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RESEARCH ARTICLE

AWARENESS OF JAUNDICE ASSOCIATED WITH LEPTOSPIROSIS IN PENANG, MALAYSIA

***Anas Bin Rosli**

Saveetha Dental Colege

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ABSTRACT

Aim of study is to assess the awareness of jaundice associated with leptospirosis among college students. The students' feedback are evaluated to investigate the awareness of jaundice which is developed from leptospirosis infection. Jaundice can occur due to obstruction of bile duct, hemolytic diseases and sometimes viral due to the spreading of hepatitis. Factors such as rate of incidence and exposure to cases, and people prone to risk of infection are taken as consideratio n for the survey. This study is to assess the awareness of jaundice associated with leptospiros is among college students.

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INTRODUCTION

Leptospirosis is an infectious disease caused by spirochaete named Leptospirae (Faine, 1994). It is most commonly transmitted from animals to humans when people with unhealed breaks in the skin, come into contact with water or soil that has been contaminated with animal urine - the bacterium can also enter the body through the eyes or mucous membranes (Adler, 2010). Leptospirosis is more common in the tropics, but it may also occur in the poor parts of large cities in developing nations that are not in tropical areas (Pappas *et al*., 2008). When cases do occur, they tend to be sporadic (Vinetz *et al*., 1996). Although more common in tropical areas, non-tropical urban conglomerations with low levels of sanitation are seeing more cases, especially during the summer and autumn months (Lau *et al*., 210). Most of the urban areasaffected involve large cities in the developing world (Lau *et al*., 2010). There two types of leptospirosis, mild and severe. Mild leptospirosis is seen during early period after the infected individual is exposed (Finsterer *et al*., 2005). The infected individuals may suffer muscle pain, chilling and headache (Kobayashi *et al*., 2001). Untreated mild leptospirosis can be progress into severe leptospirosis. It can be life-threatening (Panaphut *et al*., 2003). There is a high risk of organ failure and hemorrhage when the bacterium infects the organs such as liver, kidneys and other major organs (Panaphut *et al*., 2003).

****Corresponding author: Anas Bin Rosli,***
Saveetha Dental Colege.

Leptospirosis in severity from a mild illness suggesting a viral infect io n to a multisystemic syndrome with unique features. It is characterized by sudden onset of high fever, rigors, headaches, photophobia and dry cough as well as nausea and vomiting (Spichler *et al*., 2008). More severe disease manifests in icteric leptospirosis (Weil's disease) is jaundice, caused by Leptospira icterohaemorrhagiae (Arean *et al*., 1964). The role of hemorrhages in tissues has been proposed to be caused by the increase of the bilirubin index in Weil's disease (Field, 1950). The jaundice appears during days 5-9 of illness and is most intense 4-5 days later, continuing for about one month (. De Francesco Daher, 2004). Liver is the vital organ to be infected by Leptospirosis that causes jaundice. Jaundice refers to the yellow discoloration of the sclerae, mucous membranes and skin and results from either enhanced bilirubin production or impaired bilirubin process by the liver (Mendis, ?). As jaundice is caused by dysfunctions at any steps of bilirubin metabolism, in some cases, it is difficult to elucidate its main mechanism (Billing, 1958).

MATERIALS AND METHODS

A questionnaire was developed to elicit this information from a total of 100 samples. The questionnaire is printed and includes details on subject's details and 20 questions to assess the information. Data were collected among 300 Pure Mathematics-enrolled course students in University of Science, Malaysia. The samples were among students of various year in Pure Mathematics. Data from science-enrolled course students were strictly excluded.

RESULTS

Based on data collected, out of 96% samples were aware of the function of liver. However, regarding malfunction liver consequence, a group of 12% were unaware about jaundice while the remaining 88% do. In further consequence of jaundice to cause death, about 10% of samples were not aware of it. 92% of samples were already aware of the efficiency of detoxification is affected in hepatitis while 8% were not. More than half of samples, about 62% of them did not aware that some jaundice cases can be treated within few days only.

In case of leptospirosis treatment, 78% of samples were aware that infected patients were usually unable to be treated even after they were admitted into hospitals, while remaining 22% were unaware of it

DISCUSSION

The liver function achieves the detoxification of drugs and alcohol through the use of enzymes, bile, and urine (Brauer, 1963). Bile and urine may them act to add sulfur or amino acids for the final step of removal (Brauer, 1963).

Q. No.	Questions	Percentage	%
1	Do you know the function of liver for the body?	96	4
2	Have you ever heard of the term jaundice?	88	12
3	Do you know that detoxification is affected in hepatitis?	92	8
4	Are you aware of fatal consequences of jaundice?	90	10
5	Are you aware that some jaundice can be treated within few days?	62	38
6	Do you know there are various types of jaundice?	71	29
7	Have you ever heard of the term hepatitis?	94	6
8	Are you aware that hepatitis can be transmitted?	86	14
9	Are you aware that hepatitis and jaundice are associated with leptospirosis?	17	83
10	Have you ever heard about leptospirosis?	97	3
11	Do you know that leptospirosis incidence is more in winter?	91	9
12	Do you know that moist area is more prone to leptospirosis infection?	95	5
13	Do know that even standing in stagnant water can cause you to be infected with leptospirosis?	87	13
14	Do you know young children is the age group that is prone to be infected?	44	56
15	In a house exposed to leptospirosis, are you aware that babies and children are more prone to be infected than the parents?	61	39
16	Can leptospirosis infection spreading be prevented?	75	25
17	Do you believe in alternative medication which is not recommended by clinician?	73	27
18	If yes, are you aware of any possible side effects?	60	40
19	Are you aware of the possibility of alternative medication failure?	57	43
20	Do you know that leptospirosis patients among children usually cannot be treated even after admitted into hospital?	78	22

Most of samples were aware of jaundice, with 71% of samples knew there are various types of jaundice leaving a lesser count of 29% were not aware of it. 94% of samples have known about hepatitis while 6% of samples were not. Out of 300 samples, 86% of them were aware that hepatitis can be transmitted from infected host to another. Regarding hepatitis and jaundice in relation to leptospirosis, only 17% of samples knew about it while the remaining 83% did not. However, leptospirosis is common among 97% of samples while another 3% have not heard of it.

The increase of leptospirosis incidence in winter compared to other seasons is well-aware from 91% samples while another 9% did not know about that. However, they understood that moist areas are prone to leptospirosis infection, about 95% of samples do while 5% do not. A huge count of 87% of samples knew that even standing in stagnant water may cause them to be infected with leptospirosis leaving only 13% of samples unware of it. In age group cases, only few of samples, 44% were aware that children is more prone to be infected compared to adults, while 56% of samples were unaware of this. But a greater count of samples about 61% have known that babies and children were commonly infected by leptospirosis compared to the parents in an exposed house with the remaining count of 39% did not know about this. Regarding leptospirosis infection spreading, 75% of samples believed that it can be prevented while another 25% said otherwise. Alternative medication for leptospirosis that were not recommended by clinician was thought to be useful to control the infection, according to 73% of samples while the other 27% said no. Regarding the alternative medication, 60% of samples were aware of any side effects outcome while the other 40% believe it was not so. In addition, 57% of samples were aware of any possible failure when using the alternative medication.

Further functions of the liver as the storehouse of sugar between meals and include storing vitamins, irons and glucose (Brauer, 1963). In much of the developing countries, Leptospirosis significantly contributes to acute disease in Southeast Asia and can mimic viral hepatitis and even febrile illnesses (Cosson *et al*., 2014). The subclinical infection or clinically inapparent illnesses may have contributed to misreporting of leptospirosis jaundice (Bharti *et al*., 2003). The mechanisms of jaundice caused by pathogenic Leptospira remain unclear, it has been most frequently attributed to hemolysis and intrahepatic biliary obstruction (Okell, 1925). In this study, samples' feedback on the questionnaire have proved to be aware of jaundice and leptospirosis, but not on the relation between jaundice and leptospirosis in the community. Treating jaundice depends on underlying cause of condition. If it is caused by viral hepatitis, rest and recovery may reduce the severity of jaundice (Zimmerman, 1999). Jaundice due to viral hepatitis takes usually 4- 6 weeks for a cure but in a few it may go on for 8-12 weeks (Johnson *et al*., 1985). There are no specific drugs for this, usually maintaining of proper lifestyle contributes to greater treatment of jaundice (Johnson *et al*., 1985). Physiological jaundice occurs mostly in newborn and it can be treated within at least 7 days (Newman, 1992). Thorough clinical diagnosis is advised to be done properly because some clinician diagnosed jaundice patients is due to hepatitis, which in fact it is further due to underlying severe Leptospirosis infection. Jaundice can either be physiologic or pathologic. Physiological jaundice is due restriction to the foetal blood cells and the replacement of red blood cells. This period of jaundice usually resolves itself within two to three days, but the infant is carefully monitored during his hospital stay to ensure the liver is functioning properly prior to being discharged (Poland, 1971). Meanwhile, pathologic jaundice can occur in children and adults and is diagnosed when jaundice presents a health risk.

In infants, pathologic jaundice can occur when what starts as physiologic jaundice becomes exacerbated by dehydration or a premature or complicated birth (Maisels, 2006). In adults, there are several causes of pathological jaundice, including blood incompatibilities and diseases, and hereditary syndromes (Maisels, 2006). Some jaundice are inherited under Gilbert's syndrome condition due to intrahepatic damage (Bosma *et al*., 1995). In hepatitis involvement, coinfection of leptospirosis and viral hepatitis may also be due exposure to waterborne containing both organisms (Azmi *et al*., 2008). Conditions that favor the environmental spread of leptospirosis largely depend upon climate conditions. Warm and humid conditions favor a longer survival of the spirochetes (Corwin *et al*., 1990). However, under extreme cold in winter, infected hosts (rodents, mice, dogs) took warm shelter in houses and spread the spirochetes. This condition favors the household circle to be infected. After dry periods of little or no rain followed by days of heavy rain, the condition seem to be a perfect setting for waterborne leptospirosis epidemics.

A case was observed in United States military personnel in Okinawa, Japan, resulting in more than 50 leptospirosis cases under only few days (Corwin *et al*., 1990). Standing in stagnant water containing Leptospira also can cause an individual, with or without any wound or cut, to be infected. Even skin contact with infected urine, urine-contaminated soil and food waste from infected animal are sufficient enough transmit the spirochete resulting the particular individual to be infected. Children and the young are more prone to be infected because they are usually exposed to leptospira as they play around and do sports like swimming as well as petting animals (Marotfo *et al*., 1997). Leptospirosis exposure can be prevented by taking preventive measurements. Care to wear shoes whenever going outside, use tissue and avoid direct touching face with hands, use of hand sanitizer whenever required, avoid stepping into puddle of water and if wearing bandage to cover any cut, change it regularly as well as practice good hygiene (Zaki *et al*., 1996). In terms of medication, it is better to take medications recommended by medical practitioner instead of taking alternative medication promoted in the social media and society.

Conclusion

The main purpose of this survey is to measure the awareness of jaundice in leptospirosis among educated people other than in scientific field. Based on the feedback given, most samples have the general information about the disease but less likely to be aware of avoiding from being infected as well as the consequences of the disease. Predominantly in developing countries, leptospirosis is largely spreading as a waterborne disease. The global climate change will further aggravate the extent of this disease until aggressive interventions to minimize exposure measure and plan are taken. Society should also be provided for the awareness to avoid and act against such the disease before it is untreatable.

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