Original Article

Type of Mass Media Exposure Effects on ZIKA-Related Knowledge and Behavior among Pregnant Women in Thailand

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Abstract

OBJECTIVES: To assess the impact of exposure to ZIKA information, knowledge and preventive behavior from mass media among pregnant women in a health district zone in Thailand.

MATERIALS AND METHODS: The sample comprised pregnant women aged between 18-45 years old, from Health Promotion Center Region 5. The sample size was estimated using 95% confidence interval levels to appropriately represent pregnant women. Valid responses were collected from 395 participants. The sample selection was divided into two stages. First, we randomly selected four provinces from the eight provinces and then selected the district health promotion center in each province. Second, we selected a specific number of pregnant women using a proportional sampling selection. The total number of samples was 395 cases. Furthermore, a multivariate regression linear was applied to analyze the effect of the independent variables towards the dependent variable.

RESULTS: The study showed that occupation, mass media exposure from internet media and personal sources had a significant effect on ZIKA-related knowledge. Moreover, education level, pregnancy check-up, mass media exposure from electronic, print and personal sources had led to a significantly higher practice of ZIKA-preventive behavior. The independent variables showed the variation of ZIKA-related knowledge and preventive behavior of 11% and 31%, respectively.

CONCLUSION: These results show that mass media can play an important role in helping to prevent transmission of ZIKA. Mass media can bring positive results at the community level, which will often involve ZIKA discussions between families and neighbors, and eventually leads to changes in behavior.

Keywords: mass media, knowledge, ZIKA, pregnancy

The Zika virus can be transmitted to humans by Aedesaegypti and Aedesalbopictus mosquitoes through their bites.[1,2] Symptoms of Zika infection are usually mild and do not require aggressive management. For this reason, the detection of Zika is not routinely performed.[1-3] However, if the virus is contagious in pregnant women, the virus can be transmitted to the fetus.[4,5] This infection can cause birth defects of microcephaly and severe effects to the fetal brain.[5-7] Accordingly, the prevention of transmission in pregnant women should get attention, because there is no vaccine for prevention and treatment. It is estimated that 80 percent of people who are infected with Zika show no significant symptoms, making it difficult to prevent disease occurrence.[1,4,7]

Since 2015, Zika virus has rapidly expanded to most countries in the Americas, Africa and Asia.[1,2] Countries in Southeast Asia and the western Pacific region continue to report new cases of Zika, in countries such as Malaysia, Philippines, Singapore, Vietnam and Thailand.[2,3]

In Thailand, the observation of Zika virus dissemination was found in 2012 and has since continued to grow until now.[8] This report presented 86 pregnant women who were infected with ZIKA and found two cases with Zika-related microcephaly and one case with congenital Zika syndrome.[9] The Ministry of Public Health adopted a Zika prevention approach and prioritized raising knowledge and awareness about the danger of ZIKA and how to prevent possible exposure to the disease.[10]

Among several other strategies, knowledge of Zika preventive behavior and its control are critical factors in controlling the infection.[11-13] Knowledge of Zika during pregnancy is important because of its potential to encourage pregnant women to take preventive action.[11,12] International studies have shown that without the proper knowledge and understanding, preventive behavior remained mostly absent in pregnant women.[13,14]

Mass media health communication through various media channels, including television, print (newspapers/ magazines), radio, and Internet, has proliferated in recent years.[17,18] The importance of mass media in health promotion and disease prevention has been confirmed by several studies.[17-19] Furthermore, it has been suggested that exposure to mass media through a variety of channels is the most effective way to change knowledge, attitude and behavior.[17-20] Evidence on the influence of receiving health information through mass media toward health-related behaviors remains controversial. Several studies supported the idea that mass media could increase knowledge of individual health status in low-income countries,[20] as well as awareness and protective behaviors.[21,22] However, several studies did not find any correlation between exposure to mass media information and health behavior change.[23-25]

Therefore, the objective of this article is to analyze the impact of mass media exposure toward Zika related knowledge and preventive behavior through various mass media channels among pregnant women living in health district zone 5, Thailand. Understanding the impact of mass media exposure may help contribute to improving mass media campaigns for population-based approaches to address the spread of Zika.

MATERIALS AND METHODS

A cross-sectional study design was applied in this research. Data was collected from May-June 2017 and entered into a database. The study collected data from the Health Promotion Center in Region 5, which included eight provinces: Ratchaburi, Nakhon Pathom, Suphanburi, Kanchanaburi, Samut Sakhon, Samut Prakarn, Phetchaburi, and Prachuap Khiri Khan. The Ministry of Public Health has reformed its management system since 2014, with the management structure being divided to 12 health zones. The main purpose is to adjust the roles and mechanisms of operations to provide quality health care services, regardless of where people live. The Health Promotion Center Region 5 has large and medium-sized industrial areas, including the fishery industry, many factories, and many unregistered migrant workers and all these factors increase the risk of spreading the disease. More importantly, the Ministry of Public Health of Thailand has confirmed infections of the Zika virus in the Health Promotion Center Region 5 since 2012.

The selection criteria were pregnant women ages 18-45 years old. There were approximately 47,889 cases of pregnant women. In order to fulfill the norms of population studies, approximately 380 respondents were included to make accurate projections for a given population of over 40,000 people.[28] In order to avoid incomplete data, 395 respondents were included in this study. This study was approved by the ethics committee of Kanchanabhishek Institute of Medical and Public Health Technology, Ministry of Public Health code KMPHT No. 2016/60020061. Data was collected from May-June 2017 and was entered into a database. This study employed multistage random sampling based on the division of administrative territory. The selection of samples based on the probability of randomly selecting a sample from the roster is a bias reduction in the sample selection.

Stage one of the sampling involved randomly selecting four provinces from the following eight provinces: Ratchaburi, Nakhonpathom, Suphanburi, Kanchanaburi, Samut Sakhon, Samut Prakarn, Phetchaburi, and Prachuap Khiri Khan. The selected provinces were Ratchaburi, Nakhon Pathom, Suphanburi, and Kanchanaburi.

Stage two involved randomly selecting from the list of pregnant women from the District Health Promotion Center, which provided their respective address and contact information. The interview was conducted at the respondent's home. In cases where the respondent was not at home, a phone interview was conducted later. This selection method continued until the respondent sample size reached 395 cases. The researcher used a proportion sample selection method based on the population in that area divided into the following groups: Suphanburi 116 people, Kanchanaburi 103 people, Nakhon Pathom 86 people and Ratchaburi 90 people.

The inclusion criteria for the sample were the following:

1. Pregnant women aged between 18-45 years old.
2. Willing to give written informed consent.

The exclusion criteria were the lack of willingness to take part in the study.

Data collection

The data was collected by using structured questionnaires. The questionnaire covers six major categories:

1. Socio-demographic variables (gender, age, education, occupation, household monthly income).
2. Health-related behavior (pregnancy check-up status, smoking and drinking alcohol).
3. Type of mass media exposure of Zika information.
4. Zika-perception.
5. Zika-knowledge.
6. Zika-preventive practice.

The content validity of the questionnaire was validated by five experts, including nurses, public health practitioners and social workers who worked with pregnant women. Thirty pregnant women from outside the area of research were given the questionnaire in order to prove the reliability of the test. The Cronbach's Alpha value of the questionnaire (0.70) was also used to assess its internal reliability.

The mass media exposure was assessed by using questionnaires in which respondents were asked the following question.

In the past year, how much information about ZIKA did you get:

1. From a doctor or other medical professional
2. From family or friends
3. On the radio
4. On the Internet
5. On television
6. From a head of village or community organization
7. From newspapers or magazines
8. Billboard or leaflet

The knowledge about ZIKA was derived from 12 questions which covered causes, infection, symptoms, and effects of ZIKA. For questions about the knowledge of ZIKA, the correct answer was rated as 1, and incorrect, "do not know" or missing responses were scored as 0. Furthermore, the preventive practice of ZIKA, which referred to mosquito bite preventions, were included as 20 questions. The respondents' answers of "Regular" were scored as 3, "Often" as 2, "Once in a while" as 1, and "Never practice" as 0.

Data analysis

Descriptive statistics were implemented to describe the variables by presenting the frequency, percentage, average and standard deviation for age, education, occupation, pregnancy check-up status, mass media exposure, ZIKA-related knowledge, and ZIKA preventive practice. Furthermore, the multivariate regression linear was applied to analyze the effect of the independent variables toward dependent (Zike-related knowledge and Zika preventive practice). The hypothesis testing considered $p < 0.05$ as statistically significant.

Results

From a total of 395 subjects, most respondents were aged 31-35 years (37.22%) and were married (86.84%). The majority had a bachelor education (36.20%). By occupation, most of the respondents were civil servants (28.35%), or commercial / private business employees (20.25%). The respondents reported having an average monthly household income of 35,837 baht. Furthermore, most the respondents had completed pregnancy check-ups (76.96%), see Table 1.

With regards to the type of Mass Media, the respondents were more exposed to printed media such as newspapers, magazines and billboards (2.94 ± 1.23) compared to electronic media such as television and radio (3.02 ± 1.42) and personal sources including doctor, nurse or family (2.87 ± 1.06). The results showed that 42% of all respondents were exposed to personal media either more than 3 times per week or every day (Table 2). In terms of media exposure from television and radio, approximately 33% and 78% of the respondents were exposed to media once a week, once a month and some were not exposed at all. Regarding internet media, 57% were exposed to the media every day and 3 times per week.

Table 1: Frequency and Percentage of Socioeconomic Characteristics (n = 395)

Variables	n (%)
Age (Years)	
18 - 20	35 (8.86)
21 - 25	62 (15.70)
26 - 30	91 (23.04)
31 - 35	147 (37.22)
36 - 40	56 (14.18)
> 40	4 (1.01)
Education	
Primary	32 (8.10)
Junior High	46 (11.65)
High school / Vocational	77 (19.49)
Diploma	69 (17.47)
Bachelor	143 (36.20)
Graduate	25 (6.33)
Other	3 (0.76)
Occupation	
Farmers	25 (6.33)
General contract	41 (10.38)
Commercial / Business	80 (20.25)
Factory employees / Private companies	86 (21.77)
Housewife	15 (3.80)
Civil servant	112 (28.35)
Other	36 (9.11)
Status	
Single	32 (8.10)
Married	343 (86.84)
Separate/Divorce/ Widowed	20 (5.06)
Check-up pregnancy	
Never been checked	23 (5.82)
Non-completed check- up	68 (17.22)
Completed check-up	304 (76.96)

Multiple regression analysis

For multiple regression analysis, the dependent was ZIKA-related knowledge and ZIKA-preventive behavior. The author employed multiple regressions to analyze the association. The multicollinearity assumption was satisfied based on the result that there was no correlation between the independent variables.[29] In conclusion, this study included all expected variables into the statistical model. The first model included only socioeconomic factors; age, education, occupation, marital status, household monthly income and pregnancy check-up status in order to know if there was any difference in Zika-related knowledge and ZIKA-preventive behavior. If people have different socio-economic factors, these are important in determining health-related behaviors resulting from personal sources.[30,31] The second model added mass media exposure which included electronic media, printed media, internet media and personal. The author examined whether people with the same socioeconomic status, would be influenced by mass media exposure on knowledge and preventive behavior of ZIKA or not, because it is difficult to change the social and economic status of an individual. Mass media campaigns may be a solution to increase personal knowledge and to reduce the probability of a Zika infection.

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*Factors influencing **Zika-related** knowledge*

Model 1: This model explains the dependent variable of 7.0%. In regard to occupation, those who are housewives have higher Zika-related knowledge compared to other occupations (Table 3).

Model 2: Types of mass media exposure (Table 3). This model explains the Zika-related knowledge of 11.0% (R-square = 0.11). The results found, after taking types of mass media exposure into account, occupation had a significant bearing on Zika-related knowledge. When considering the type of mass media, the author found respondents who had received Zika information from internet and personal sources to have a higher score and significantly more chance to have obtained Zika-related knowledge compared to those who had lower scores (β = 0.31 and 0.74, respectively). Based on the results, these factors could explain the rise in ZIKA-related knowledge from 7.0% in the first model to 11.0% in the second model (R-square increase from 0.07 to 0.11).

Table 2: Descriptive statistics of Type of Mass Media (n = 395)

Variable	Every day	>3 Times per week	once a week	once a month	none at all	Mean ± SD
Electronic media						3.02 ± 1.42
Television	46.1	20.8	11.9	4.8	16.5	3.75 ± 1.48
Radio	7.6	14.9	30.9	20.8	25.8	2.57 ± 1.23
Printed media						2.94 ± 1.23
Brochures	6.6	17.7	37.5	19.0	19.2	2.73 ± 1.54
Newspapers	13.4	36.7	20.0	9.6	20.3	3.13 ± 1.34
Poster / billboard	5.6	16.7	42.0	17.7	18.0	2.74 ± 1.11
Internet media						3.43 ± 1.42
Internet	29.1	28.1	17.0	8.9	17.0	3.43 ± 1.42
Personal						2.39 ± 1.19
Medical doctor, Nurse, Health personnel	10.1	31.9	26.6	14.2	17.2	3.04 ± 1.25
Family/Friend/Relative	1.5	9.9	21.3	29.1	38.2	2.07 ± 1.06
Volunteer Village/Priest/Head of Village	6.1	9.9	18.5	16.2	49.4	2.07 ± 1.27

Table 3: Coefficient Beta (β) and 95% confidence interval (CI) of socioeconomic and type of mass media factors on **Zika-related knowledge** (n = 395)

Data	ZIKA-preventive behavior			
	Model 1		Model 2	
	β	95% CI	β	95% CI
Age (ref. 18 - 20 years)				
21 - 25	0.05	-1.27 - 1.16	0.24	-0.96 - 1.45
26 - 30	0.60	-0.67 - 1.86	0.64	-0.61 - 1.89
31 - 35	0.22	-1.05 - 1.50	0.26	-1.00 - 1.53
36 - 40	0.68	-2.05 - 0.69	0.45	-1.82 - 0.91
>40	0.40	-3.37 - 2.56	0.68	-3.60 - 2.23
Education (ref. Primary school)				
Junior High	0.45	-1.68 - 0.78	0.42	-1.64 - 0.80
High school / Vocational	0.04	-1.16 - 1.08	0.11	-1.22 - 1.01
Diploma	0.27	-0.94 - 1.49	0.02	-1.22 - 1.25
Bachelor	0.81	-0.38 - 1.99	0.56	-0.66 - 1.78
Post graduate	1.00	-0.66 - 2.66	0.87	-0.82 - 2.57
Other	0.07	-3.17 - 3.04	0.35	-3.41 - 2.72
Occupation (ref. Farmers)				
General contract	1.47	-2.95 - 0.14	**1.95***	**-3.42 - 0.47**
Commercial / private business	1.14	-2.41 - 0.13	**1.64***	**-2.91 - 0.37**
Employees	**1.41***	**-2.69 - 0.13**	**2.02***	**-3.31 - 0.73**
Housewife	**2.40***	**-4.26 - 0.53**	**2.66***	**-4.50 - 0.83**
Civil servant	1.20	-2.42 - 0.02	**1.76***	**-3.00 - 0.53**
Other	0.92	-2.35 - 0.50	1.29	-2.71 - 0.13
Marital Status (ref. Single)				
Married	0.69	-1.67 - 0.30	0.83	-1.82 - 0.15
Separate/Divorce/Widowed	0.34	-1.82 - 1.13	0.54	-2.01 - 0.92
Household monthly income	0.04	-0.00 - 0.00	0.28	-0.05 - 0.00
Pregnancy check-up status	0.13	-0.61 - 0.36	0.21	-0.69 - 0.28
Types of mass media exposure (ref. Never been checked)				
Electronic media			0.24	
Printed media			0.08	-0.15 - 0.63
Internet media			**0.31***	-0.49 - 0.34
Personal			**0.74***	**0.06 - 0.57**
R-Squared	0.07		0.11	**-1.12 - 0.37**

*Significant at < 0.05

*Factors influencing **ZIKA-preventive** behavior*

Model 1: this model could explain the dependent variable of 17.0%. Regarding socioeconomic factors, respondents who had graduated from junior high, high school / vocational, diploma, bachelor and post graduate presented β values of 4.13, 3.79, 5.34, 7.07 and 9.14, respectively. The coefficient beta yielded that the higher the education level, the better respondents displayed Zika-preventive behavior. Furthermore, respondents who completed pregnancy check-ups had significantly more chance to employ Zika-preventive behavior than those who did not attend pregnancy check-ups (β =2.59).

Model 2: Those who graduated with bachelor and post-graduate degrees had significantly better Zika-preventive behavior, then those who only graduated primary school (Table 4).

Moreover, respondents who completed recommended pregnancy check-ups were more likely to practice Zika-preventive behavior than those who had none or had not completed recommended pregnancy check-ups (β = 3.06). Regarding the type of mass media, the more information on Zika from electronic media, print media and personal sources respondents received, the greater the Zika-preventive behavior the respondent showed. (β = 1.22, 1.68 and 2.24, respectively). Based on the results above, these factors could explain Zika-preventive behavior of 17.0% in the first model to 31.0% in the second model (R-square increase from 0.17 to 0.31).

Discussion

This study provides important information on the impact of mass media in educating the public about Zika and on basic knowledge of respondents with regards to the control of Zika. The results showed that 42% and 57% of respondents were exposed to personal media and internet media either more than three times per week or everyday which is enough to raise awareness. In terms of media exposure from television and radio, approximately 33% and 78% of respondents were exposed to the mass media once a week, every month, and some had not been exposed at all. This shows that among the

Table 4 : Coefficient Beta (β) and 95% confidence interval (CI) of socioeconomic and type of mass media factors with **ZIKA-preventive behavior** (n = 395)

Data	ZIKA-preventive behavior			
	Model 1		Model 2	
	β	95% CI	β	95% CI
Age (ref. 18 - 20 years)				
21 - 25	-2.08	-5.73 - 1.56	-3.21	-6.59 - 0.16
26 - 30	-2.98	-6.78 - 0.82	-3.41	-6.91 - 0.09
31 - 35	-1.08	-4.90 - 2.75	-0.99	-4.54 - 2.56
36 - 40	1.01	-3.11 - 5.14	0.19	-3.64 - 4.02
>40	3.56	-5.35 - 12.47	2.67	-5.52 - 10.85
Education (ref. Primary school)				
Junior High	4.13*	0.43 - 7.83	2.34	-1.08 - 5.77
High school / Vocational	3.79*	0.43 - 7.15	2.56	-0.57 - 5.69
Diploma	5.34*	1.69 - 8.99	3.36	-0.11 - 6.83
Bachelor	7.07*	3.51 - 10.64	4.45*	1.02 - 7.88
Graduate	9.14*	4.15 - 14.14	5.66*	0.91 - 10.41
Other	1.90	-7.42 - 11.23	6.22	-2.34 - 14.83
Occupation (ref. Farmers)				
General contract	-1.68	-6.13 - 2.76	0.07	-4.06 - 4.21
Commercial / private business	1.05	-2.77 - 4.86	2.09	-1.47 - 5.64
Employees	-0.06	-3.90 - 3.78	1.59	-2.03 - 5.20
Housewife	-0.18	-5.78 - 5.41	0.27	-4.88 - 5.41
Civil servant	0.11	-3.56 - 3.77	1.91	-1.55 - 5.36
Other	-1.53	-5.80 - 2.74	1.54	-2.45 - 5.53
Marital Status (ref. Single)				
Married	-1.84	-4.79 - 1.11	-2.55	-5.31 - 0.20
Separate/Divorce/Widowed	-4.08	-8.51 - 0.36	-3.69	-7.79 - 0.41
Household monthly income	0.00	-5.23 - 0.00	0.00	0.00 - 0.00
Pregnancy check-up status	2.59*	1.13 - 4.05	3.06*	1.71 - 4.42
Types of mass media exposure (ref. Never been checked)				
Electronic media			1.22*	-2.31 - 0.12
Print source			1.68*	0.50 - 2.85
Internet source			0.70	-0.01 - 1.42
Personal source			2.24*	1.19 - 3.29
R-Squared	0.17		0.31	

*Significant at < 0.05

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population at large, many are not adequately exposed to the media to obtain the necessary information about Zika. that The finding was consistent with a study in China which found that more than 50%of participants expressed inadequate health behavior[32] but was greater than the finding of Niu et al.[33] and Li et al.[34] regarding health literacy and health risk behavior.

The multiple regression analysis showed housewives have higher Zika-related knowledge compared to others. People with different professions have a wide range of social interactions, including access and distribution about health information.[30,32] This finding was consistent with the study done in Chengdu, China which found managers and technicians to be more knowledgeable about health behavior because they have easier access to information and knowledge than others. Furthermore, findings confirmed that the participants who reported higher education levels displayed more Zika-preventive behavior than those who had lower education levels. This means that mass media may influence respondents who have graduated with a bachelor degree and a post-graduate degree but did not affect those with low education levels. As predicted, the level of comprehension and knowledge, the ability to analyze, and the ability to screen data is higher in respondents with higher education compared to those with lower education levels.[32,35]

Importantly, people with lower education and income may not be able to find information sources. In addition, illiterate people will not be able to understand and use this information delivered through mass media.[17,20,22] Meanwhile, exposure to internet and personal sources was revealed to have a significant relationship on Zika-related knowledge of the respondents, while electronic media, print media and personal source had an influence on Zika-preventive behavior. The finding was consistent with a study involving the U.S. Hispanic population which revealed exposure to health information from the mass media influences health decisions in seeking medical advice and information from health providers.[36] Other studies about health communication have shown that mass communication channels increase awareness and knowledge about health.[37]

Based on the results of this study, the demand for effective and consistent mass media coverage is clear.[10,18,22] Our analysis suggests that mass media can play an important role in intervening to prevent transmission of ZIKA. Mass media will bring positive results at the community level, which will often involve ZIKA discussions between families and neighbors, eventually leading to changes in behavior. In addition, the researchers recommend that the government should provide additional ZIKA information via electronic media, print media and personal media. This can influence the knowledge and protective behavior to prevent transmission of Zika.

Internet sources and personal sources most affect knowledge related to Zika while personal sources influence towards ZIKA-preventive behavior. Overall, sample groups or pregnant people are likely to want to use the internet for easy access to medical information about Zika disease, while they trust the advice of their doctor. Therefore, it is advisable to create various online media for public awareness outreach so that people can access knowledge and advice continuously. Pregnant women can receive services that will allow them to apply knowledge correctly. Moreover, it is important to keep in mind that the obstacles to accessing information over the internet are impacted by social and demographic variables such as age, ethnicity, income, education and occupation, information search skills and reliability of health information.

Conclusion

The regression analysis revealed that education level, completed pregnancy check-up and type of mass media all have an effect on Zika-preventive behavior. Most importantly, the greater the level of Zika information from electronic media, print media and personal sources respondents received, the higher Zika-preventive behavior they showed. This displayed the importance of social media as a source for public health information. Zika-related prevention outreach of reliable health information through social media may benefit pregnant women's health outcomes.

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