Research Article

EPIDEMIOLOGICAL REASONING SKILLS OF HEALTH-RELATED UNIVERSITY STUDENTS TOWARD CORONA VIRUS INFECTIONIN ITS EARLIER ONSET

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A R T I C L E   I N F O

A B S T R A C T

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 needs an epidemiological reasoning skill.

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 self-administered 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 (45%) but most of students did not know the exact period of communicability (51%). About 86% of students recognized that the main route of transmission is air droplet and the susceptibility is universe (72%). Most of students know that there is no specific treatment nor specific vaccine for COVID19 (77%).Most of students consider COVID 19 is epidemic (50%); the transmission is from person to person (81%), the causative agent is new agent (46%) and mode of transmission is already known but they consider the geographic distribution of the current diseases is worldwide (556%).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 (69%), will spread globally (57%) and the deaths will increasing (77%), they expected the spread of the disease will affect negatively on the international trade (96%) and on the international tourism (95%).

Observations and Result: The left lateral ventricle was larger than the right one and both were larger in males and largest in sixth and seventh decade.

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

INTRODUCTION

An outbreak of respiratory disease caused by a novel (new) corona virus was first detected in Wuhan City, Hubei Province, China. The virus has been named "SARS-CoV-2" and the disease it caused 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]SARS-CoV-2 is the causative agent of COVID-19, and 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]

Considerable information about the current Novel corona virus disease is still not clear on its 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] Doshi (2011) argues convincingly that the definition of pandemic influenza in 2009

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was elusive but does not refer to the classical epidemiological definition of a pandemic.[5]The dictionary of epidemiology defines 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 creates more inconsistency. The sudden emergence and rapid global spread of a novel H1N1 influenza virus in early 2009has caused confusion about the meaning of the word "pandemic" and how to recognize pandemics when they occur.[8] 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 betters in the case of the current novel corona virus disease 19.[13]

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 needs an epidemiological reasoning skill. The aim of this study is to assess the epidemiological reasoning skills of health-related students of Hadramout University in Yemen toward the current novel corona virus disease.

METHODOLOGY

The students of the college medicine at Hadramout University in Mukalla, Yemen are the study population which includes medical, laboratory sciences, pharmacy and nursing students. The college has adopted student-centered and problem-based curriculum from its inception in 1997.[14]Multi-disciplinary integrated courses of epidemiology are experienced during different years of the undergraduate study. A cross-sectional study was conducted among a convenience sample of students at Hadramout University College of Medicine (HUCOM) from different years. Data were collected during the period 1-10 of February 2020. A self-administered structured questionnaire was designed to collect relevant data from students. The questionnaire was composed of four sections: section one for the personal data including age, sex and the year. Section two covered questions about knowledge of students about the coronal virus diseases. Section three contained equations exploring the reasoning skills of students while the last section four was devoted to sightsee the expectation of students in regard to what will happen in the coming period. SPSS version 23 was used for data entry and analysis.

RESULTS

Out of the 230-student sample, a total of 186 students responded to the questionnaire (81%). The mean age of the respondents is 22.8 years (±1.6). Male students made (57%) of the respondents and mostly were medical students (65%) and mostly from the third year (53%). Most of students' answers on the incubation period is expected to be more than 7 days (45%) but most of students did not know the exact period of communicability (51%). About 86% of students recognized that the main route of transmission is through air droplets and that the susceptibility is universal (72%). Most of students know that there is no specific treatment nor specific vaccine for COVID19 (77%). See table 1. Most of students consider COVID-19 is epidemic (50%); the transmission is from person to person (81%), the causative agent is a new agent (46%) and mode of transmission is already known but they consider the geographic distribution of the current diseases is worldwide (55%). See table 2.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 (69%), will spread globally (57%) 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%) . See table 3.

Table 1 Knowledge of health-related university students about the Corona virus infection, Hadramout, Yemen

Item	Single choice	No of students	%
Incubation period	≤ 7 days	34	18%
	> 7 days	88	45%
	I don't know	69	37%
Period of communicability	≤ 7 days	37	20%
	> 7 days	54	29%
	I don't know	95	51%
Most frequent mode of transmission	Air droplet	196	86%
	Direct contact	24	13%
	Fecal-Oral route	2	1%
The susceptibility	Universe	133	72%
	only Immune compromised persons	10	5%
	Mostly children	5	3%
	Mostly travelers	38	20%
Treatment and prevention	There is specific treatment but no specific vaccine	6	3%
	There is no specific treatment but there is specific vaccine.	7	4%
	There is no specific treatment nor specific vaccine	142	77%
	I don't know	32	16%

Table 2 Epidemiological reasoning skills of health-related university students on current corona disease, February 2020

Item	Single choice	No of students	%
The current pattern of corona virus disease is	Sporadic disease	12	6%
	Endemic	33	18%
	Epidemic	93	50%
	Pandemic	48	26%
The expected pattern of the spread of the disease is due to	Common source	18	9%
	Person to person	149	81%
	Animal to person	19	10%
The causative agent is	Already known	59	32%
	New agent	86	46%
	Need further investigation	41	22%
Mode of transmission is	Already known	112	61%
	New mode of transmission not known before	20	10%
	Need further investigation	54	29%
Geographical distribution of current disease	China only	47	26%
	South East Asia	37	20%
	Worldwide	102	54%

Table 3 Expectations of University Students on Progress of the Current Corona Disease, February 2020

Item	Single Choice	No of students	%
In term of time, I expect the disease will:	Be contained within days	23	12%
	Stop within the coming weeks	35	20%
	Continue up to months	127	69%
In term of place, I expect the disease will:	Contained in its country of origin	17	9%
	Spread to the Nürburgring countries	63	34%
	Be global	106	57%
I expect the deaths will:	Be increasing	144	77%
	Be decreasing	26	14%
	Continue with same rate	16	9%
Impact of the diseases on the international trade:	Badly affected	178	96%
	No negative affect	8	4%
Impact of the disease on international tourism:	Badly affected	177	95%
	No negative affect	9	5%

DISCUSSION

This study was conducted among students of the college medicine at Hadramout University in Yemen and the data were collected in 1-10 February 2020 before WHO declared the Corona disease as a pandemic. As the "novel corona virus" is a new corona virus that has not been previously identified, 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 corona virus infections.[15] For example, most of the students predicted that the incubation period may extends more than 7 days (45%) and about 37% of them did not know exactly compared to only 17% who expected that the period is equal or less than 7 days. Wang reported that the average incubation period of COVID-19 is around 6.4 days, ranging from 0-24 days. [16]This wide range of incubation period represents a ground of confusion to medical students maintained the understanding of the incubation period for COVID-19 as a confusing issue. 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.[17]

Students are more confused about period of communicability. This issue is not clear in case of viral respiratory tract infections. The latent period, or the time between the occurrence of infection and onset of becoming infectious can be shorter or longer than the incubation period, implying that an asymptomatic person may be able to transmit the virus. However, COVID-19 is a new corona virus, and much remains unknown about its transmission parameters and dynamics.[18]Chen Chen et al reported in March 2020 that "we collected 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-q PCR up to 39 and 13 days, respectively, after the obtained pharyngeal samples were negative.[19]Though this COVID-19 is highly contagious as number of cases was doubled about every seven days, whereas on average, each patient transmits the infection to an additional 2.2 individuals.[20]

Students' knowledge is good in regard to the main rout of transmission; about 86% of students recognized that the main route of transmission is air droplets and the susceptibility is universe (72%).Respiratory transmission and person to person transmission were reported elsewhere. SARS-CoV mainly spreads through the respiratory tract and there is increasing evidence showing sustained human-to-human transmission. As recently reported, human-to-human transmission has been confirmed regarding COVID 19.[21]Other report indicated that that person-to-person transmission is considered main route of transmission of COVID19.[22]Most of the students answered correctly that there is no specific treatment nor specific vaccine available (775%). The effective treatment is still lacking despite clinical trials still investigating the efficacy of several agents, including Remdesivir and Chloroquine which are still underway in China.[23]

Most of students considered COVID-19 as an epidemic (50%); this thinking is accepted because data were collected in February 2020,only several days after World Health Organization (WHO) officially declared that the COVID-19 epidemic on 30 January 2020 and as a public health emergency of international concern. [21,24] The WHO declaration of COVID-19 as a pandemic was 11 March 2020.[24,25] Also, students correctly considered the causative agent as a new agent (46%); nCoV-2019 is sufficiently divergent from SARS-Co V to be considered a new human-infecting beta-corona virus. [21]The geographic distribution of the current disease as of February 2020 was perceived by majority of students as a worldwide spread (54%) conforming with reports that COVID-19 epidemic was spreading all over the world. [26, 27] The novel corona virus (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.[28] Even when air travel from and to China has subsided, still cases of people infected with the COVID□19 corona virus appear appeared all over the world.[29]

Although data collected from students in the early days of February 2020, it shows relevant expectation about the progress and the impact of the outbreak. Students expected that the disease will continue up to months (69%), will spread globally (57%) and the deaths will be increasing (77%). They also expected that the spread of the disease will negatively affect the international trade (96%) and the international tourism (95%).The novel corona virus 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. [30]The COVID pandemic is still ongoing since the first case reported in China in December 2019 and may be continuing without indication when it will end. A huge number of cases and deaths were still being reported from different countries in the world. Up to first April 2020, WHO documented a total of 896,450 confirmed COVID cases and 45,526 deaths globally including 72,839 new confirmed cases and 4,924 new deaths.[31]At time of submission of this paper (October 15, 2020), the global cumulative cases are rapidly approaching 40M and continue raising in the coming months.[33]. Although the true burden of disease in the human population is currently unknown, early estimates suggested that the true case count may be as much as 10 times higher than was being reported. [34]

CONCLUSIONS

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

Conflict of interest.

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