



**Public Health and Epidemiology Education in Saudi Arabia: Changes Required to Be Made Following COVID-19 Pandemic- An Opinion of Public Health Expert**

Alkhateeb, Badr F.<sup>1,\*</sup>,

<sup>1</sup> *Department of Family Medicine & PHC, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia*

**Abstract**

The COVID-19 global health pandemic has not only affected the economies and education system in the short run, but it will have detrimental effects in the long run for which organizations mainly academia might not be thinking of currently. This is even more imperative for countries where there is a dearth of academic institutions such as countries like Saudi Arabia. Since Saudi Arabia is one of the countries with the scarcity of Public Health Institutions, therefore it is crucial to envisage at the moment how this COVID-19 pandemic will affect the Public Health Institutions in Saudi Arabia. Hence, in this opinion article, I review and appraise the existing situation of Public Health Institutions in Saudi Arabia and provide my opinion how this era of COVID-19 will affect the Public Health Institutions from different perspectives in Saudi Arabia and what changes required to be made following COVID-19 Pandemic in Public Health and Epidemiology Academic Institutions in Saudi Arabia following COVID-19. It is very evident, that COVID-19 has increased the demand of Public Health professionals, which has increased the need of experts in various public health fields to plan suitable programs. Numerous National Institutions can come forward and collaborate to portray their leadership roles in improving and standardizing the Public Health curricula. The uniformity and standardization of the curriculum also require a National level collaboration to develop a standard and unified National Public Health Competency framework. Following COVID-19 era, there is a gigantic need to include important courses in the medical curriculum being taught in a bachelor's program such as Epidemiology, Infectious illnesses, and surveillance courses. Lastly, public health faculty members and people in academia need to revisit the curriculum of both Bachelors and Postgraduate study program to harmonize these in important aspects to achieve common goals of public health teaching.

<sup>1\*</sup>Dr Badr Al-Khateeb; Assistant Professor in Family Medicine; College of Medicine; Consultant Family Medicine in King Abdulaziz Medical City; P.O. Box 3660, Riyadh 11481. Mail Code: 2350; Kingdom of Saudi Arabia; Tel: +966-11-4295404; Email: [khateebb@ngha.med.sa](mailto:khateebb@ngha.med.sa)

**Key words:** COVID-19; Public Health Education; Epidemiology; Changes; Saudi Arabia.

## **Introduction**

The novel coronavirus (SARS-nCoV) belongs to the family of coronaviridae and has been identified to be the causative pathogen for the coronavirus disease 2019 (CoVID-2019) [1, 2]. Since first reported in Wuhan, China, in late December 2019, the outbreak of the novel coronavirus now known as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) has spread rapidly [3], owing to its highly contagious nature, across countries and continents [4, 5]. By March 16, 2020, the number of cases of COVID-19 outside China had increased drastically and the number of affected countries, states, or territories reporting infections to WHO increased drastically within weeks and then within few days. Based on alarming levels of spread and severity, and by the alarming levels of procrastination, on March 11, 2020, the Director-General of WHO characterized the COVID-19 situation as a pandemic, which had then affected millions of individuals and claimed thousands of lives across the globe [6]. The ongoing coronavirus disease 2019 (COVID-19) outbreak is a Public Health Emergency of International Concern (PHEIC), and the emergence of new epicenters of spread, such as Iran, South Korea, United States, Italy, and Europe besides Wuhan, China, should draw attention to potential super spreader events.

Over the last months, new major epidemic foci of coronavirus disease 2019 (COVID-19), some without traceable origin, were identified, which rapidly expanded in Europe, North America, Asia, and the Middle East, with the confirmed cases being identified in African and Latin American countries. An interactive web-based dashboard set up by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University, Maryland, USA estimates the total number of cases to be 4,079,388 which includes 13,94,920 recoveries and 281,313 fatalities as of May 10th, 2020 [7]. Like other countries and continents, COVID-19 affected the middle east and Arab countries including Saudi Arabia. The data also reveals that as of May 10, 2020, the total number of cases being reported in Saudi Arabia is 39,048 with 246 deaths reported in the country, which is an alarming number. The higher authorities including governments, scientific communities, public health associations, and non-governmental organizations are responding to the rising cases on COVID-19 in their respective capacities.

The COVID-19 global health pandemic is rapidly changing the ways we live and work. More specifically, this COVID-19 has not only affected the economies and education system in the short run, but it will have detrimental effects in the long run for which organizations mainly academia might not be thinking of currently. This might be more important for countries where there is a dearth of academic institutions such as countries like Saudi Arabia. Although the data surrounding the biology, epidemiology, and clinical characteristics of the SARS-CoV-2 virus have been growing daily, with more than 400 articles published in PubMed on different themes. However, no one has talked about

how this pandemic will affect the academic institutions mainly Public Health institutions in different countries. Since Saudi Arabia is one of the countries with the scarcity of Public Health Institutions, therefore it is crucial to envisage at the moment how this COVID-19 pandemic will affect the Public Health Institutions in Saudi Arabia. Hence, in this opinion article, I review and appraise the existing situation of Public Health Institutions in Saudi Arabia and provide my opinion how this era of COVID-19 will affect the Public Health Institutions from different perspectives in Saudi Arabia and what changes required to be made following COVID-19 Pandemic in Public Health and Epidemiology Academic Institutions in Saudi Arabia following COVID-19.

### **Existing Situation of Public Health Institutions in Saudi Arabia**

Efficient public health services play a vital and crucial role in preventing diseases and increasing the quality of life of the masses and large communities. Public health is a broad umbrella, which is comprised of various disciplines, as public health professionals from a myriad of disciplines contribute their knowledge and expertise for promoting the health of the communities[8]. There is a strong connection between the health workforce and public health education as public health requires an intellectually sound and challenging workforce[9].

Like other countries in the world, the Kingdom of Saudi Arabia (KSA), keeps the foundation of the first public health department in Mecca in 1925, for providing free healthcare[10]. This was followed by another milestone in the public health service in KSA, which was the establishment of the Ministry of Health (MOH) in 1950 whose main mandate was to manage, plan health policies, supervise and monitor health services mainly in the private sector[11]. The recent annual report of the Saudi Ministry of Education (MOE) 2018 highlights very important and alarming figures regarding the proportion of academic institutions offering services in Public Health[12]. More specifically, this report alludes that only 46.7% (n=14) out of total 30 universities offer bachelor courses in a variety of disciplines of public health and 16.67% universities (n=5) offers master's degree in public health. Moreover, among the private universities and colleges, only 13.3% (n=4) institutions provide bachelor courses in public health and 3.3%( n=1) offers a master's degree in public health[12]. More specifically, there are very few universities, which offer degrees for a few disciplines such as Epidemiology and Biostatistics. More specifically, King Saud bin Abdulaziz for Health Sciences - College of Public health and Health informatics, King Faisal University, Imam Abdulrahman Bin Faisal University, King Abdul Aziz University, and Umm Alqura university are some the examples of such universities offering Masters in Public Health Although the overall scope of public health education has increased since 2015 to 3% and 6% in public and private institutions' bachelor's courses respectively. The overall rate shows that it would take a long time to fulfil the need of competent public health workforce of Saudi Arabia[12].

With the new Saudi National Vision 2030, more attention and strategic local health plans are targeting to a greater extent on Public Health specific goals and objectives e.g., in increasing population life expectancy, improving in health determinants, healthy cities etc. A national momentum that calls for more Public Health qualified graduates and better trained Public Health workforce. In relation to this and in addition to the dearth and scarcity of public health institutions, other challenges enhance the intricacy of the problem. These challenges include the lack of uniformity in the courses offered by the private and government academic institutions to produce the public health workforce. Moreover, there is no harmony in offering the standardized public health curriculum by the universities and educational institutions in the KSA. This is probably due to a lack of specific accreditation mandate of educational institutions, which is required to achieve the standardized curriculum and courses to prepare the competent public health workforce. Moreover, these institutions also lack capacity in providing enough practical knowledge and sufficient exposure to the students so that they can address the emerging and current cases and illnesses of public health importance[13]. Besides, these challenges are reflected in the overall shortage of public health professionals in Saudi Arabia or in the Arab world, which requires urgent attention to rectify this situation. Furthermore, the number of practicing public health professionals in this gigantic country is far below the ideal. Moreover, this small number of professionals also require better training and work opportunities to transfer their knowledge into action[14].

### **Changes required to be made in the Public Health Education Institutions following COVID-19 Pandemic.**

Given the current transition due to COVID-19, like many other health and education sectors, public health institutions might get affected and authorities in these institutions might need to modify their existing scope of the work. More specifically, this is an appropriate time when public health professionals and faculties in the universities of Saudi Arabia offering advanced degrees in Public Health need to reflect on and think critically to make some changes in various domains of Public Health Education.

First of all, it is very obvious, that COVID-19 has increased the demand of Public Health professionals, which in turn has increased the need of experts in various public health fields to plan suitable programs and take the necessary measures. This means that all levels of public health workers such as public health teachers, public health practitioners, and public health technicians need to be well-trained in health planning and decision making in various public health fields. Given the shortage of public health institutions, it might become necessary that all public health institutions need to collaborate by involving the universities and reference health and educational ministries in the country as actual partners in establishing public health schools and institutes at the undergraduate and postgraduate levels. This will

help to initiate public health training programs with a clear mission to promote the teaching and practice of public health and decision-making. This partnership and collaboration might be the solution in the era of COVID-19 to the success of the practice in public health and might produce a real positive impact in the field of public health to address the shortage.

Secondly, since COVID-19 has resulted in social and physical distancing with the lockdown in the country, this has affected the overall education system delivery including the public health institutions. Even though higher authorities in the country might relieve the restrictions gradually, it will take some time for institutions to allow the students to sit together in the class and attend the classes physically. Given this uncertainty, public health institutions might need to develop a plan for longstanding virtual education with more sophisticated technology such as the available online applications to cater to the needs of students without wasting more time. Thus public health institutions might come together to devise a long term plan for online education to cater as many students as they can. Besides, the independent universities need to join hands to work together for this common goal to provide a uniform and standardized training with a standard curriculum to the students.

In doing so, a myriad of local National Institutions can come forward to portray their leadership roles in improving and standardizing the Public Health curricula. For example, Saudi Health Council, Saudi Commission for Health Specialties, Ministry of Education, and Ministry of Health (Public Health Agency) can collaborate to play a vital role in standardizing the curriculum at multiple levels. This will not only enhance the collaboration between the Public Health Institutions but will also cater to more students both from within and outside Saudi Arabia. So far one of the difficulties for the students of neighboring countries of Saudi Arabia is the living and accommodation expenses, which can be addressed by offering online classes to the students to native and foreign students. This will also increase enrollment and revenue for the public health institutions and will help them to expand their existing infrastructure in terms of workforce, disciplines of public health, and creating more departments within the same university.

Moreover, the uniformity and standardization of the curriculum also require a National level collaboration to develop a standard and unified National Public Health Competency framework. This will help to make a collaboration with various universities in Saudi Arabia offering the Public Health Education. Moreover, developing such a unified National Competency framework will ensure to address the needs of all the academic and market stakeholders and this will also help to bridge the gaps between theory and practice.

Thirdly, COVID-19 has affected one of the important categories of students, nurses, Public Health practitioners and Public Health doctors, who have become super busy in providing frontline care to the patients suffering from COVID-19. This might result in decreased enrollment of these types of

students and trainees mainly in the short courses offered for these types of students. This problem can be addressed by revisiting the available courses that were being offered to these students and to re-develop or modify the existing courses both in the content and number. Since these Public Health practitioners and nurses are one of the important cadres in the health sector, they need to be aware of public health so that they can effectively respond to the outbreaks such as COVID-19 or any other unknown outbreaks impending in the future. To address their needs, public health institutions should focus on important disciplines such as key and core ideas of Epidemiology and Biostatistics instead of only teaching occupational or Environmental health that they are important subjects, but weighing the concentration of teaching according to the visible and expected demands. Also, in improving on the collaboration among universities, better distribution on teaching different branches to the huge diversity of major discipline like Public Health could be further gained, as currently same classical courses are repeated among Public Health programs, while more newly introduced subjects of international recognition are lacking among most.

Fourthly, there is also a need to introduce more Public Health courses in the medical curriculum due to changing dynamics and the transition of the global burden of diseases. Saudi Arabia is currently facing problems of both communicable and non-communicable diseases and this additional burden of COVID-19 has created a need for the medical doctors taught curricula to develop more courses by the institutions in the uniform and standardized way. For example, medical students should be able to know how to trace an outbreak of highly contagious diseases, and how to develop a surveillance system for contact tracing. Moreover, courses on infectious disease modeling need to be introduced in the existing curriculum with the inflow of new soft wares required to do the epidemiology modeling and projections for infectious diseases such as COVID-19.

If the existing institutions lack the capacity in providing these new courses, they can collaborate with other public health institutions in the neighboring or even from the developed countries to involve the experts on the given as such topics. Due to COVID-19, the chances of getting help from other institutions are also high and faculty in Saudi Arabia might benefit from the knowledge of other faculty members on these new topics, which they can later offer to their students in the long run. This training will be highly helpful not only for the students themselves but they can be of great help to the ministries, and higher authorities of the countries in making informed decisions to handle such types of outbreaks.

Fifthly, it has been found that curricula focusing on public health that is designed and developed for bachelors' and Masters' and postgraduate study Programs vary in different aspects including the language of delivery, differences in the content of courses, and learning outcomes. This might be good to some extent but major differences in these main areas might produce students and professionals with different learning experiences and curves, which might affect their practical experiences and causes

differences in the performances in practical life. Therefore, public health faculty members and people in academia need to revisit the curriculum of both Bachelors and Postgraduate study program to harmonize these in important aspects to achieve common goals of public health teaching.

Lastly, there is a high need to make public health students more practical in addressing the burden of diseases in their practical life. It has been found that students usually focus on theory and ignore on some practical aspects, which are more important in a real-life scenario. This is not the fault of students rather this is due to the design of the curriculum in a way that overlooks the practical aspect of any issue or problem. For instance, a public health student might be good at describing the types of the outbreak and might get good marks in the theory but he or she might not be good at handling the outbreak in real life because of a lack of proper exposure to practical work. Therefore, public health institutions and mainly faculty members need to include a strong practical aspect of every topic with a specific focus on COVID-19. It might be done through case studies by providing a more simulated environment to the students where students can practice to handle the outbreak without being exposed to the virus itself in the hospital settings. This can also be achieved by signing a teaching agreement or contract between the universities and colleges that teach Public Health programs with places of great practical experiences such as Primary Health Care facilities, Ministry of Health Laboratories, and quarantine camps, etc to act like a big open practice field for Public Health students to apply the learned theoretical knowledge to the practical world.

Besides this, there is a need to revisit the pedagogies and teaching methodologies being used currently and think to change those pedagogies to cater to a large number of students with a greater span of attention. More specifically, Public health teaching institutions can incorporate the best teaching modalities by adopting health professions philosophy and recommendations such as learner-centered learning, flipped classrooms, cooperative learning methodologies, problem-based learning, team-based learning, and visual learning by using graphics and videos to name just a few. This will help faculty members to transition from a teaching style that is based solely on facts processing to analysis, applications, and reasoning with enhanced learning.

These should also be with a monitoring and evaluation mechanism, which can monitor the implementation of revised or existing teaching pedagogies and curricula. In this regard, an external monitoring and mentoring academic body such as National Commission for Academic Accreditation and Assessment (NCAAA) can supervise and monitor the best Public Health academic teaching and practice to provide their invaluable, impartial, and ongoing feedback for further improvement. This will help to carefully revisit the teaching quality indicators with periodic accreditation and checking to assess Public health teachings.

## **Conclusion**

Saudi Arabia is one of the countries facing a dearth of Public Health Institutions and professionals, which is further challenged by the current COVID-19. Given the era of COVID-19 pandemic, the public health institutions need to revisit their strategies, pedagogies, courses, curriculum and standardization to cater to many students in the area of Public Health. COVID-19 has increased the demand for Public Health Professionals and this might be a challenge for public health institutions in the short term but this can also be considered as an opportunity to devise or modify the existing plans of training in various disciplines of Public health. The technology of using an online teaching system can be helpful to cater to both national and international students to address the urgent need to strengthen the national public health system and develop appropriate measures to maintain and enhance Public health training in Saudi Arabia.

## **Declarations:**

Competing interests: Authors declare no conflict of interests for this article.

Funding: None

Acknowledgements: None.

## 1. References

1. Chen, Y., Q. Liu, and D. Guo, Emerging coronaviruses: Genome structure, replication, and pathogenesis. *J Med Virol*, 2020. 92(4): p. 418-423.
2. Tu, H., et al., The epidemiological and clinical features of COVID-19 and lessons from this global infectious public health event. *J Infect*, 2020.
3. Liu, S.L. and L. Saif, Emerging Viruses without Borders: The Wuhan Coronavirus. *Viruses*, 2020. 12(2).
4. Nishiura, H., et al., The Extent of Transmission of Novel Coronavirus in Wuhan, China, 2020. *J Clin Med*, 2020. 9(2).
5. Khachfe, H.H., et al., An Epidemiological Study on COVID-19: A Rapidly Spreading Disease. *Cureus*, 2020. 12(3): p. e7313.
6. Mahase, E., Covid-19: WHO declares pandemic because of "alarming levels" of spread, severity, and inaction. *Bmj*, 2020. 368: p. m1036.
7. Dong, E., H. Du, and L. Gardner, An interactive web-based dashboard to track COVID-19 in real time. *Lancet Infect Dis*, 2020.
8. Choi, B.C. and A.W. Pak, Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. Definitions, objectives, and evidence of effectiveness. *Clinical and investigative medicine*, 2006. 29(6): p. 351.
9. Council, P.E.C., SME's, Other Constituencies, and the Contested Definitions of Human Resource Development.
10. Almalki, M., G. FitzGerald, and M. Clark, Health care system in Saudi Arabia: an overview. 2011.
11. Al Yousuf, M., T. Akerele, and Y. Al Mazrou, Organization of the Saudi health system. 2002.
12. Saudi Arabia Ministry of Education Report, 2018. ; Available from: <https://www.moe.gov.sa/ar/news/Documents/Dalil-t.pdf>.
13. Mahmoud, M.A., et al., Public health education in Saudi Arabia: Needs and challenges Public health education in Saudi Arabia: Needs and challenges. 2016.
14. Milaat, W., Public health around the world: Saudi Arabia. *Public Health Medicine*, 1999. 1(1): p. 34-38.