

Knowledge, perception and Quality of Life assessment of Chikungunya Infected patients in Dhaka, Bangladesh

Mohammad Kawsar sharif siam ^{1*}, Farah Naz Tanni ² and Mohammad Umer Sharif Shohan ³

¹ Head of Clinical Pharmacy Department, El Minia Hospital for Mental Health and Addiction Treatment.

² Head of Clinical Research Department, Manager of El Minia Hospital for Mental Health and Addiction Treatment.

³ Lecturer of Internal Medicine Department, University of Deraya.

*Corresponding Author: Mohammad Kawsar Sharif Siam, Mohammad Kawsar Sharif Siam

Received Date: Jun 01, 2023; Accepted Date: Jun 07, 2023; Published Date: Jun 18, 2023

Citation: M.A. Nagy, M.M. Mahmoud, N A. Ibrahim (2023), Knowledge, Perception and Quality of Life Assessment of Chikungunya Infected patients in Dhaka, Bangladesh, *Clinical Medical Reviews and Reports*, 5(3); DOI:10.31579/2690-8794/166

Copyright: © 2023, Mohammad Kawsar Sharif Siam. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

During mid-2017, a major outbreak occurred in Bangladesh especially in Dhaka city. Before this outbreak, the people of Bangladesh did not have adequate knowledge about the Chikungunya infection virus. Throughout our study, we wanted to find the level of knowledge of the patients. Additionally, we wanted to see what sort of impact chikungunya put on the quality of life (QoL) of these patients. The cross-sectional study consisted of 50 (100% participation in follow up) healthcare background and 98 non-healthcare (91.84% participation in follow up). Preparation of the questionnaire was done after proper analysis. The questionnaire was validated applying reliability scale. The value of Cronbach alpha is found more than 0.5 that validated the questionnaire. In the cross-sectional study, we compared the knowledge and perception by using different statistical analysis tools and models. Also, in the follow-up study, statistical analysis was done to find out the impacts on QoL using a systemic methodology. 51.35% of patients who participated in the study are female. From the total patients, 52.03% took home remedies for recovery as 46.62% visited the hospitals. Preexisting medical conditions are not affected by 69.59% of patients. However, in the cross-sectional study, differences in knowledge are found between healthcare and non-healthcare patients. Healthcare patients have more significant (p-value < 0.05) knowledge (e.g., chikungunya is a viral infection) than non-healthcare patients. From the two-sample T-test, we found no significant difference in the average awareness in some truth, false and perception-based statements among healthcare and non-healthcare patients. In a follow-up study, patients have faced different types of post-chikungunya symptoms like joint pain, muscle pain, skin problems (mostly rashes), headache, etc. from which, joint pain and headache were most significant (p-value < 0.05). Findings of this suggest that they experienced worse QoL in terms of a physical and mental state than before having affected by chikungunya infection although there is less effect on QoL in terms of financial condition. Our study shows that the difference between healthcare and non-healthcare patients is significant. This will help us to establish awareness and knowledge campaigns among the general people. Additionally, our study will help people to take post chikungunya cautions.

Keywords: chikungunya; outbreak in bangladesh; chikungunya outbreak; bangladesh; viral infection; dhaka chikungunya; chikungunya in dhaka

Introduction

Chikungunya is a viral infection transmitted between people by contaminated female mosquitoes and the causative agent for this disease is CHIKV, an alphavirus that is categorized as a part of the Togaviridae family carried by Aedes mosquitos (Sudeep and Parashar, 2008). This disease causes acute illness such as fever, skin rash, and incapacitating arthralgia, which are similar to dengue, this is also not surprising as the causative viruses are carried by the same vector (Pialoux, Gaüzère, Jauréguiberry, & Strobel, 2007). Additionally, comparing the symptoms of dengue and

chikungunya, it was found that fever (with shorter duration), conjunctivitis, acute arthritis, myalgia/arthralgia and rash were more noticeable in chikungunya (Halstead, Nimmannitya, & Margiotta, 1969; Nimmannitya et al., 1969; Halstead et al., 1969; Hochedez et al., 2008; Kularatne et al., 2009; Taraphdar et al., 2012; Laoprasopwattana et al., 2012). Chikungunya was first identified in 1952 in Africa following an outbreak on the Makonde Plateau that is a fringe territory between northern Mozambique and southeast Tanzania. (Powers et al., 2000; Zeller et al., 2016). Historically, CHIKV has

surfaced in Africa, Asia, and the Indian and Pacific Ocean Islands (Thiberville et al., 2013). In February of 2005, a major outbreak of chikungunya occurred in some islands located in the Indian Ocean. (Simon et al., 2011). During 2013, CHIKV was found to disperse to the Americas causing outbreaks in countries harboring strains of *Aedes aegypti* and *Aedes albopictus* mosquitoes, the vector for the Chikungunya virus (CHIKV) (Thiberville et al., 2013; Weaver & Forrester, 2015).

During December 2008, the first chikungunya epidemic in the Rajshahi and Chapainawabganj districts of Bangladesh was inquired by an investigation team from the Institute of Epidemiology, Disease Control and Research (IEDCR) and International Centre for Diarrheal Disease Research, Bangladesh (ICDDR, B) (ICDDR, 2009), which was the third outbreak in the entire country (Chowdhury et al., 2012). In the very first chikungunya epidemic that occurred in Bangladesh, 32 patients were recognized (Chowdhury et al., 2012). Furthermore, to discover the etiology of the epidemic and the vectors that are associated with the disease, another inquiry team was formed in November 2011. This team consisted of medical epidemiologists, FRA (field research assistants), several entomologists and laboratory technicians from the Institute of Epidemiology Disease Control and Research (IEDCR), of the Bangladesh Ministry of Health and Family Welfare, and ICDDR, B (Khatun et al., 2015). A statement by the former IEDCR director delineated that at least 10% of Dhaka City's total population are exceedingly prone to be affected by the mosquito-borne infection this year (Hassan et al., 2014). Due to lack of cognizance and proper diagnostic services, the nature of the chikungunya disease and most importantly, the nature of chikungunya disease, similar to another mosquito-borne disease, Dengue, remains misdiagnosed or undiagnosed (Hassan et al., 2014).

During 2017, excessive rainfall occurred from January to March that triggered the suitable condition for *Aedes* mosquitos (vector for chikungunya virus) to grow. A chikungunya outbreak was anticipated during that season (Khatun et al., 2015; Salje et al., 2016). Due to the outbreak, from April 2017 to September 2017, Bangladesh Ministry of health received 984 clinically confirmed cases which was diagnosed in Dhaka and a total of 13176 clinically confirmed cases in 17 other districts (Kabir et al., 2017). All the diagnosis was confirmed by Reverse Transcription PCR (RT-PCR) assay. Additionally, our climate has a foremost effect on the occurrence of dengue and chikungunya infection. Thus, people in Dhaka city suffered from chikungunya infection due to the presence of stagnant areas, poor

environmental management, and polluted lakes and ponds in the surroundings (Karim et al., 2012).

An outbreak like this can have an impact on the quality of life (QoL) of the patients (van Aalst et al., 2017). According to the World Health Organization (WHO), health is "a state of complete physical, mental, and social well-being not merely the absence of disease..." (Elsinga et al., 2017). The latest description is widely known as the definition of QoL (quality of life) although health related QoL (HRQoL) generally known as the well-being of the physical, emotional and social state of mind. However, sometimes it includes the measurement of the socio-economic wellbeing as well (Cramer et al., 2002; Peterson, 2003). Poor QoL usually leads to long or short-term economic burden for patients. For example in countries like India, patients with chikungunya also dealt with economic burden (Cardona-Ospina, Villamil-Gómez, Jimenez-Canizales, Castañeda-Hernández, & Rodríguez-Morales, 2015; Krishnamoorthy, Harichandrakumar, Kumari, & Das, 2009; Marimoutou, Ferraro, Javelle, Deparis, & Simon, 2015; Schilte et al., 2013).

This study is a part of a larger investigation project based on chikungunya. The aim of this study was to elucidate the knowledge and attitude of health care and non-health care people who are chikungunya patients. We designed it to obtain an in-depth outcome about the knowledge and attitude perception of chikungunya infection among chikungunya patients, how chikungunya impacts the quality of life. Therefore, this research study contains two parts. They are- (a) knowledge and attitude perception of chikungunya infection among affected individuals which is a cross-sectional study and (b) impact of chikungunya on quality of life of patients which is a 3-months follow up study.

Materials and Methods

Results

The cross-sectional study

In section 1 of the questionnaire, demographic information was taken. 51.35% of the participants are female, 47.97% of the participants have HSC/A levels as the highest level of education and 68.24% of the participants belong to the age group of 18–29 years (Table 2). Most patients affected by chikungunya were from Mirpur and Dhanmondi area of Dhaka city. (Fig. 2).

Table 2: Demographical information of the study.

Variable	n	%
Groups		
Healthcare	50	33.78
Non-healthcare	98	66.22
Gender		
Male	72	48.65
Female	76	51.35
Age group (years)		
18-29	101	68.24
30-49	23	15.54
50-64	24	16.22
Marital Status		
Single	90	60.81
Married	56	37.83
Divorce	1	0.68
Widowed	1	0.68
Highest Level of Study		
Doctorate/PhD	1	0.68
HSC/A Levels	71	47.97
Bachelors (Undergraduate)	47	31.76
Masters (Postgraduate)	24	16.22
Diploma/Training	3	2.03
SSC/ O levels	2	1.35

Table 2 describes the baseline demographical information of the participants. From this table information of sample size of each category and frequency can be obtained.

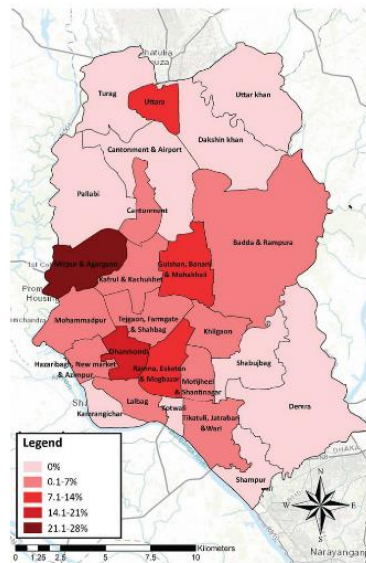


Figure 2: Spatial distribution of CHIKV infected patients in the outbreak of 2017 in Dhaka city

In section 2 of the questionnaire, the participants were asked about their existing knowledge of chikungunya infection. They got information about chikungunya from different sources (Fig. 3). The participants' knowledge of chikungunya infection found to be good as the percent score on the knowledge-based questions is more than 55%. Except for the question regarding transmission from mother to newborn, the patients are enough knowledgeable on the other questions as we can see in table 3. Moreover, the are- i) type of infection that chikungunya is (p-value < 0.05) and ii) the name of mosquito which is responsible for spreading chikungunya (value < 0.05) (Table 3).

margin of difference between knowledge of healthcare and non-healthcare background patients was found to be narrow. For this reason, the association between the field of education (Healthcare and non-healthcare) and knowledge is assessed with the Chi-square test. A significant difference between the two groups was found in the two knowledge questions. Those two

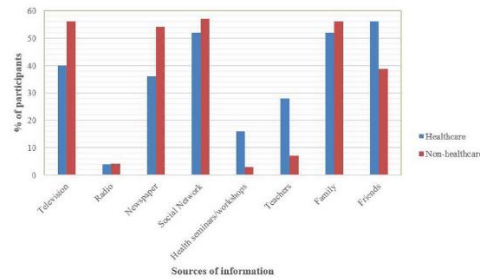


Figure 3: Percentage of patients gathering information from different sources of information.

Table 3: Knowledge based questions and their responses by the patients with AKS (Average Knowledge Score) of each item and association between the field of education and knowledge.

Questions	Healthcare Background Nhc=50	Non-healthcare Background Nnhc=98	Total Patients (Ntotal=148)	AKS of total patients	p-value	
1. Chikungunya is –					1.14±0.52	0.021
a. Bacterial infection	2	9	11 (7.43%)			
b. Viral infection ✓	43	63	106 (71.62%)			
c. Do not know	5	26	31 (20.95%)			
2. Which infection is closely related to Chikungunya infection?					1.23±0.64	0.135
a. Pneumonia	0	0	0			
b. Dengue infection ✓	47	84	131 (88.51%)			
c. Ebola infection	0	0	0			
d. Do not know	3	14	17 (11.49%)			
3. Chikungunya is caused by mosquito bite; do you know the name of mosquito spreading Chikungunya?					1.55±0.96	0.017
a. Anopheles	4	4	8 (5.41%)			
b. Aedes ✓	38	54	92 (62.16%)			
c. Both	1	5	6 (4.05%)			
d. Do not know	7	35	42 (28.38%)			

Table 3: Knowledge-based questions and their responses by the patients with AKS (Average Knowledge Score) of each item and association between the field of education and knowledge.

Table 3 carries the knowledge questions and their responses by the two groups of patients with the average knowledge score (AKS) on each item. Additionally, the association between the field of education and knowledge has been observed. Nhc, Nnhc, and Ntotal define the number of healthcare background patients, non-healthcare background patients and the total number of patients. A tick mark (‘✓’) beside an option defines the right answer to that question.

In section 3, participants were asked about the Chikungunya registry. About 52.03% took home remedies where 46.62% visited the hospital or physician and maximum physician suggested analgesic (e.g. paracetamol) (34%). 69.59% of the participants did not have any preexisting medical condition but 29.73% had preexisting medical conditions like rheumatoid arthritis, diabetes, spinal cord injury, etc. However, only 19.59% believe that their pre-existing medical conditions were worsened by chikungunya.

In section 4, participants were asked about awareness among affected individuals. Eleven items were used to assess awareness among the affected individuals. 68.02% strongly agreed to the statement that fever with severe joint pain is the most common symptoms of Chikungunya. Moreover, 35.14% agreed to the statement that chikungunya usually results in

permanent joint destruction. Both groups of people were asked about the identification test for Chikungunya and 47.3% agreed to the point. Similarly, they responded to the other statements (Fig. 7). Furthermore, boxplot and two-sample T-test was done to assess if there is any difference in average awareness. Therefore, six statements, which are theoretically true and two theoretically false statements, were used to assess whether two groups of people (healthcare and non-healthcare) are aware of the true or false statements. To begin with, for the true statements, there is a difference in mean awareness among healthcare and non-healthcare people (Fig. 4). T-test ($p < 0.01$, $df = 146$) also confirms that means awareness of patient from healthcare and non-healthcare are not equal ($p\text{-value} > 0.05$). Similarly, for the false statements, from the boxplot it can be seen that the mean of the two groups are almost same which ensures that there is no difference on the awareness among healthcare and non-healthcare (Fig. 5). Therefore, further, the t-test cannot be done. Additionally, 2 variables taken to assess the perception with the help of boxplot and t-test. Variables are-i) Chikungunya is responsible for immense sleep disturbances and ii) Changes in dietary patterns were observed after being affected by chikungunya. Figure 6 and t-test ($p\text{-value} = 0.6233$; $df = 146$) suggest that there is no significant difference in mean perception between healthcare and non-healthcare group.

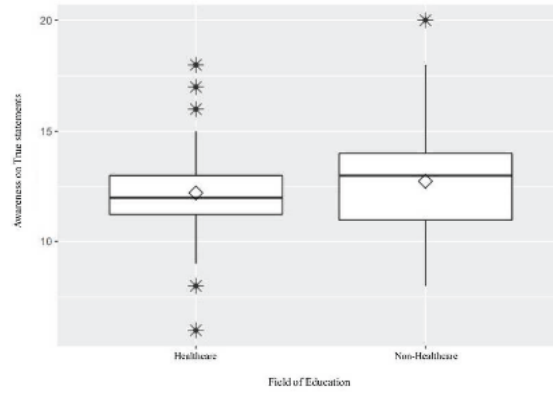


Figure 4: Boxplot to see the difference of mean awareness of true statements among healthcare and non-healthcare group

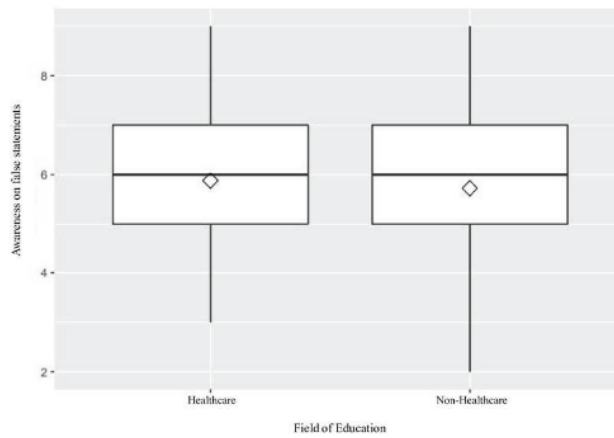


Figure 5: Boxplot to see the difference of mean awareness of false statements among healthcare and non-healthcare group.

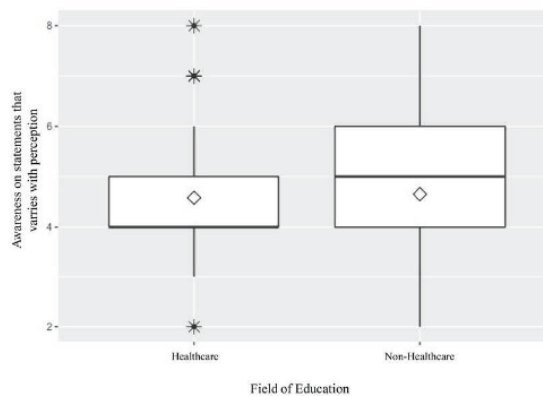


Figure 6: Boxplot to see the difference of perception among healthcare and non-healthcare group.

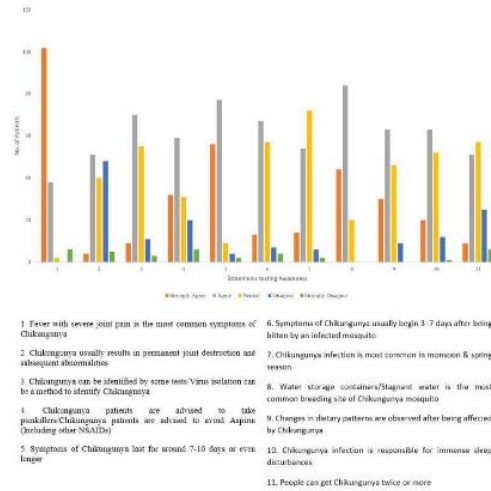


Figure 7: Testing of awareness of two different groups where they agreed, neutralized, disagreed on some statements. These statements were given to the participants to assess their awareness.

The Follow-up Study

In the follow-up, 148 populations 140 participated in the follow-up study. Among 140 participants, 67 of them were male and 73 of them are female. The response to the question of the existence of post-chikungunya symptoms was analyzed. After analyzing, it was found that 33.47% of them have suffered from fever, 77.14% of them suffered from joint pain, 67.86% of them suffered from muscle pain. Additionally, 28.57% of them suffered from

skin problems, 22.14% of them suffered from fatigue. Also, 29.29% of them suffered from a headache. 26.43% of them suffered from sleep disturbance and 20.71% of them suffered from loss of appetite. This percentage shows that people suffered more from joint pain and muscle pain than any other disease condition or discomfort within these 3 months. However, an independent chi-square test has been done to all of the disease conditions to see the significance and it has been seen that joint pain (p-value < 0.05) is the most significant disease condition (Table 4).

Table 4: Symptoms that has been observed on chikungunya patients in the follow up period of 3 months

Symptoms	Healthcare Background (N _{hc} =50)	Non-healthcare Background (N _{nhc} =90)	p-value
Fever	19	28	0.408
Joint Pain	32	76	0.006
Muscle Pain	33	62	0.726
Skin Problem	14	26	0.911
Fatigue	11	20	0.976
Headache	20	21	0.038
Sleep Disturbance	15	22	0.475
Loss of Appetite	12	17	0.475

Table 4 describes the symptoms they have faced during the follow up periods. Both healthcare and non-healthcare background people face similar kind of problems. N_{hc} and N_{nhc} defines the number of healthcare background patients and non-healthcare background patients

Table 4: Symptoms that have been observed on chikungunya patients in the follow-up period of 3 months

Table 4 describes the symptoms they have faced during the follow-up periods. Both healthcare and non-healthcare background people face similar kinds of problems. N_{hc} and N_{nhc} defines the number of healthcare background patients and non-healthcare background patients

Moreover, it was observed that 65% of people have experienced chikungunya-associated ache in their joints or muscles (table 5) within the follow-up period. 34.29% of the participant did not face chikungunya associated ache in their joints or muscle (p-value < 0.05).

Table 5: Parts of the body that are affected by chikungunya infection associated ache to the respondents.

Parts of the body affected	Healthcare Background (N _{hc} =50)	Non-Healthcare Background (N _{nhc} =90)	Total N _{total} (%)
Fingers	23	38	61 (43.57)
Wrists	10	19	29 (20.71)
Elbows	11	8	19 (13.57)
Knees	23	28	51 (36.43)
Ankles	10	21	31 (22.14)
Soles	2	13	15 (10.71)
Shoulders	7	15	22 (15.71)
Waist Joints	1	1	2 (1.43)
Neck	0	3	3 (2.14)
Lumber Ciatic Pain	0	1	1 (0.71)
Tringing Sensation in Legs	0	1	1 (0.71)

Table 5 describes the parts of the body that are affected by chikungunya associated ache. Here, N_{hc}, N_{nhc} and N_{total} defines the number of healthcare background patients, non-healthcare background patients and total number of patients.

Table 5: Parts of the body that are affected by chikungunya infection associated ache to the respondents.

Table 5 describes the parts of the body that are affected by chikungunya associated ache. Here, N_{hc}, N_{nhc}, and N_{total} define the number of healthcare background patients, non-healthcare background patients and the total number of patients.

Additionally, it was observed that 53.57% of the people have experienced pain with stiffness in their joints immediately after waking up in the morning. Furthermore, 32.14% of the people have experienced pain with stiffness in their joints immediately after waking up at any time of the day except morning. In the follow-up period, some of the participants suffered from fever having different frequencies (Table 6).

Table 6: Frequency of the participants experienced post chikungunya fever.

Frequency	Healthcare Background (N _{hc} =50)	Non-healthcare Background (N _{nhc} =90)	Total N(%)	p-value
Not even once	25	43	68 (48.57)	>0.05
Once	7	18	25 (17.86)	>0.05
Twice	12	19	31 (22.14)	>0.05
Thrice	1	6	7 (5)	>0.05
More than 3 times	5	4	9 (6.43)	>0.05

Table 6 describes the frequency in which sample population face post chikungunya fever. Both group of patients had faced these frequencies. Here, N_{hc} and N_{nhc} defines the number of healthcare background patients and non-healthcare background patients. Here, no significant difference is found between two groups.

Table 6: Frequency of the participants experienced post chikungunya fever.

Table 6 describes the frequency in which the sample population faces post chikungunya fever. Both groups of patients had faced these frequencies. Here, N_{hc} and N_{nhc} define the number of healthcare background patients and non-healthcare background patients. Here, no significant difference is found between the two groups.

Furthermore, 54.29% of 140 participants have experienced different kinds of skin problems in different parts of their bodies (Figs. 8 and 9). Also, in response to the question about specific medication recommended by the physician or doctor to manage the symptoms of chikungunya 114 out of 140 participants answered negatively. In addition, 24 of them answered affirmatively and 2 of them did not respond to the question. However, those 24 participants have list out some of the medications that they were

recommended. Most of them have mentioned about paracetamol with brand names like Napa (BEXIMCO Pharmaceuticals Ltd., Bangladesh). Additionally, they enlisted medication like Naproxen in the brand name of Naproxen (Amico Laboratories Ltd., Bangladesh). And Naprosyn (Roche Bangladesh Pharmaceuticals Ltd.), Naprosyn plus (Radiant Pharmaceuticals Ltd., Bangladesh) have been used by the patients. Additionally, ibuprofen in the brand name of Flamex (ACI Ltd., Bangladesh) which are NSAIDs (Non-steroidal anti-inflammatory drugs), esomeprazole in the brand name of Pronex (Drug International Ltd., Bangladesh), Zil forte for hair fall has been used by the patients. Moreover, they were suggested to have a morning walk and drinking lots of fluid or liquid.

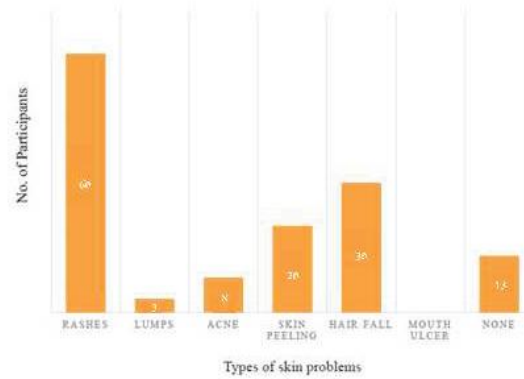


Figure 8: Types of skin problem participants have faced during the follow-up period

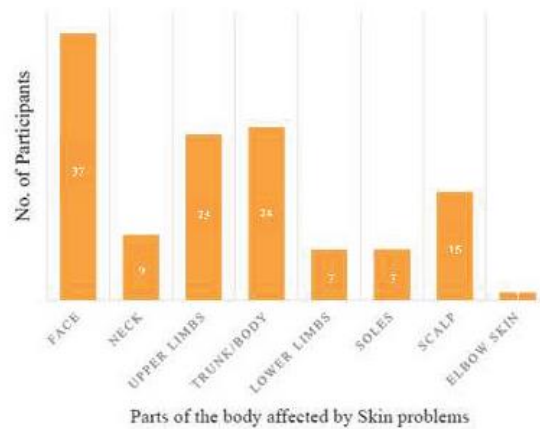


Figure 9: Part of the body affected by skin problems during the follow-up period.

It has been observed that 59.29% of them experienced sleep disruption (from severe to moderate) in those 3 months and 43.57% of them have experienced different types of change (Fig. 10) in their dietary pattern.

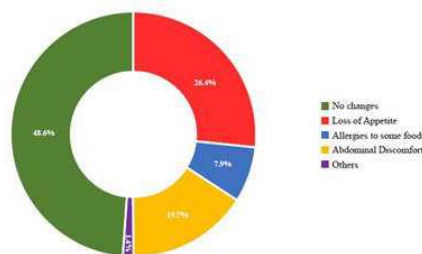


Figure 10: Types of change participants experienced in their dietary pattern during the follow-up period

Additionally, participants hardly found any effect in comorbidities and only 18.57% of participants' pre-existing medical conditions have been affected by chikungunya (p-value > 0.05). In addition, 49.29% of people believed that

their physical work or activities were refrained by the chikungunya associated pain (p-value > 0.05) and 47.14% of people believed that their strength and stamina to perform daily, regular work in those 3 months were

not adequate. The quality of health, sleep and neurotic emotion was analyzed. It was found that more than 50% of the patients did not find any significant change. Although patients did not find their financial condition being affected by chikungunya infection (Fig. 11).

Discussion

The outbreak of Chikungunya across Dhaka, Bangladesh in 2017 (April to September) is a remarkable phenomenon in Bangladesh (Kabir et al., 2017). According to our knowledge, we are the first group who worked with knowledge and attitude perception of chikungunya infection among chikungunya patients from healthcare and non-healthcare professional background in Dhaka city. Additionally, we have assessed the quality of life (QoL) among these patients during 3 months after recovery. Chikungunya was an unfamiliar disease to the people of Bangladesh then. It was a huge challenge to handle the situation, as Dhaka is one of the most densely populated cities in the world.

Chikungunya patients generally went through an acute and chronic disease stage which is proved by the current literature (Feldstein, Ellis, Rowhani-Rahbar, Elizabeth Halloran, & Ellis, 2016; Larrieu et al., 2010; Manimunda et al., 2010; Mattar et al., 2015; Moro et al., 2012; Renault et al., 2007). As a result, there may have some variety of symptoms and their intensity. Also, some participants may have confusion regarding chikungunya sequelae. Different clinical studies have shown difference in disease indications (van Aalst et al., 2017). However, a complete clinical picture of chikungunya and level of knowledge about Chikungunya and its after effect is still lacking. This study attempts to assess the knowledge and attitude perception of Chikungunya infection among a sample of 148 individuals belonging to the healthcare and non-healthcare background living in Dhaka city. In the follow-up of 140 patients who belong to those 148 patients for three months to have an insight into the problems, they have faced afterward.

Few literatures show that there are some clinical manifestations, which can be observed during and after chikungunya. Symptoms like joint pain are observed in a different part of the body like ankle, wrist, feet, fingers and knee having variety in frequency. Additionally, symptoms like rashes, disturbance in sleep, headache, depression can be seen in the chikungunya patients (Anish et al., 2011; Chopra, Anuradha, Ghorpade, & Saluja, 2012; Queyriaux et al., 2008; Staikowsky et al., 2008; van Genderen et al., 2016). Moreover, one study shows that 53% of patients suffered from joint pain, 42% suffered from muscle pain and 10% had skin disorders during follow-ups. From which joint pain and muscle pain were very significant (p -value < 0.001) (Soumahoro et al., 2009). Although, our study shows that joint pain and headache are the most significant among the patients (p -value < 0.05). Due to the difference in the environment and follow up period, this dissimilarity may occur. Four studies after 2008 show that patients with a pre-existing medical condition like rheumatoid manifestation were affected by chikungunya infection. In the 15-, 17-, 18- and 24-months follow-up rheumatoid symptom is affected for 57%, 44%, 64% and 59% patients respectively (Borgherini et al., 2008; Larrieu et al., 2010; Sissoko et al., 2009; Soumahoro et al., 2009). However, less than 20% of our patients affected their pre-existing medical conditions like rheumatoid arthritis. It differed due to less population and less follow up period than those studies.

Throughout the study, we have found that most patients have a good insight of chikungunya as they have adequate knowledge about being chikungunya is a viral infection. Additionally, they also believe that chikungunya is closely related to dengue and the same vector is responsible for both diseases, which is confirmed by some literature (Pialoux et al., 2007; Sharmin, Viennet, Glass, & Harley, 2015). Moreover, we have found that there is a significant (p -value < 0.05) association between the field of education (healthcare and non-healthcare) and knowledge of Chikungunya is a viral infection. In addition, the field of education and knowledge of Chikungunya spreading mosquito were found to have a notably significant association between them. However, we have not found any significant association between the field of education and another infection related to Chikungunya.

Furthermore, there was no noteworthy association between sex and as to whether Chikungunya transfers from human-to-human contact. However, the mean knowledge of patients from healthcare and non-healthcare and mean knowledge of males and females about Chikungunya do not differ significantly. In addition, the mean perception of patients from healthcare and non-healthcare has also come out to be statistically insignificant.

Moreover, in the follow-up study, we have found that the gender and the study field of the Chikungunya affected patients are significantly associated. We have also found that the age group of the patients and the study background are significantly associated. We can also infer that the individuals of the age group 18–29 were the worst sufferer from Chikungunya in terms of the percentage of individuals affected. Muscle and joint pain also has a notable association with the study field of the participants. Although muscle pain in the morning does not have a significant association with the study field, muscle pain except morning has such association. Furthermore, the frequency of headaches, skin problems and dietary patterns discussed in the exploratory analysis was found to have a statistically significant association with healthcare and a non-healthcare group of participants. However, the frequency of fever, preexisting medical condition, and problems in physical works along with some other categories have failed to have a significant association with the study field of the Chikungunya affected people who participated in the study.

During the study, we have found some limitations. To begin with, some limitations were found in the cross-sectional study. Firstly, the number of participants is low because a country like Bangladesh where literacy is not that high (Basu, K., Narayan, A., & Ravallion, M., 2001), it was not easy to find patients having a highly qualified background. Secondly, it was not easy to collect information from professionals, as they were too busy with their daily work. Additionally, we have found some limitations during the follow-up study. Firstly, it was very hard to reach the entire patient within a short time, a few of them did not share their real contact information. Many of them are contacted through social media or by a person to bring out the information. Secondly, most of the population is from the non-healthcare profession and they could hardly verify the symptoms that are caused by chikungunya. They are also not able to differ the comorbidities and after effect of chikungunya. Thirdly, the duration of the follow up was 3 months and many of the patients found difficulty to recall all the symptoms they faced during that period. Furthermore, some recommendations can be given after the study. More awareness campaigns and seminars are needed to be arranged about chikungunya. Chikungunya is a disease that not only affects during the chikungunya fever but also affects after recovery for several months. For this reason, there should more awareness campaigns and seminars are needed. Although there is less possibility of having chikungunya twice the symptoms like joint pain, skin rashes can affect patients for a long period even after recovery. So, patients must be advised to carry on their check-up after recovery until they get rid of completely from chikungunya.

Conclusions

The study depicts one of the most complete pictures of Chikungunya affected people of Bangladesh despite having a relatively lower sample size. Our findings would contribute to establishing an effective syndromic surveillance system for early diagnosis and timely public health intervention of future Chikungunya outbreaks in underdeveloped countries like Bangladesh along with countries like India, Pakistan, Bhutan, and Sri Lanka. Our study also suggests having a close eye on the Chikungunya affected people after their recovery. Additionally, based on the statistical analysis we have determined the knowledge difference between healthcare and non-healthcare patients that will help the policymakers to make awareness campaigns for the future. Hence, a more strategize survey throughout the country is needed to establish a well-balanced and informative education plan for the nation.

Appendix (Abbreviations)

CHIKV= Chikungunya Virus

IEDCR= Institute of Epidemiology, Disease Control and Research

ICDDR, B= International Centre for Diarrheal Disease Research, Bangladesh

FRA= Field Research Assistant

RT-PCR= Real Time Polymerase Chain Reaction

WHO= World Health Organization

QoL= Quality of Life

HRQoL= Health Related Quality of Life

MBBS= Bachelor of Medicine and Bachelor of Surgery

CSE= Computer Science Engineering

BBA= Bachelor of Business Administration

AKS= Average Knowledge Score

Declarations

Conflicts of Interest

No conflicts of interest.

Acknowledgements

We would like to acknowledge all the chikungunya patients who have participated in the study.

Funding

This study received no external funding.

Author Contributions

Mohammad Kawsar Sharif Siam conceived and designed the experiments, performed the experiments, analyzed the data, contributed reagents/materials/analysis tools, prepared figures and/or tables, performed the statistical analysis, authored or reviewed drafts of the paper, and approved the final draft.

Farah Naz Tanni conceived and designed the experiments, performed the experiments, analyzed the data, performed the statistical analysis, authored or reviewed drafts of the paper, performed the statistical analysis, and approved the final draft.

Mohammad Umer Sharif Shohan performed the experiments, prepared figures and/or tables, performed the statistical analysis, authored or reviewed drafts of the paper, and approved the final draft.

References

- Anish, T. N, George, B, Lawrence, T, Muthukkutty, S, Ramachandran, R, & Vijayakumar, K. (2011). Clinical Profile of Chikungunya Patients during the Epidemic of 2007 in Kerala, India. *Journal of Global Infectious Diseases*, 3(3):221.
- Basu, K, Narayan, A, & Ravallion, M. (2001). Is knowledge shared within households? theory and evidence for Bangladesh. Working Paper, 8(82):23.
- Borgherini, G, Poubeau, P, Jossaume, A, Gouix, A, Cotte, L, Michault, A, Paganin, F. (2008). Persistent Arthralgia Associated with Chikungunya Virus: A Study of 88 Adult Patients on Reunion Island. *Clinical Infectious Diseases*, 47(4):469-475.
- Cardona-Ospina, J. A, Villamil-Gómez, W. E, Jimenez-Canizales, C. E, Castañeda-Hernández, D. M, & Rodríguez-Morales, A. J. (2015). Estimating the burden of disease and the economic cost attributable to chikungunya, Colombia, 2014. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 109(12):793-802.
- Chopra, A, Anuradha, V, Ghorpade, R, & Saluja, M. (2012). Acute Chikungunya and persistent musculoskeletal pain following the 2006 Indian epidemic: A 2-year prospective rural community study. *Epidemiology and Infection*, 140(5):842-850.
- Chowdhury, F. I, Kabir, A, Das, A, Mukerrama, S. M, & Masud, S. (2012). Chikungunya fever: An emerging threat to Bangladesh. *Journal of Medicine*, 13(1): 60-64.
- Cramer, J. A, & ILAE Subcommittee on Outcome Measurement in Epilepsy (Carol Camfield, Hans Carpay, Christopher Helmstaedter, John Langfitt, Kristina Malmgren, and Samuel Wiebe). (2002). Principles of health-related quality of life: *assessment in clinical trials. Epilepsia*, 43(9):1084-1095.
- Feldstein, L. R, Ellis, E. M, Rowhani-Rahbar, A, Elizabeth Halloran, M, & Ellis, B. R. (2016). The first reported outbreak of chikungunya in the U.S. Virgin Islands, 2014-2015. *American Journal of Tropical Medicine and Hygiene*, 95(4):885-889.
- Hassan, R, Rahman, M, Rahim, A, Barua, S, & Biswas, R. (2014). Chikungunya - An emerging infection in Bangladesh: A case series Chikungunya – an emerging infection in Bangladesh: a case series. *Journal of Medical Case Reports*, 8(1):1-3.
- ICDDR. (2009). First identified outbreak of Chikungunya in Bangladesh, 2008. *Health and Science Bulletin*, 7(1), 1–6.
- J, E, M.P, G, A, T, I, G, & Bailey A. AO - Elsinga, J. O. (2017). Health-related impact on quality of life and coping strategies for chikungunya: A qualitative study in Curacao. *PLoS Neglected Tropical Diseases*, 11(10), 0005987.
- Kabir, I, Dhimal, M, Müller, R, Banik, S, & Haque, U. (2017). The 2017 Dhaka chikungunya outbreak. *The Lancet Infectious Diseases*, 17(11):1118.
- Karim, M. N, Munshi, S. U, Anwar, N, & Alam, M. S. (2012). karim.pdf, 136(1):32-39.
- Khatun, S, Chakraborty, A, Rahman, M, Nasreen Banu, N, Rahman, M. M, Hasan, S. M. M, Gurley, E. S. (2015). An outbreak of chikungunya in rural Bangladesh, 2011. *PLoS Neglected Tropical Diseases*, 9(7):1-9.
- Krishnamoorthy, K., Harichandrakumar, K. T., Kumari, A. K., & Das, L. K. (2009). Burden of Chikungunya in India: Estimates of disability adjusted life years (DALY) lost in 2006 epidemic. *Journal of Vector Borne Diseases*, 46(1):26-35.
- Larrieu, S, Poudroux, N, Pistone, T, Filleul, L, Receveur, M. C, Sissoko, D, Malvy, D. (2010). Factors associated with persistence of arthralgia among chikungunya virus-infected travellers: Report of 42 French cases. *Journal of Clinical Virology*, 47(1):85-88.
- Manimunda, S. P, Vijayachari, P, Uppoor, R, Sugunan, A. P, Singh, S. S, Rai, S. K, Guruprasad, D. R. (2010). Clinical progression of chikungunya fever during acute and chronic arthritic stages and the changes in joint morphology as revealed by imaging. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 104(6):92-399.
- Marimoutou, C, Ferraro, J, Javelle, E, Deparis, X, & Simon, F. (2015). Chikungunya infection: Self-reported rheumatic morbidity and impaired quality of life persist 6 years later. *Clinical Microbiology and Infection*, 21(7):688-693.
- Mattar, S, Miranda, J, Pinzon, H, Tique, V, Bolaños, A, Aponte, J, Aleman, A. (2015). Outbreak of chikungunya virus in the north caribbean area of colombia: Clinical presentation and phylogenetic analysis. *Journal of Infection in Developing Countries*, 9(10):1126-1132.
- Moro, M. L, Grilli, E, Corvetta, A, Silvi, G, Angelini, R, Mascella, F, Bossio, N. (2012). Long-term chikungunya infection clinical manifestations after an outbreak in Italy: A prognostic cohort study. *Journal of Infection*, 65(2):165-172.
- Peterson, M. (2003). Handbook of Quality-Of-Life Research: An Ethical Marketing Perspective. *Journal of Macromarketing*.

22. Pialoux, G, Gaüzère, B. A, Jauréguiberry, S, & Strobel, M. (2007). Chikungunya, an epidemic arbovirosis. *Lancet Infectious Diseases*, 7(5):319-327.
23. Powers, A. M, Brault, A. C, Tesh, R. B, & Weaver, S. C. (2000). Re-emergence of chikungunya and o'nyong-nyong viruses: Evidence for distinct geographical lineages and distant evolutionary relationships. *Journal of General Virology*, 81(2):471-479.
24. Queyriaux, B, Simon, F, Grandadam, M, Michel, R, Tolou, H, & Boutin, J. P. (2008). Clinical burden of chikungunya virus infection. *The Lancet Infectious Diseases*, 8(1):2-3.
25. Renault, P, Solet, J, Sissoko, D, Balleysdier, E, Larrieu, S, Filleul, L, Pierre, V. (2007). A Major Epidemic of Chikungunya Virus Infection on Réunion Island, *American Journal of Tropical Medicine and Hygiene*, 77(4):727-731.
26. Salje, H, Lessler, J, Paul, K. K, Azman, A. S, Rahman, M. W, Rahman, M, Cauchemez, S. (2016). How social structures, space, and behaviors shape the spread of infectious diseases using chikungunya as a case study. *Proceedings of the National Academy of Sciences*, 113(47):13420-13425.
27. Schilte, C, Staikovsky, F, Couderc, T, Madec, Y, Carpentier, F, Kassab, S, Michault, A. (2013). Chikungunya Virus-associated Long-term Arthralgia: A 36-month Prospective Longitudinal Study. *PLoS Neglected Tropical Diseases*, 7(3).
28. Sharmin, S., Viennet, E., Glass, K., & Harley, D. (2015). The emergence of dengue in Bangladesh: Epidemiology, challenges and future disease risk. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 109(10):619-627.
29. Simon, F, Javelle, E, Oliver, M, Leparc-Goffart, I, & Marimoutou, C. (2011). Chikungunya virus infection. *Current Infectious Disease Reports*, 13(3):218-228.
30. Sissoko, D., Malvy, D., Ezzedine, K., Renault, P., Moschetti, F., Ledrans, M., & Pierre, V. (2009). Post-epidemic Chikungunya disease on reunion island: Course of rheumatic manifestations and associated factors over a 15-month period. *PLoS Neglected Tropical Diseases*, 3(3):1-6.
31. Soumahoro, M.-K, Gérardin, P, Boëlle, P.-Y, Perrau, J, Fianu, A, Pouchot, J, Hanslik, T. (2009). Impact of Chikungunya Virus Infection on Health Status and Quality of Life: A Retrospective Cohort Study. *PLoS ONE*, 4(11):7800.
32. Staikovsky, F, Le Roux, K, Schuffenecker, I, Laurent, P, Grivard, P, Develay, A, & Michault, A. (2008). Retrospective survey of Chikungunya disease in Réunion Island hospital staff. *Epidemiology and Infection*, 136(2):196-206.
33. Sudeep, A. B, & Parashar, D. (2008). Chikungunya: An overview. *Journal of Biosciences*, 33(4):443-449.
34. Thiberville, S. D, Moyen, N, Dupuis-Maguiraga, L, Nougairède, A, Gould, E. A, Roques, P, & de Lamballerie, X. (2013). Chikungunya fever: Epidemiology, clinical syndrome, pathogenesis and therapy. *Antiviral Research*, 99(3):345-370.
35. van Aalst, M, Nelen, C. M, Goorhuis, A, Stijns, C, & Grobusch, M. P. (2017). Long-term sequelae of chikungunya virus disease: A systematic review. *Travel Medicine and Infectious Disease*, 15:8-22.
36. van Genderen, F. T, Krishnadath, I, Sno, R, Grunberg, M. G, Zijlmans, W, & Adhin, M. R. (2016). First Chikungunya Outbreak in Suriname; Clinical and Epidemiological Features. *PLoS Neglected Tropical Diseases*, 10(4):1-18.
37. Weaver, S. C, & Forrester, N. L. (2015). Chikungunya: Evolutionary history and recent epidemic spread. *Antiviral Research*, 120:32-39.
38. Zeller, H, Van Bortel, W, & Sudre, B. (2016). Chikungunya: Its history in Africa and Asia and its spread to new regions in 2013-2014. *Journal of Infectious Diseases*, 214:436-440.
39. Halstead SB, Nimmannitya S, Margiotta MR (1969) Dengue and chikungunya virus infection in man in Thailand, 1962–1964. II. Observations on disease in outpatients. *Am J Trop Med Hyg*, 18:972-983.
40. Nimmannitya S, Halstead SB, Cohen SN, Margiotta MR (1969) Dengue and chikungunya virus infection in man in Thailand, 1962–1964. I. Observations on hospitalized patients with hemorrhagic fever. *Am J Trop Med Hyg*, 18:954-971.
41. Halstead SB, Udomsakdi S, Singharaj P, Nisalak A (1969) Dengue chikungunya virus infection in man in Thailand, 1962–1964. 3. Clinical, epidemiologic, and virologic observations on disease in non-indigenous white persons. *Am J Trop Med Hyg*, 18: 984-996.
42. Hochedez P, Canestri A, Guihot A, Briclher S, Bricaire F, et al. (2008) Management of travelers with fever and exanthema, notably dengue and chikungunya infections. *Am J Trop Med Hyg*, 78:710-713.
43. Kularatne SA, Gihan MC, Weerasinghe SC, Gunasena S (2009). Concurrent outbreaks of Chikungunya and Dengue fever in Kandy, Sri Lanka, 2006–07: a comparative analysis of clinical and laboratory features. *Postgrad Med J*, 85:342-346.
44. Taraphdar D, Sarkar A, Mukhopadhyay BB, Chatterjee S (2012) A comparative study of clinical features between monotypic and dual infection cases with Chikungunya virus and dengue virus in West Bengal, India. *Am J Trop Med Hyg* 86:720-723.
45. Laoprasopwattana K, Kaewjungwad L, Jarumanokul R, Geater A (2012) Differential diagnosis of Chikungunya, dengue viral infection and other acute febrile illnesses in children. *Pediatr Infect Dis J*, 31:459-463.
46. Raosoft.com. (2016). Sample Size Calculator. [online] Available at.
47. WHO. Chikungunya: Fact sheet [Accessed on 2018 Aug 16] [Internet]. 2017. Available.
48. WHO. Guidelines on clinical management of chikungunya fever. [Accessed on 2018 Aug 16] [Internet]. 2008. Available.
49. IEDCR. Chikungunya Newsletter. [Accessed on 2018 Aug 16] [Internet]. 2017. Available.
50. The Economist Intelligence Unit. (2018). The Global Liveability Index 2018. Available at.
51. Rahman, M, M. (2017). Secondary education: A long way to go. *The Daily Star*. Available at.
52. Anam, M. (2018). Dhaka second least liveable city. *The Daily Star*. Available at.
53. Tavakol, M. & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical education*, 2:53-55.
54. Daniel, W. W. (1999). *Biostatistics: A Foundation for Analysis in the Health Sciences* (7th ed.). New York: John Wiley & Sons.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here:

Submit Manuscript

DOI:10.31579/2690-8794/166

Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://auctoresonline.org/journals/clinical-medical-reviews-and-reports->