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Epidemiological Reasoning Skills of University Medical Students Toward Corona Virus Infection

Ghouth AB[1*] and Barhman OM[2]

[1]Professor of Community Medicine, Hadramout University College of medicine, Yemen

[2]Assistant Professor of Tropical Medicine, Hadramout University College of medicine, Yemen

[*]**Corresponding author:** Abdulla Bin Ghouth, Professor of Community Medicine, Hadramout University College of medicine, Yemen, Tel: 00967713963030; Email: abinghouth2007@yahoo.com

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Abstract

Background: Medical students receiving a lot of controversial data from different sources like media, academia and the international and local reports, and they have a lot of questions regarding the current novel corona virus disease 19 and facing difficulty in interpreting the epidemiological data to more conclusive information. This issue need an epidemiological reasoning skills.

Objective: The aim of this study is to assess the epidemiological reasoning skills of medical students of Hadramout University in Yemen toward the current novel corona virus diseases.

Methodology: A cross-sectional study was conducted among a convenience sample of Hadramout University medical students from different departments and years. A well self-structured questionnaire was designed to collect relevant data from students.

Results: Most of student's answers about the incubation period is more than 7 days (44.6%) but most of students did not know the exact period of communicability (51.1%). About 86% of students recognized that the main route of transmission is air droplet and the susceptibility is universe (71.5%). Most of students know that there is no specific treatment nor specific vaccine for COVID19 (76.5%).

Most of students consider COVID 19 is epidemic (50%); the transmission is from person to person (80.7%) the causative agent isnew agent (46.3%) and mode of transmission is already known but they consider the geographic distribution of the current diseases is worldwide (54.6%).As the data were collected in February 2020; and according to their knowledge and reasoning skills, students expected that the disease will continue up to months(68.9%), will spread globally (57.2%) and the deaths will increasing (77%), they expected the spread of the disease will affect negatively on the international trade(95.5%)and on the international tourism (95%) .

Conclusion: University students have good epidemiological reasoning skills if provided with updated knowledge.

Keywords: COVID19; Pandemic; University Students

Introduction

An outbreak of respiratory disease caused by a novel (new) corona virus that was first detected in Wuhan City, Hubei Province, China. The virus has been named "SARS-CoV-2" and the disease it causes has been named "corona virus disease 2019" (abbreviated "COVID-19"). The SARS-CoV-2 virus is a beta corona virus, like MERS-CoV and SARS-CoV.All three of these viruses have their origins in bats [1].So SARS-CoV-2 is the causative agent of COVID-19, it is transmitted through large respiratory droplets and direct contact; other modes of transmission (i.e. airborne and faeco-oral) have also been proposed. The average incubation period is

estimated at 5 to 6 days, ranging from 0 to 14 days [2]. There is currently no specific treatment or vaccine against COVID-19 [3].

A lot of information about the current Novel corona virus disease is still not clear, from source of infection, method of spread to clinical presentation and the intervention needed to combat this disease. The epidemiological assessment is inconclusive. Even for the definition of the pandemic may be not applicable of such influenza outbreaks. A pandemic is the worldwide spread of a new disease [4]argues cogently that the definition of pandemic influenza in 2009 was elusive but does not refer to the classical epidemiological definition of a pandemic [5]. The dictionary of epidemiology defined pandemic as "an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people" [6]. The classical definition includes nothing about population immunity, virology or disease severity [7]. The complete clinical picture with regard to COVID-19 is not fully understood [1].

Referring to previous experience with influenza outbreaks; the definition of pandemic rises more inconsistency. The sudden emergence and rapid global spread of a novel H1N1 influenza virus in early 20098 has caused confusion about the meaning of the word "pandemic" and how to recognize pandemics when they occur. Any assumption that the term pandemic had an agreed-upon meaning was quickly undermined by debates and discussions about the term in the popular media and in scientific publications [9-12]. Uses of the term by official health agencies, scientists, and the media often seemed to be at odds. For example, some argued that a level of explosive transmissibility was sufficient to declare a pandemic, whereas others maintained that severity of infection should also be considered [9-12].

Even if there is no single accepted definition of the term pandemic, it may still be fruitful to consider diseases commonly said to be pandemic and to try to understand them better;[13] as the case of the current novel corona virus disease 19.

Medical students receiving a lot of controversial data from different sources like media, academia and the international and local reports, and they have a lot of questions regarding the current novel corona virus disease 19 and facing difficulty in interpreting the epidemiological data to more conclusive information. This issue need an epidemiological reasoning skills. The aim of this study is to assess the epidemiological reasoning skills of medical students of Hadramout University in Yemen toward the current novel corona virus diseases.

Materials and Methods

The students of colleges of medicine of Hadramout University in Yemen are the study population. A cross-sectional study was conducted among a convenience sample of Hadramout University medical students from different departments and years. Data were collected during February 2020. A well self-structured questionnaire was designed to collect relevant data from students. The questionnaire composed of four sections: section one is the perusal data including age, sex and the university, grade and the specialty.Section two composed of questions about knowledge of students toward the coronal virus disease. Section three explore the reasoning skills of students while the last section four about the expectation of students toward the what will happen in the coming period. SPSS version 23 was used for data entry and analysis.

Results

A total of 186 students responded to the questionnaire out of 230 students (81%). The mean age of the respondent is 22.8 years (±1.6). Most of students are males (57%) and mostly are medical students (64.5%) and mostly from the third year (52.7%).

Most of student's answers about the incubation period is more than 7 days (44.6%) but most of students did not know the exact period of communicability (51.1%). About 86% of students recognized that the main route of transmission is air droplet and the susceptibility is universe (71.5%). Most of students know that there is no specific treatment nor specific vaccine for COVID19 (76.5%)**(Table 1)**.

Item		No of students	%
Incubation periodis :	≤ 7 days	34	18.3%
	> 7 days	88	44.6%
	I did not know	69	37.1%
Period of communicability:	≤ 7 days	37	19.8%
	> 7 days	54	29.1%
	I did not know	95	51.1%
The most frequent mode of transmission:	Air droplet	196	86.4%
	Direct contact	24	12.5%
	Fecal-Oral route	2	1.1%

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The susceptibility is :	Universe	133	71.5%
	only Immune compromised persons	10	5.5%
	Mostly children	5	2.8%
	Mostly travelers	38	20.2%
Treatment and prevention available:	There is specific treatment but no specific vaccine	6	3.3%
	There is no specific treatment but there is specific vaccine.	7	3.8%
	There is no specific treatment nor specific vaccine	142	76.5%
	I don't know	32	16.4%

Table 1: Knowledge of University students about the Corona virus infection, Hadramout, Yemen.

Epidemiological Reasoning skills about COVID19 related data in February 2020.Most of students consider COVID 19 is epidemic (50%); the transmission is from person to person (80.7%), the causative agent is new agent (46.3%) and mode of transmission is already known but they consider the geographic distribution of the current diseases is worldwide (54.6%) **(Table 2)**.

Item		No of students	**%**
The current pattern of corona virus disease is:	Sporadic disease	12	6%
	Endemic	33	17.60%
	Epidemic	93	50%
	Pandemic	48	26.40%
The expected pattern of the spread of the disease is due to:	Common source	18	9.30%
	Person to person	149	80.70%
	Animal to person	19	10%
The causative agent is:	Already known	59	32.20%
	new agent	86	46.30%
	need further investigation	41	21.50%
Mode of transmission is:	Already known	112	61%
	new mode of transmission not known before	20	10.20%
	need further investigation	54	28.80%
The geographic distribution of the current diseases is:	China only	47	25.70%
	South East Asia	37	19.70%
	Worldwide	102	54.,6%

Table 2: Epidemiological Reasoning skills of Hadramout University studentsabout the current corona disease, February 2020.

As the data were collected in February 2020; and according to their knowledge and reasoning skills, students expected that the disease will continue up to months (68.9%), will spread globally (57.2%) and the deaths will be increasing (77%), they expected the spread of the disease will affect negatively on the international trade(95.5%) and on the international tourism (95%) **(Table 3)**.

Item		No of students	%
In term of time; I expect the disease will	contained within days	23	12.20%
	stop within the coming weeks	35	18.90%
	continue up to months	127	68.90%
In term of place;I expectthe disease will:	contained in its country of origin	17	9.10%
	spread to the niebourghing countries	63	33.70%
	be global	106	57.2%%
I expect the deaths will:	Increasing	144	77%
	decreasing	26	14.30%
	continue with same rate	16	8.70%
The impact of the diseases on the international trade	badly affected	178	95.50%
	No negative affect	8	4.50%
The impact of the diseases on the international tourism	badly affected	177	95%
	No negative affect	9	5%

Table 3: Expectations of University students about progress of COVID 19, Hadramout February 2020.

Discussion

This study was conducted among Hadramout University medical students in Yemen and the data were collected in February 2020 before WHO declared the diseases as pandemic. As a novel coronavirus is a new coronavirus that has not been previously identified[14] medical students try to capture information from different literatures to know the epidemiology of the diseases but controversial or updated data may confuse what they know before about coronavirus infections.For example, most of them said that the incubation period may be more than 7 days (44.6%) and about 37% of them are not know exactly while only 17% said that it is equal or less than 7 days. Wang et al (2020) reported that the average incubation period of COVID-19 is around 6.4 days, ranges from 0-24 days,[15]this large range of incubation period is a ground of confusion to medical students. The understanding of the incubation period for COVID-19 is limited. An early analysis based on 88 confirmed cases in Chinese provinces outside Wuhan, using data on known travel to and from Wuhan to estimate the exposure interval, indicated a mean incubation period of 6.4 days, with a range of 2.1 to 11.1 days. Another analysis based on 158 confirmed cases outside Wuhan estimated a median incubation period of 5.0 days with a range of 2 to 14 days[16].

Students are more confused about period of communicability. This issue is not clear about viral respiratory tract infections. The latent period, or the time between the occurrence of infection and becoming infectious, this can be shorter or longer than the incubation period, implying that an asymptomatic person may be able to transmit the virus. but COVID-19 is a new coronavirus, and much remains unknown about its transmission parameters and dynamics [17].reported in March 2020 that wecollected 545 specimens from 22 patients, including 209 pharyngeal swabs, 262 sputum samples, and 74 feces samples, in these patients, sputum and feces remained positive for SARS-CoV2 on RT-qPCR up to 39 and 13 days, respectively, after the obtained pharyngeal samples werenegative[18].However, his COVID 19 is highly contagious; as it doubled about every seven days, whereas on average, each patient transmits the infection to an additional 2.2 individuals [19].

Knowledge of medical students is good regarding the main rout of transmission; about 86% of students recognized that the main route of transmission is air droplet and the susceptibility is universe (71.5%).Respiratory transmission and person to person transmission were reported elsewhere; SARS-CoV is mainly spreads through the respiratory tract and there is increasingly evidence showed sustained human-to-human transmission, reported that human-to-human transmission has been confirmed regarding COVID 19 [20] reported that Person to person transmission is considered main route of transmission of COVID19 [21].Most of the students answered correctly that there is no specific treatment nor specific vaccine (76.5%). To date, effective treatment is lacking; however, clinical trials investigating the efficacy of several agents, including remdesivir and chloroquine, are underway in China[22].

Most of students considered COVID 19 is an epidemic (50%); this thinking is accepted because data were collected on February 2020, while on 30 January 2020 World Health Organization (WHO) officially declared the COVID-19 epidemic as a public health emergency of international concern[20, 23]and then formally declaring it a pandemic on 11 March 2020[24, 25].

Students correctly considered the causative agent is new agent (46.3%); nCoV-2019 is sufficiently divergent from SARS-CoV to be considered a new human-infecting beta coronavirus[20].

Regarding the geographic distribution; students considered the current spread of the disease is worldwide (54.6%) as The COVID-19 epidemic is spreading all over the world,[26]. The novel coronavirus (2019-nCoV) outbreak, which initially began in China, has spread to many countries around the globe, with the number of confirmed cases increasing every day [27].Even when air travel from and to China has subsided; cases of people infected with the COVID-19 coronavirus appear all over the world [28].

Although data were collected from students on early February 2020 but they show relevant expectation about the progress and the impact of the outbreak.Students expected that the disease will continue up to months (68.9%), will spread globally (57.2%) and the deaths will be increasing (77%), and they expected the spread of the disease will affect negatively on the international trade (95.5%) and on the international tourism (95%).

The novel coronavirus outbreak (COVID-19) in mainland China has rapidly spread across the globe and within 2 months since the outbreak was first reported on December 31, 2019,[29]. The COVID pandemic is still ongoing since the first case reported in China in December 2019 till April 2020 and may be continuing without indication when will end. A huge number of cases and deaths were still reporting from different countries in the world. Up to first April 2020; WHO documents a total of 896,450 confirmed COVID cases and 45,526 deaths globally including 72,839 new confirmed cases and 4,924 new deaths [30]. Since 2nd April 2020, The global cumulative cases exceeds a million and continue raising in the coming days and weeks. Although the true burden of disease in the human population is currently unknown[31] early estimates suggested that the true case count may be as much as 10 times higher than was being reported [30].

Conclusion

Although data were collected in February 2020 before WHO declared the COVID 19 is pandemic, but student's expectations met with the ongoing progress of the disease.University students have good epidemiological reasoning skills if provided with updated knowledge.

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