



Awareness about Human Brucellosis in Healthcare Professional in India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Human brucellosis is a widespread zoonosis of serious public health consequences. The infection is transmitted from animal to human through direct contact with infected animals or consumption of infected, unpasteurized animal milk. Being a disease with wide and non-specific clinical manifestations, a case of brucellosis can be detected only if the treating health care professional is aware of the disease and keeps a high rate of suspicion when dealing with suspected cases. We surveyed to find the extent of awareness about Human brucellosis in healthcare professionals in Gujarat, India.

Methodology: A cross-sectional study was conducted among healthcare professionals from December 2020 to May 2021 using a self-administrated questionnaire. This study included healthcare professionals including AYUSH practicing in Gujarat. A validated questionnaire consisting of 23 items was administered to assess the knowledge of professionals toward suspecting, diagnosing, preventing, and managing a case of brucellosis. Both physical and Google forms were used to collect data. Data were analyzed using Statistical Package for the Social Sciences (SPSS) program, IBM version 22.

Results: Sixty-nine healthcare professionals responded to the questionnaire. The findings of the study showed overall good awareness about brucellosis with a higher rate of knowledge in allopathic healthcare professionals and nurses in comparison to AYUSH doctors. Nearly 50% of respondents did not know the treatment as well as the preventive potential of human brucellosis.

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Conclusion: The current study suggests a need for creating more awareness in the healthcare professional, particularly AYUSH practitioners about brucellosis for better management and prevention.

Keywords: Brucellosis; awareness; healthcare professionals.

1. INTRODUCTION

Brucellosis is one of the major zoonosis that affects health and the economy in many parts of the world. According to the World Health Organization 500,000 to 12,500,000 human cases occur globally every year [1,2,3]. Brucellosis is rarely focused on by health systems and is considered a neglected zoonosis by the World Health Organization (WHO) and World Organisation for Animal Health (OIE) [4,5]. The problem is compounded by the lack of national surveillance programs, laboratory facilities and reliable data in endemic areas [1,4,5].

India is the world's leading milk producer, the primary occupation in the villages is agriculture and cattle rearing. Thus the prevalence of brucellosis is expected to be high. In India, direct contact of man and animal is common, due to cattle rearing and occupational groups like veterinarian and dairy workers along with consumption of unpasteurized milk or milk products [6].

Most of the cases of infections by *Brucella* arise from, poor hygienic conditions, the presence of the disease – producing factors around the animals, or the environment contaminated by their discharges and practices that expose humans to infected animals can crucially increase the risk the disease in humans [7,8]. Clinically, human disease is characterized by fever, fatigue, sweating, joint pain, headache, loss of appetite, muscular pain, lumbar pain, weight loss, and arthritis [9,10] and is often misdiagnosed as other febrile conditions [11,12].

The true incidence of brucellosis may be higher than the reported incidence due to misdiagnosis and under-reporting. The knowledge and awareness about human brucellosis in healthcare providers will help to predict and estimate accurately the true incidence of brucellosis [13]. So, the main objective was to study the awareness about human brucellosis in healthcare professional in Gujarat, India. In this study, we assessed the knowledge of professionals toward suspecting, diagnosing,

prevention and management of a case of brucellosis, which in turn will improve the care level of the disease in humans.

2. MATERIALS AND METHODS

2.1 Questionnaire and Data Collection

A cross-sectional survey was conducted in the year 2020-21 after approval from the Institutional Research Ethics committee of HM Patel Centre for Medical Care and Education (vide letter no.62) This survey was conducted by use of physical forms as well as through Google form (https://docs.google.com/forms/d/1EYT69Hac1Uee1-6MXC_-ICIXtdwD0J1oxcHTliFEKo/edit?chromeless=1) The link to the survey titled “To study the awareness about Human Brucellosis in health care professional in India” was shared with various health care professionals working in India/Gujarat state, both in government setup as well as in private setup either through personal or group mails. The overall goal and objectives of the survey along with the invitation to fill the form were sent in the forwarding mail. When physical forms were used, consent was taken after a telephonic conversation with the health care professionals. The survey questionnaire was designed by a microbiology subject expert with inputs from clinicians and community health experts. The questionnaire was validated by five other subject and medical education experts.

The survey questionnaire had three sections and consisted of 19 questions. *Section 1* contained general instruction and stated the voluntary nature of the survey. *Section II* sought relevant personal & demographic information like gender, qualification [Allopathic (graduate/postgraduate), AYUSH (Ayurvedic, homeopathic, Unani, Siddha) and Nursing), years of experience, working in government or private set up. *Section III* had specific questions to assess the level of awareness in health care professionals. The aspects of awareness that were included in the questions were basic microbiological knowledge of the organism associated with human brucellosis and the source from where this knowledge has been gained. A major focus of the questions was on assessing the knowledge

about modes of transmission of the disease, risk and predisposing factors associated with disease acquisition, laboratory diagnosis, treatment, prevention and control. Response to the majority of questions were in Yes/No/ Don't know format and responses were selected by the participants from the options given and only three questions had multiple options with specific answers to choose from. Four questions were having a sub-question where participants were expected to give details if they had chosen "yes" as the answer eg if a participant said, *Brucella* is a preventable disease, then they had to write how they think it can be prevented.

2.2 Data Analysis

Questionnaire responses were collected, and entered into an Excel sheet. The responses were analysed using Statistical Package for the Social Sciences (SPSS) program, IBM version 22. Descriptive analysis was carried out. Percentages, frequencies and cross-table analysis were used for numerical variables.

3. RESULTS

Sixty-nine healthcare professionals from India responded to the questionnaire. The years of experience of participants were ranged from just graduated to 45 years of working in health care with a mean of 8 years. Among the respondents, 31 (44.93%) were male and 38 (55.07 %) were females. Participants who had different qualifications are shown in Table 1 and maximum i.e 31 (44.92%) were from, Allopathic System of medicine.

3.1 The Overall Level of Awareness

Overall 66/69 (95.65%) respondents had heard about brucellosis, this was 100% for allopathic practitioners and only 89% for AYUSH practitioners.

Newspaper and media, as a source of information were reported by 62% of participants, while academic gatherings like conferences/workshops/ CMEs were reported by 52% participants only.

When asked about brucellosis being a disease of animals, out of 69, there were 29 (42%) participants who knew about the correct answer, 35(51%) participants knew that brucellosis is a

disease of "Both" (Animal and Human beings). On asking if a Human being is infected by coming in contact with the infected animal or animal products, 62 (98%) participants gave the right response. Total 58 (84%) participants knew about brucellosis being an occupational hazard for some professions.

A total of 91% of participants had good knowledge about the aetiological cause and 67% knew about the ways of transmission. A maximum of, 8 (42%) Medical specialists come across a patient of human brucellosis in their practices with only 2 (16%) medical graduates (MBBS) reporting to come across these patients in practices. This was 21% and 26% in AYUSH and Nursing practitioners. Knowledge about basic microbiology of disease was good in MBBS and Specialist, but poor in AYUSH and nurses. All participants had an overall poor knowledge about clinical manifestations of the disease, ranging from 16% in MBBS to 74% in nurses. When asked, if brucellosis was easy to diagnose, overall 59% of participants said, "Yes". Of these, the maximum was among medical specialists (74%) and the minimum among nurses (32%). The knowledge of specific diagnostic tests available was the poorest in AYUSH practitioners (26%) Though the majority of the respondents (80-100%) except nurses (68%) said, the disease was easily treatable, treatment modalities were known only to 21-37% of them. Only 26 (38%) knew the disease can be prevented.

The results showed that 77% of participants had mentioned the professions associated with risks of brucellosis, 51% mentioned the diagnostic test available for human brucellosis, only 36% knew the treatments available for the disease. Thus, most of the participants except nurses (32%) knew the disease can be easily diagnosed and treated but knowledge about the complete cure, preventive potential and availability of a vaccine was poor (33%) except in nurses (95%).

The level of knowledge regarding brucellosis significantly differed with gender and different job position, where males had overall good knowledge than females. The majority of the participants had graduated to 21 years of working in health care. Freshers and graduates have good knowledge and information about human brucellosis.

Table 1. Qualification of the participants

System of Medicine Studied	Sex		Total
	Male	Female	
Allopathic -Graduate	7 (58%)	5 (42%)	12 (17.39 %)
Allopathic –Post Graduate	13 (68%)	6 (32%)	19 (27.54 %)
AYUSH	7 (37%)	12 (63%)	19 (27.54 %)
Nursing	4 (21%)	15 (79%)	19 (27.54 %)
Total	31 (45%)	38 (55%)	69 (100%)

Table 2. Awareness level of different health care professional about human brucellosis (n=69)

Sr No	Question	Response Options	Correct Response Received			
			MBBS [12]	MBBS, Specialist (surgical/ medical) [19]	Ayush- Ayurveda/ Homeopathy/ any other [19]	Nursing [19]
Source of information						
1	Have you heard about the disease brucellosis?	Yes/No	12 (100%)	19 (100%)	17(89%)	18(95%)
2	I have read about the disease during my undergraduate /postgraduate studies	Yes/No	12 (100%)	19 (100%)	13 (64%)	10 (53%)
3	I have read about the disease in newspapers/ any other media	Yes/No	6 (50%)	15 (79%)	11 (58%)	11(57%)
4	I have learned about the disease through academic gatherings like conferences/ workshops/ CMEs	Yes/No	7 (58%)	16 (84%)	9 (47%)	4 (21%)
5	I have learnt about the disease through interaction with colleague	Yes/No	4 (33%)	14 (74%)	8 (42%)	9 (47%)
6	I often across patients with Brucellosis and thus, know about the disease	Yes/No	2 (16%)	8 (42%)	4 (21%)	5(26%)
Awareness about Clinical and Microbiological details						
7	Brucellosis is primarily a disease of animals like cattle, sheep, goat, etc..	Yes/No	12 (100%)	19 (100%)	15 (79%)	14 (74%)
8	Brucellosis is a disease of---	() Human beings () Animals	11 (83%)	13 (68%)	10 (53%)	1 (5%)

Sr No	Question	Response Options	Correct Response Received			
			MBBS [12]	MBBS, Specialist (surgical/ medical) [19]	Ayush- Ayurveda/ Homeopathy/ any other [19]	Nursing [19]
9	The disease is caused by infection with a--	() Both () None () Don't know () Virus () Bacteria () Parasite () Fungus () If any others, please specify	12 (100%)	18 (95%)	15 (79%)	18 (95%)
10	The common ways by which the disease gets transmitted to human beings are (tick as many as applicable)	() Ingestion () Inhalation () Coming in contact with infected material () All of the above routes () None of the above	8 (67%)	12 (63%)	12 (63%)	14 (74%)
11	The Human being is infected by coming in contact with the infected Animal or Animal products.	Yes/No/Don't know	12 (100%)	16 (84%)	17 (89%)	17 (89%)
12	This disease is an occupational hazard for some professions	Yes/No/Don't know	12 (100%)	17 (89%)	15 (79%)	14 (74%)
13	Give some example of the professions that are highly associated with the risk of encountering brucellosis	Open ended	11 (83%)	18 (95%)	15 (79%)	9 (47%)
14	A human being suffering from this disease has very specific clinical manifestation and can be easily suspected	Yes/No	5 (42%)	10 (53%)	7 (37%)	11(57%)

Sr No	Question	Response Options	Correct Response Received			
			MBBS [12]	MBBS, Specialist (surgical/ medical) [19]	Ayush- Ayurveda/ Homeopathy/ any other [19]	Nursing [19]
15	A human being suffering from this disease can have signs and symptoms that can be confused with many other commonly seen diseases in Man	Yes/No	2(16%)	7 (37%)	6 (32%)	14 (74%)
Awareness about disease diagnosis, treatment and prevention						
16	The brucellosis disease can be easily diagnosed	Yes/No	8 (67%)	14 (74%)	13 (68%)	6 (32%)
17	Kindly mention the diagnostic test available for the disease	Open ended	8 (67%)	15 (79%)	5(26%)	7 (37%)
18	The disease can be easily treated	Yes/No	12 (100%)	16 (84%)	14 (74%)	13 (68%)
19	Kindly mention the basic treatment modality available	Open ended	7 (37%)	7 (37%)	4 (21%)	7 (37%)
20	Treatment, complete cure is possible	Yes/No	2 (16%)	0	6 (32%)	10 (53%)
21	The disease can be easily prevented	Yes/No	2 (16%)	0	6 (32%)	18 (95%)
22	If Yes mention the prevention methods	Open ended	9 (75%)	13(68%)	10(53%)	9(47%)
23	Vaccine is available to prevent Brucellosis in human beings	Yes/No/Don't know	2 (16%)	0	6 (32%)	15 (79%)

3.2 Awareness Level in Practitioners from Different Healthcare Systems Common in India

All medical Graduates (MBBS) had heard about the disease and are being taught of them in the curriculum. They knew the disease can be easily diagnosed (67%) and treated (100%) but they don't come across many patients of brucellosis in practices (16%) and knowledge about symptoms, complete cure, and prevention was poor (16%).

All Medical specialists had also heard about the disease and had good exposure to the disease in conferences and CME (84%). Only 37% knew that disease has non-specific signs and symptoms that can be confused with many other commonly seen diseases in man.

Among AYUSH practitioners, only 89% knew about the disease and 64% said they have read about brucellosis during their studies. Only 58 and 47% had read about *Brucella* in newspapers and 47% discussed it in different platforms like conferences/ workshops/ CMEs or discussed it with a colleague, 21% come across the patients with *Brucella* and 68% feel the disease can be easily diagnosed. The knowledge about disease cure, prevention and the vaccine was poor (32%).

Among nurses, 95% had heard about *Brucella* but only 53% read about the disease during studies. 21-57% had exposure to media, conference CME and interaction with friends as a source of information about *brucella*. Their knowledge about disease clinical manifestation, treatment and prevention including vaccination was good (53-95%) in comparison to other professionals.

4. DISCUSSION

The main objective of this study was to find the level of awareness about human brucellosis in health care providers. In our study all participants with the qualification from the Allopathic system of medicine, and Nursing had heard about brucellosis and most of them read about brucellosis as a part of the UG/PG curriculum. More than half of the participants had read about the disease in newspapers other media and academic gatherings like conferences, workshops, and CMEs.

The results have shown the difference in the level of knowledge of brucellosis amongst

different types of health care practitioners. The key finding of our study is the presence of a good amount of awareness in graduates & post graduates from the Allopathic system and nurses when compared with graduates from alternative systems of health i.e. AYUSH (Ayurveda, Unani, Siddha, Homeopathy). Similar to our findings, a good level of knowledge among physicians has been reported in a similar study conducted by Sahari MAM et al. [14] on primary healthcare physicians' knowledge and practice on brucellosis; its prevention, diagnosis, and treatment from Saudi Arabia. Fahad Nasser Ali et al. [15] reported that only 55% of healthcare physicians, in their study had high knowledge of brucellosis. In contrast to this, a study from Tanzania [16] showed insufficient knowledge among medical practitioners. A survey on the information of physicians in the health Center in Shiraz about infectious diseases (Tuberculosis, *Brucella*, typhoid fever, and dysentery) [17] reported that the knowledge of physicians about these infectious diseases including brucellosis was at an unacceptable level. In a systematic review including studies conducted in Asia and Africa, it was found that there was insufficient knowledge about brucellosis, but these studies were conducted on the general population and not on medical staff [18].

In the present study, 26% of the respondent had reported coming across patients with brucellosis, they don't diagnose or treat brucellosis cases frequently, thus most healthcare practitioners had limited knowledge of brucellosis diagnostic tests (51%), treatment (36%), and prevention (59%) in humans.

Similar to our findings, Manners et al found that general practitioner physicians, especially those belonging to the governmental sector, are more in contact with brucellosis patients than specialist physicians [19]. Generally, specialist physicians are involved when complications of the disease occur [20]. In our study, less than 50% of nursing participants knew the basic diagnostic test, treatments, and associated risk of brucellosis. The respondents from AYUSH practice also had limited knowledge of brucellosis diagnostic tests and treatments. Nurses don't directly deal with patients diagnosis and treatment but they play the role of community health officer, and come into direct contact with the community. Similarly though AYUSH practitioners are not permitted to practice the allopathic system of diagnosis & treatment, they form the healthcare provider of first contact in the rural community. Thus must be

aware of common zoonotic diseases and associated risk factors, so that they can suspect such cases and refer timely to prevent disease complications.

According to WHO, the general public, especially those belonging to endemic areas, has to be made aware of the danger to health and the economic importance of zoonoses and food-borne diseases [20]. Health care providers like AYUSH and nurses, can educate community people about these diseases and spread awareness.

5. CONCLUSION

The published literature on awareness about brucellosis is less and the findings of our study are variable. The majority of participants though had heard about brucellosis but were not well informed about clinical manifestation, treatments and prevention. Most health workers or doctors do not come across or suspect, investigate or diagnose these important and endemic zoonotic diseases. There is a need to generate awareness about the disease in newspapers and other media, academic gatherings like conferences/ workshops/ CMEs for healthcare professionals and also conduct community education programs. This will provide the required knowledge to help in timely suspecting, diagnosing, treatment and prevention of human brucellosis in the community.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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