts, can be illustrated by several examples. Providing optimal pharmacotherapy to a single patient has great value. Nonetheless, lessons learned from the management of individual patients can have an even greater impact when they result in practice guidelines or health policies that affect the larger population. Such policy development requires careful evaluation and synthesis of health information using epidemiologic principles. Similarly, identification of a specific ADE is an important patient care service routinely performed by health-system pharmacists. The phamacoepidemiologic study of ADE across a population, coupled with action to prevent or mitigate such events, can have a significant impact on public health. Counseling a patient on the proper use of a medication helps that patient. When that knowledge is systematically evaluated and used to develop better behavioral outcomes, general public health can be improved. Finally, a health-system pharmacist who dis-penses medications as a member of an emergency-response team has a limited impact on public health. However, the same health-system pharmacist working with emergency-preparedness planners to develop policies and programs that ensure proper utilization of the full range of pharmacy services during a disaster can have an enormous effect on the health of the affected population.

CONCLUSION

Pharmacists perceived their role as a positive role during the coronavirus pandemic. Not only they took responsibilities for their daily services during the crises, but they took additional responsibilities to assure patient safety and satisfaction. A reasonable number of studies that described the role of the pharmacists during the COVID-19 pandemic were found. Several methods of communication were performed in different settings of intervention. Moreover, all studies reported actions taken by pharmacists, mainly drug information and patient counseling, although description was not satisfactory. Thus, future research with more detailed description and evaluated the impact of pharmacist intervention is needed in order to guide the actions of the pharmacists in this and-or other pandemic.

REFERENCE

1. Visacri, M.B., Figueiredo, I.V. and Lima, T.M. (2021). Role of pharmacist during the COVID-19 pandemic: A scoping review. Res Social Adm Pharm., 17(1): 1799-1806. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7334137/
2. Mukattash, T.L.,Jarab, A.S., Mukattash, I., Nusair M.B., Farha, R.A., Bisharat, M., Basheti, I.A. (2020). Pharmacists' perception of their role during COVID-19: a qualitative content analysis of posts on Facebook pharmacy groups in Jordan. Pharmacy Pract (Granada), [online], Available: https://scielo.isciii.es/scielo.php?script=sciarttext&pid=S1885-642X2020000300002.
3. Pharmacy Right to me (2020). How Pharmacists Are Helping To Manage And Prevent The Spread Of Covid-19 (Coronavirus), [Online], Available:https://pharmacyforme.org/2020/03/19/pharmacists-helping-manage-prevent-covid-19/
4. Mallhi et al. (2020). Multilevel Engagements of Pharmacists During the COVID-19 Pandemic: The Way Forward. Public Health. https://www.frontiersin.org/articles/10.3389/fpubh.2020.561924/full
5. Wick, A.N., Drury, D.R.,Nakada, H.I. and Wolfe, J.B. (1957). Localization of the primary metabolic block produced by 2-deoxyglucose. J Biol Chem., 224 (2): 963–969. doi:10.1016/S0021-9258(18)64988-9. PMID 13405925.
6. Pelicano, H. Martin, D.S., Xu, R.H. and Huang, P. (2006). Glycolysis inhibition for anticancer treatment. Oncogene, 25 (34): 4633–4646. doi: 10.1038/sj.onc.1209597.
7. Ralser, M., Wamelink, M.M., Struys, E.A.,Joppich, C., Krobitsch, S,Jakobs, C. and Lehrach, H. (2008). A catabolic block does not sufficiently explain how 2-deoxy-D-glucose inhibits cell growth. Proceedings of the National Academy of Sciences, 105 (46): 17807–17811. doi:10.1073/pnas.0803090105. PMC 2584745. PMID 19004802
8. Kurtoglu, M., Gao, N., Shang, J., Maher, J. C.,Lehrman, M. A.,Wangpaichitr, M.,

Savaraj, N., Lane, A. N. andLampidis, T. J. (2007). Under normoxia, 2-deoxy-D-glucose elicits cell death in select tumor types not by inhibition of glycolysis but by interfering with N-linked glycosylation. Molecular Cancer Therapeutics, 6 (11): 3049–3058. doi:10.1158/1535-7163.PMID 18025288.

9. Xi, H.,Kurtoglu, M., Liu, H.,Wangpaichitr, M.Y., Min L, Xiongfei, S.N. andLampidis, T,J. (2010). 2-Deoxy-d-glucose activates autophagy via endoplasmic reticulum stress rather than ATP depletion. Cancer Chemotherapy and Pharmacology, 67 (4): 899–910. doi:10.1007/s00280-010-1391-0. ISSN 0344-5704. PMC 3093301. PMID 20593179.
10. Defenouillère, Q,Verraes, A,Laussel, C, Friedrich, A,Schacherer, J. and Léon, S. (2019). The induction of HAD-like phosphatases by multiple signaling pathways confers resistance to the metabolic inhibitor 2-deoxyglucose. Science Signaling. 12 (597): eaaw8000. doi:10.1126/scisignal.aaw8000. ISSN 1945-0877. PMID 31481524. S2CID 201829818.
11. Kovar, J.L., Volcheck, W, Sevick-Muraca, E, Simpson, M.A. and Olive, D.M. (2009). Characterization and performance of a near-infrared 2-deoxyglucose optical imaging agent for mouse cancer models. Analytical Biochemistry, 384 (2): 254–262. doi:10.1016/j.ab.2008.09.050. PMC 2720560. PMID 18938129.
12. Cheng, Z., Levi, J., Xiong, Z., Gheysens, O., Keren, S., Chen, X., and Gambhir, S. (2006).Bioconjugate Chemistry, 17(3): 662-669
13. What is 2-deoxy-D-glucose (2-DG) and is it effective against Covid?, The Economic Times, 17 May 2021.
14. "DCGI approves anti-COVID drug developed by DRDO for emergency use". (2021). Press Information Bureau, Government of India.
15. Ronak, B. (2021). India's Drug Regulator Has Approved DRDO's New COVID Drug on Missing Evidence. The Wire Science. 5-18.
16. Koshy, J. (2021). Questions remain on DRDO's COVID drug. The Hindu. 05-18.https://www.thehindu.com/news/national/questions-remain-on-drdos-covid-drug/article34537596.ece
17. Smith, M. C., Fincham, J. E. (1991). Effect of a unit of continuing education on pharmacists' knowledge and reported practice. Journal of Pharmacy Teaching, *2*(1), 41-53.

18. ChemicalS, C. O. (1994). Policy Statements Adopted by the Governing Council of the. American Journal of Public Health, 84(3).
19. Roberts, A. S., Benrimoj, S. I., Chen, T. F., Williams, K. A., & Aslani, P. (2006). Implementing cognitive services in community pharmacy: a review of facilitators used in practice change. International Journal of Pharmacy Practice, 14(3), 163-170.
20. Hogue, M. D., Grabenstein, J. D., Foster, S. L., & Rothholz, M. C. (2006). Pharmacist involvement with immunizations: a decade of professional advancement. Journal of the American Pharmacists Association, *46*(2), 168-182.
21. Wiedenmayer, K., Summers, R. S., Mackie, C. A., Gous, A. G., Everard, M., Tromp, D., & World Health Organization. (2006). Developing pharmacy practice: a focus on patient care: handbook (No. WHO/PSM/PAR/2006.5). World Health Organization.