

Design and validation of a self-administered questionnaire to assess knowledge, attitudes and behaviours about Zika virus infection among general population in Italy. A pilot study conducted among Italian residents in Public Health

Vincenza Gianfredi ⁽¹⁾, Nicola Luigi Bragazzi ^(2,3), Daniele Nucci ⁽⁴⁾, Francesca Zanella ⁽⁵⁾, Domenico Martinelli ⁽⁶⁾, Barbara Camilloni ⁽⁷⁾, Milena Villarini ⁽⁸⁾, Massimo Moretti ⁽⁸⁾, Fabrizio Stracci ⁽¹⁾

(1) Postgraduate School of Hygiene and Preventive Medicine, Department of Experimental Medicine, University of Perugia, Perugia, Italy

(2) Postgraduate School of Public Health, Department of Health Sciences (DISSAL), University of Genoa, Genoa, Italy

(3) Padeh and Ziv hospitals, Bar-Ilan Faculty of Medicine, Israel

(4) Digestive Endoscopy Unit, Veneto Institute of Oncology IOV – IRCCS, Padua, Italy

(5) Department of Public Health and Screening, Venezia, Veneto Region, Italy

(6) Department of Medical and Surgical Sciences, University of Foggia, Foggia, Italy

(7) Department of Experimental Medicine; University of Perugia, Perugia, Italy

(8) Department of Pharmaceutical Sciences, University of Perugia, Perugia, Italy

CORRESPONDING AUTHOR: Dr. Vincenza Gianfredi, Tel: 075 5857488, Fax: 075 5857428, email: vincenza.gianfredi@studenti.unipg.it, Piazzale Gambuli, Perugia 06126, Italy

DOI: 10.2427/12662

Accepted on September 26, 2017

ABSTRACT

Background: Zika (ZIKV), a flavivirus firstly identified in rhesus monkeys in Zika Forest of Uganda, in 1947, is an emerging virus, mainly transmitted by mosquitoes bites. Due to ZIKV adaptation to humans, that can maintain a mosquito-human-mosquito transmission cycle, it is essential to know the attitudes, knowledge and behaviours of general population regarding ZIKV prevention. Our main study aims were to develop and validate a questionnaire administered to the general population, in order to assess attitudes, knowledge and behaviours around prevention and control of Zika infection. The current study was intended as a preliminary, pilot study.

Methods: A questionnaire was developed based on a comprehensive review of the extant literature, pre-existing questionnaires and experts focus groups.

Results: The final version of the questionnaire comprised 27 items, with good psychometric properties (Kuder-Richardson 21 formula coefficient of 0.886). Overall test/re-test concordance was 0.77.

Conclusion: In conclusion, the questionnaire seems to be an appropriate and useful tool to detect cognitive gaps concerning behaviours responsible for possible transmissions of the disease, even in a non-endemic country such as Italy. Future analysis will explore the factorial structure of the questionnaire as well as knowledge, beliefs and attitudes concerning ZIKV among Italian general population.

Key words: survey, validation process, questionnaire, Zika

INTRODUCTION

Zika virus (ZIKV) is an emerging virus transmitted mainly by mosquitoes bites. Zika ZIKV is a flavivirus belongs to the family of *Flaviviridae* and was firstly isolated and identified in rhesus Rhesus monkeys in the Ziika Forest (or Zika Forest) near Entebbe, in of Uganda, in 1947. After the first isolated identification, the virus was then recognised sporadically reported in humans, in Uganda and Nigeria, in 1952 [1]. In 2007 in Micronesia the first Zika ZIKV infection epidemic was reported described, with 185 suspected cases [2]. *Aedes aegypti* (*A. aegypti*) is considered the leading vector of ZIKV, however even though also *Aedes albopictus* (*A. albopictus*) is also could be a potential vector of ZIKV, based on data from experimental infection models [3]. Most frequently, the infection spreads through horizontal transmission, in fact during mosquitoes viremic blood meal, the virus infects the mosquitoes's salivary glands. During the following bites, infected mosquitoes can inject saliva and viruses in the host's blood during blood feeding [4].

According to *A. aegypti* and *A. albopictus*'s life-circle, the bites occur during daytime hours. Even though both *A. aegypti* and *A. albopictus* species were previously mainly considered rural vectors, however these species are now have well adapted also to urban settings [5]. This adaptation is particularly due to the abundance of artificial containers such as buckets, tires, and, in general, water storage containers, where adult female mosquitoes lay their eggs [6].

Even though the clinical manifestation is generally mild/asymptomatic and self-limiting, a growing body of evidence suggests an association with some neurological diseases, particularly microcephaly and Guillain-Barré syndrome [7]. This represent the reason why for this reason, on the 1st February 2016, the World Health Organization (WHO) has declared the an international public health emergency. Actually, the increasing trend in the virus spreading has been, indeed, concomitant with increasing reported cases of microcephaly, in all the infected areas [1]. Epidemiological data seem to suggest the possibility of the vertical transmission, especially if pregnant women contract the infection during their first trimester [8]. Also the isolation of the virus in following lumbar puncture of in microcephalic infants [9] and in amniotic fluid has confirmed the possible relationship between the ZIKV and microcephaly [10]. The possible trans-placental transmission was already known for the other flaviviruses and the hypothesis is also supported by well-established relation between the Dengue and the Chikungunya infections and neurological complications [11]. Although evidence are is not yet sufficient to confirm the link between ZIKV infection in pregnancy and microcephaly, there are enough proofs to promote and recommend Public Health initiatives.

Actually, according to the European Centre for

Disease Control and Prevention (ECDC) updates, pregnant women and or those women who are planning to become pregnant should delete or postpone their travel to affected areas, or they should evaluate the risk with their physicians. Moreover, they should also use condom if their partners are returning from endemic areas [12]. In fact, ZIKV infection could also spread by blood transfusion [13] or sexual intercourse [14]. Due to ZIKV adaptation to humans, that can maintain a mosquito-human-mosquito transmission cycle, it is essential to know the attitudes, knowledge and behaviours of general population regarding ZIKV prevention.

The main study aims of the current study were to develop and validate a questionnaire to administer to the general population, in order to assess attitudes, knowledge and behaviours around concerning prevention and control of ZIKV infection in the general population. To the best of our knowledge, there are no validated questionnaires tailored specifically for Italian general population.

The current study was intended as a preliminary, pilot study and was, conducted among medical residents.

MATERIAL AND METHODS

This cross-sectional survey received the scientific support of the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I), Umbria Section.

Questionnaire

The questionnaire was developed based on a comprehensive review of the extant literature, pre-existing questionnaires and experts focus groups. Literature review was performed searching on scholarly databases, namely PubMed/MEDLINE and Scopus.

Criteria for inclusion of questions in the items pool were 1) questions assessing the socio-demographic characteristics of respondents; 2) questions evaluating the attitude and knowledge on ZIKV prevention and control; and 3) questions measuring investigating the ZIKV-related behaviours, in particular exploring travelling habits.

The 38-items questionnaire included 33 multiple-choice questions and 1 open-ended, fill-in-the-blank question. The majority of multiple-choice questions had only one answer permitted, whilst 3 questions allowed for more than one answer. The only three multiple-choice questions that allowed for more than one answer were: "Where do you get information about Zika?", "Which source of information do you consider the best?" and "Who has the responsibility to protect you against Zika?". Besides these questions, there were 3 further questions with a Likert scale 1 to 5 assessing the completeness, usefulness and clarity of the administered questionnaire. A final open-

ended, fill-in-the-blank question investigated whether the interviewee had further observations and/or comments regarding the administered questionnaire.

The questionnaire was conceived as being divided into 5 sections. The first section was centered on socio-demographic variables, for example sex, age, education level, marital and occupational status. The second section investigated general knowledge regarding disease and virus transmission. The third section evaluated knowledge on prevention and control, whilst the fourth section explored the attitudes, i.e. sources of information, and propensity to be vaccinated in case of vaccine availability against ZIKV. The fifth section investigated self-reported grade of knowledge on ZIKV infection, and travelling habits. The only open ended, fill-in-the-blank question asked about the most efficient methods to encourage people to protect themselves from ZIKV infection.

The questionnaire followed an introductory cover letter containing information about the purpose of the study and the reason for conducting the such study. The questionnaire was administered via the Web, using Google Forms®, which is a user-friendly, free tool that can be used to quickly and easily create a survey.

Study population

During the validation process, we administered the *ad-hoc* survey to a sample of medical doctors, residents in Public Health. The respondents were selected with a convenience sampling approach, among the residents registered at the University of Perugia and University of Genoa enrolled in the study. The questionnaire was anonymous, self-administered and voluntary based. The survey was sent to 28 medical doctors in order to verify the validity and reliability of the questionnaire. Data were collected twice, in a double questionnaire administration, fifteen days apart, in order to assess the reliability of the survey. The validation process took place between January and February 2017.

Statistical analysis

Data, after being extracted in an Excel® format, were analysed and processed using a commercial statistical software, namely the Statistical Package for Social Sciences for Windows (SPSS IBM Inc., version 24.0, Chicago, IL, USA).

Due to the dichotomous nature of the items, the Kuder-Richardson formula 21 (KR21) was used in order to evaluate internal consistency:

$$\rho_{KR21} = \frac{k}{k-1} \cdot \left[1 - \frac{\mu \cdot (k - \mu)}{k \cdot \sigma^2} \right]$$

where k is the number of items present in the questionnaire, μ is the population mean score, and σ^2 is the variance of the total scores.

KR21 is a measure of the extent to which given items are related to each other as a group. The higher is the KR21 value, the higher is the inter-correlations among tested items and, as such, the internal consistency of the questionnaire. Usually, the accepted value is >0.70 , especially for research tools aimed to compare groups; whilst for clinical purpose the value needed is higher ($\alpha=0.95$ and above) [15].

Overall test/re-test concordance coefficient was computed in order to assess stability and generalizability of scores across time, in absence of practice/learning effects.

RESULTS

Besides the final questions investigating the clarity, completeness and usefulness of the questionnaire, together with further potential comments/observations, the starting pool of 26 items was increased to 34 after the focus groups with experts, who assessed the content validity and proposed changes in order to strengthen the questionnaire (Figure 1). The final version of the administered questionnaire included 38 items and was characterized by an acceptable KR21 coefficient ($\rho_{KR21}=0.8986$) (Table 1). Overall test/re-test concordance was 0.77 ($p=0.0003$).

The sample size of the present pilot study included 22 Italian residents in Public Health at University of Perugia and Genoa. The completion rate was 78.6%. The mean age was 30.55 years, 63.6% of subjects were female, and came from six different Italian regions (namely, Apulia, Calabria, Lazio, Liguria, Tuscany and Umbria).

Socio-demographic characteristics of the recruited sample are shown in Figure 2. Table 2 shows the full list of administered items.

Concerning the questions about Zika ZIKV knowledge, the 81.2% of the sample choose the correct answer, with a range between 18.2% and 100.0%, depending on the item. The frequency of right answer for each item is shown in Table 3. The question with the lowest score was "What is the time, in the course of the day, when Zika's carrier is more active?". The majority of the sample (63.6%) found information about Zika ZIKV on the Internet, however the 90.9% of the subjects considered health-care workers as the most trustful and reliable source of information about ZIKV. At the same time, 59.1% of the interviewees were favourable to be vaccinated against ZIKV in case of availability of the vaccine. Even though the sample was based on residents in Public Health, only the 27.2% of subjects were sufficiently informed about ZIKV, in fact for the 86.4% of the sample, more information (provided, for example, by campaigns on ZIKV prevention and control) are needed necessary (Table 4). Total scores did not vary according to the socio-demographic variables investigated.

A median score of 4 was attributed to the clarity,

TABLE 1. List of the 38 items administered.

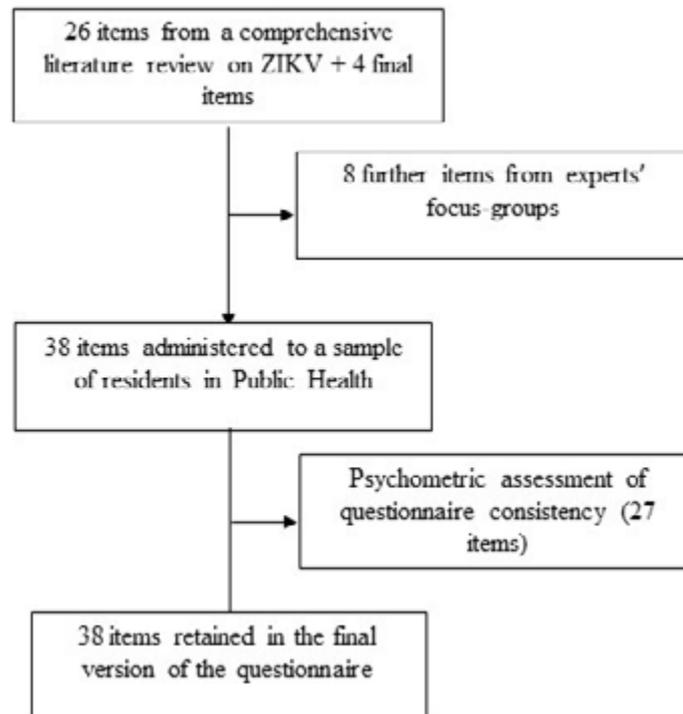
- 1) Which is your gender?
- 2) Which is your citizenship?
- 3) Which is your age?
- 4) Which is your geographic provenience?
- 5) Which is your marital status?
- 6) Which is your education level? Indicate your highest achievement.
- 7) Which is your current job?
- 8) What causes Zika infection?
- 9) Which is the Zika transmission route?
- 10) If the Zika is transmitted by mosquito bites, which mosquito is responsible for the transmission?
- 11) Which are the symptoms of Zika infection?
- 12) What is the time, in the course of the day, where Zika's carrier is more active?
- 13) Which is the common site of reproduction of mosquitoes?
- 14) What do you need to do before travelling on endemic airplanes (where Zika is highly widespread)?
- 15) If Zika symptoms appear after a trip to the endemic areas, what should be done to prevent transmission of the infection?
- 16) If after a trip to the endemic areas, no Zika symptoms appear, what should be done to reduce the risk of transmitting the infection?
- 17) Which of the following preventive measures is necessary to take back from a trip to the endemic areas, if the symptoms related to Zika have not appeared?
- 18) In order to prevent / reduce the proliferation of mosquitoes, is it useful to cover, empty or clean containers (cans, buckets, pots, jars, etc ...) of water?
- 19) How to protect yourself from mosquito bites?
- 20) Is it recommended for women who are planning to become pregnant, to avoid / postpone trips to endemic areas?
- 21) Is it recommended for pregnant women to avoid endemic areas?
- 22) Do you think Zika is a major issue in your country?
- 23) Where did you find information about Zika?
- 24) Who / What do you think is the most credible source of information on Zika?
- 25) If a vaccine against Zika is available, would you consider vaccination?
- 26) What is your opinion, the most important way to encourage people to protect themselves and their community from Zika's risk?
- 27) Who has the responsibility to protect you from contracting Zika infection?
- 28) Do you think you have sufficient information about Zika?
- 29) Do you think it is necessary to increase information campaigns on Zika infection prevention techniques?
- 30) How many trips, outside Europe, have you made in the last 5 years?
- 31) How many journeys, in Europe, have you made in the last 5 years?
- 32) How often do you go to the travel medicine centre?
- 33) Before embarking on a trip abroad, do you know if your target is a high risk area for Zika?
- 34) Have you changed your tourist habits and / or working missions in endemic areas?
- 35) From 1 to 5 how do you evaluate the completeness of the questionnaire?
- 36) From 1 to 5 how do you evaluate the usefulness of the questionnaire? How do you feel the time to answer the questionnaire?
- 37) From 1 to 5, how do you assess the clarity of these questions?
- 38) Do you have further observations/comments on this questionnaire?

completeness and usefulness of the questionnaire.

DISCUSSION

A proper knowledge of ZIKV can be pivotal in infection prevention and control. Unfortunately, in the extant literature, there is a dearth of studies reporting questionnaires/surveys conducted to explore beliefs and

FIGURE 1. Flowchart of the items selection and validation. Abbreviations: ZIKV (Zika virus).



knowledge of ZIKV.

To the best of our knowledge, only few studies [16–21] have addressed this topic. Guo and collaborators [16] carried out a cross-sectional online survey in order to assess ZIKV-related knowledge in a sample of 492 pregnant women aged 18–50 years in the United States, their travelling plans and habit, as well as communication exchanges with their healthcare providers. 97.8% of the participants had heard of ZIKV. Over one third of the women had discussed with their providers about ZIKV. 34% were worried about the health impact of ZIKV on their babies. Most of them changed their travelling plans and habit after ZIKV outbreak.

Mouchtouri and colleagues [17] performed a survey among 573 pregnant women in Greece. 77.4% of the participants had heard of ZIKV, even though 63.3% did not know that the virus could spread sexually. More informed women were likely to have travelled abroad the last six months.

Harapan and co-workers [18] assessed knowledge of ZIKV among 442 healthcare workers (healthcare workers (HCWs)) in Aceh (Indonesia). 35.9% of them had a good knowledge. HCWs tended to use social media, medical articles/news and television as major source of information.

Gupta and collaborators [19] in India recruited a sample of 412 private dental practitioners. Only 38.2% of them reported high knowledge of ZIKV. They tended to use television in 37.8% of cases, while only 4.7% journals

as source of information.

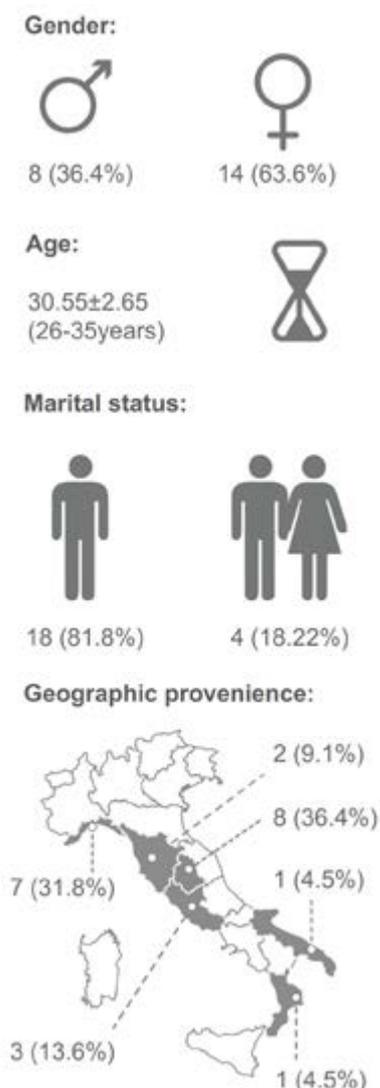
In Colombia, Betancourt-Trejos et al. [20] recruited a sample of 325 HCWs, including medical students, and investigated their ZIKV-related knowledge before and after an educational intervention. Always in Colombia, Sabogal-Roman and collaborators [21] had performed a similar research among 269 HCWs.

Arief and co-workers [22] performed a cross-sectional survey to assess ZIKV-related knowledge, attitudes and sources of information in Malaysia among general population. The authors used a validated questionnaire, which was pilot-tested in a sample of 30 subjects and showed sufficient psychometric properties (Cronbach's alpha 0.73 and 0.70 for general knowledge and attitudes, respectively). 400 participants took part into the survey: 71.5% and 74.5% of them showed good knowledge and positive attitudes, respectively. The main source of information related to ZIKV was represented by the Internet.

Results of our study are in line with previous analyses. Actually, our study sample showed good knowledge with mean percentage of correct answer in 81.2% of the cases; even though, only approximately 30% of the sample declared to be sufficiently informed about ZIKV. Moreover, the majority of the subject showed a positive attitude both to improve their knowledge and to be vaccinated in case of vaccine availability.

Our study aims were to fill in a gap in knowledge concerning beliefs and attitudes related to ZIKV among

FIGURE 2. Characteristics of the sample.



Italian general population.

CONCLUSION

The final questionnaire seems to be an appropriate and useful tool to detect cognitive gaps concerning behaviours responsible for possible transmissions of the disease, even in a non-endemic country such as Italy. This study was intended as a pilot study. Due to its limitations, future analysis will should explore the factorial structure of the questionnaire as well as knowledge, beliefs and attitudes concerning ZIKV among Italian general population.

Ethical approval

The study has received ethical approval from the local ethics committee of the University of Perugia (Comitato

TABLE 2. General item statistics for the items of the questionnaire concerning Zika infection.

Item	ρ_{KR21} is the item excluded	$\Delta \rho_{KR21}$
8	0.889	0.003
9	0.856	-0.030
10	0.865	-0.021
11	0.877	-0.009
12	0.875	-0.011
13	0.888	0.002
14	0.888	0.002
15	0.856	-0.030
16	0.855	-0.031
17	0.856	-0.030
18	0.888	0.002
19	0.888	0.002
20	0.888	0.002
21	0.891	0.005
22	0.884	-0.002
23	0.859	-0.027
24	0.887	0.001
25	0.873	-0.013
26	0.888	0.002
27	0.871	-0.015
28	0.882	-0.004
29	0.889	0.003
30	0.887	0.001
31	0.882	-0.004
32	0.891	0.005
33	0.875	-0.011
34	0.888	0.002

Universitario di Bioetica), Reference Number: 2016-09R.

Financial Support

This research received no grant from any funding agency, commercial or not-for-profit sectors.

Conflict of interest

None to declare

Acknowledgements

The study was designed by Dr. Vincenza Gianfredi and Dr. Nicola Luigi Bragazzi; data were collected by

TABLE 3. Frequency of right and wrong answers to the knowledge items of the administered questionnaire.

Items	Right	Wrong
8	20 (90.91)	2 (9.09)
9	20 (90.91)	2 (9.09)
10	13 (59.09)	9 (40.91)
11	19 (86.36)	3 (13.64)
12	4 (18.18)	18 (81.82)
13	22 (100)	0 (0)
14	21 (95.45)	1 (4.55)
15	17(77.27)	5 (22.73)
16	16 (72.73)	6 (27.27)
17	20 (90.91)	2 (9.09)
18	22 (100)	0 (0)
19	22 (100)	0 (0)
20	22 (100)	0 (0)
21	20 (90.91)	2 (9.09)
22	10 (45.45)	12 (54.55)

Dr. Vincenza Gianfredi and analyzed by Dr. Vincenza Gianfredi and Dr. Nicola Luigi Bragazzi; data interpretation and manuscript preparation were undertaken by Dr. Vincenza Gianfredi, Dr. Daniele Nucci and Dr. Nicola Luigi Bragazzi. Dr. Francesca Zanella, Dr. Domenico Martinelli, Dr. Barbara Camilloni, Dr. Milena Villarini, Professor Massimo Moretti and Professor Fabrizio Stracci contributed in data interpretation and manuscript revision. All authors approved the final version of the paper. The Authors would like to thanks Valeria Parisi, University of Milan, for assistance with figure and all the participants, who voluntary participate to the validation process and the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I), Umbria Section for the scientific support.

References

TABLE 4. Frequency of replies for the other items of the administered questionnaire.

	HEALTH-CARE WORKERS	INTERNET	TELEVISION	NEWS PAPER	FRIENDS/ RELATIVES
Where did you find information about Zika?	11 (50.0)	14 (63.6)	6 (27.3)	4 (18.2)	1 (4.5)
Who / What do you think is the most credible source of information on Zika?	20 (90.9)	8 (36.4)	0	2 (9.0)	0
	Yes		No		Don't know
If a vaccine against Zika is available, would you consider vaccination?	13 (59.1)		4 (18.2)		5 (22.7)
	Own responsibility	Doctor/ local health authorities	National govern		The community
Who has the responsibility to protect you from contracting Zika infection?	14 (63.6)	16 (72.7)	12 (54.5)		3 (13.6)
	Yes		No		Don't know
Do you think you have sufficient information about Zika?	6 (27.2)		8 (36.4)		8 (36.4)
	Yes				No
In your opinion, is it necessary to increase information campaigns on Zika prevention?	19 (86.4)				3 (13.6)
	1-3 times	>4 times			None
How many trips, OUTSIDE Europe, have you done in the last 5 years?	10 (45.5)	0			12 (54.5)
	1-3 times	>4 times			None
How many trips, WITHIN Europe, have you done in the last 5 years?	8 (36.4)	11 (50.0)			3 (13.6)
	Never	I never heard about it	Every time, before a travel		Only for travel outside Europe
How often do you go to the travel medicine center?	8 (36.4)	4 (18.2)	2 (9.0)		8 (36.4)
	Yes		No		
Before embarking on a trip abroad, do you know if your target is a Zika high risk area?	14 (63.6)		8 (36.4)		
Have you changed your tourist habits and / or work missions in endemic areas?	1 (4.5)		21 (95.5)		

1. ECDC. Rapid risk assessment: Microcephaly in Brazil potentially linked to the Zika virus epidemic. Stockholm: European Centre for Disease Prevention Control: 2015 Contract No.: 24 November 2015.
2. Roth A, Mercier A, Lepers C, Hoy D, Duituturaga S, Benyon E, et al. Concurrent outbreaks of dengue, chikungunya and Zika virus infections - an unprecedented epidemic wave of mosquito-borne viruses in the Pacific 2012-2014. *Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin*. 2014;19(41). PubMed PMID: 25345518.
3. Wong PS, Li MZ, Chong CS, Ng LC, Tan CH. *Aedes (Stegomyia) albopictus* (Skuse): a potential vector of Zika virus in Singapore. *PLoS neglected tropical diseases*. 2013;7(8):e2348. PubMed PMID: 23936579. Pubmed Central PMCID: 3731215.
4. Pawitwar SS, Dhar S, Tiwari S, Ojha CR, Lapierre J, Martins K, et al. Overview on the Current Status of Zika Virus Pathogenesis and Animal Related Research. *Journal of neuroimmune pharmacology : the official journal of the Society on NeuroImmune Pharmacology*. 2017 Apr 25. PubMed PMID: 28444557.
5. Higa Y. Dengue Vectors and their Spatial Distribution. *Tropical medicine and health*. 2011 Dec;39(4 Suppl):17-27. PubMed PMID: 22500133. Pubmed Central PMCID: 3317606.
6. Bonizzoni M, Gasperi G, Chen X, James AA. The invasive mosquito species *Aedes albopictus*: current knowledge and future perspectives. *Trends in parasitology*. 2013 Sep;29(9):460-8. PubMed PMID: 23916878. Pubmed Central PMCID: 3777778.
7. Song BH, Yun SI, Woolley M, Lee YM. Zika virus: History, epidemiology, transmission, and clinical presentation. *Journal of neuroimmunology*. 2017 Mar 03. PubMed PMID: 28285789.
8. Rather IA, Lone JB, Bajpai VK, Park YH. Zika Virus Infection during Pregnancy and Congenital Abnormalities. *Frontiers in microbiology*. 2017;8:581. PubMed PMID: 28421065. Pubmed Central PMCID: 5378815.
9. Schuler-Faccini L, Ribeiro EM, Feitosa IM, Horovitz DD, Cavalcanti DP, Pessoa A, et al. Possible Association Between Zika Virus Infection and Microcephaly - Brazil, 2015. *MMWR Morbidity and mortality weekly report*. 2016 Jan 29;65(3):59-62. PubMed PMID: 26820244.
10. Ministério da Saúde Brazil. Ministério da Saúde divulga boletim epidemiológico 2015 [updated 17/11/2015; cited 02/05/2017]. Available from: <http://portalsaude.saude.gov.br/index.php/cidadao/principal/agencia-saude/20805-ministerio-da-saude-divulga-boletim-epidemiologico>.
11. ECDC. Zika virus epidemic in the Americas: potential association with microcephaly and Guillain-Barré syndrome (first update). Stockholm: European Centre for Disease Prevention and Control: 2016 Contract No.: 21 January 2016.
12. ECDC. Rapid Risk Assessment. Zika virus disease epidemic: potential association with microcephaly and Guillain-Barré syndrome. Second updat. Stockholm: European Centre for Disease Prevention and Control: 2016 Contract No.: 8 February 2016.
13. Venturi G, Zammarchi L, Fortuna C, Remoli ME, Benedetti E, Fiorentini C, et al. An autochthonous case of Zika due to possible sexual transmission, Florence, Italy, 2014. *Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin*. 2016;21(8):30148. PubMed PMID: 26939607.
14. Hills SL, Russell K, Hennessey M, Williams C, Oster AM, Fischer M, et al. Transmission of Zika Virus Through Sexual Contact with Travelers to Areas of Ongoing Transmission - Continental United States, 2016. *MMWR Morbidity and mortality weekly report*. 2016 Mar 04;65(8):215-6. PubMed PMID: 26937739.
15. Bland JM, Altman DG. Cronbach's alpha. *Brmj*. 1997 Feb 22;314(7080):572. PubMed PMID: 9055718. Pubmed Central PMCID: 2126061.
16. Guo F, Norton AR, Fuchs EL, Hirth JM, Garcia-Blanco MA, Berenson AB. Provider-patient communication about Zika during prenatal visits. *Prev Med Rep*. 2017 May 18;7:26-29. doi: 10.1016/j.pmedr.2017.05.003. eCollection 2017 Sep.
17. Mouchtouri VA, Papagiannis D, Katsioulis A, Rachiotis G, Dafopoulos K, Hadjichristodoulou C. Knowledge, Attitudes, and Practices about the Prevention of Mosquito Bites and Zika Virus Disease in Pregnant Women in Greece. *Int J Environ Res Public Health*. 2017 Mar 31;14(4). pii: E367. doi: 10.3390/ijerph14040367.
18. Harapan H, Aletta A, Anwar S, Setiawan AM, Maulana R, Wahyuniaty N, Ramadana MR, Haryanto S, Rodríguez-Morales AJ, Jamil KF. Healthcare workers' knowledge towards Zika virus infection in Indonesia: A survey in Aceh. *Asian Pac J Trop Med*. 2017 Feb;10(2):189-194. doi: 10.1016/j.apjtm.2017.01.018. Epub 2017 Jan 24.
19. Gupta N, Randhawa RK, Thakar S, Bansal M, Gupta P, Arora V. Knowledge regarding Zika virus infection among dental practitioners of tricity area (Chandigarh, Panchkula and Mohali), India. *Niger Postgrad Med J*. 2016 Jan-Mar;23(1):33-7. doi: 10.4103/1117-1936.180179.
20. Betancourt-Trejos ML, Narváez-Maldonado CF, Ortiz-Erazo WF, Arias-Guzmán JS, Gil-Restrepo AF, Sánchez-Rueda MA, Muñoz-Calle NJ, Maya-Betancourth JG, Rodríguez-Morales AJ. Healthcare students and workers' knowledge about Zika and its association with microcephaly in two cities of Colombia. *Travel Med Infect Dis*. 2016 May-Jun;14(3):283-5. doi: 10.1016/j.tmaid.2016.03.017. Epub 2016 Apr 8. No abstract available.
21. Sabogal-Roman JA, Murillo-García DR, Yepes-Echeverri MC, Restrepo-Mejía JD, Granados-Álvarez S, Paniz-Mondolfi AE, Villamil-Gómez WE, Zapata-Cerpa DC, Barreto-Rodríguez K, Rodríguez-Morales AJ. Healthcare students and workers' knowledge about transmission, epidemiology and symptoms of Zika fever in four cities of Colombia. *Travel Med Infect Dis*. 2016 Jan-Feb;14(1):52-4. doi: 10.1016/j.tmaid.2015.12.003. Epub 2015 Dec 23. No abstract available.

