Analyzing & Evaluating the Effects of Public Service Messages about Dengue in Punjab-Pakistan

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Abstract

This research aimed to evaluate the impact of public service messages about Dengue in Punjab, Pakistan. The aim was to measure the perceived effectiveness of public service messages, knowledge, attitudes, and practices in the context of Health Belief Model constructs. The pre-constructed questionnaire was used to collect data from 540 respondents through the survey method. The findings indicated a significant difference in the perceived effectiveness of the PSM between normal and diseased. Among normal people. There was a significant difference in knowledge about Dengue among people belonging to different socioeconomic backgrounds. A positive and significant relationship between knowledge and attitudes toward dengue was discovered, with a linear regression model indicating a 54.7% positive impact on attitudes. In addition, perceived susceptibility to dengue had a significant impact on dengue prevention measures (p-value>0.05). But the impact of perceived severity on the preventive measures was not noteworthy (p-value =.144 > 0.05). Moreover, the perceived benefits of Dengue had a significant impact on the self-efficacy but Perceived barriers were negatively correlated with self-efficacy, although the correlation was very weak (r = -16). Furthermore, exposure to the media and participation in health-related awareness

had a significant impact on knowledge. TV, newspapers, and health clinics/hospitals were rated the most effective and leading sources of Dengue awareness.

Keywords: Dengue Fever, Effectiveness of Public Services Messages, Knowledge, Attitudes, Health Belief Model constructs

Introduction & Background:

Public health organizations have employed a variety of strategies to change people's negative attitudes and behaviors. It is becoming more common for organizations to use media that can reach a larger audience, such as doctor-patient dialogues about good health behaviors or community-sponsored workshops, rather than relying on restricted media channels like brochures and posters. There are several methods in which public service announcements (PSAs), websites, social media platforms, or conventional advertising may be utilized to disseminate health-related content. (Risi et al., 2004). Public Service announcements/messages are the means of promotional material related to health aiming to encourage the people towards healthy behavior adoption. They are about general concerns of the public and raise health awareness to provide possible solutions to the problems advocated (O'Keefe & Reid, 1990).

Dengue fever is a concern in Pakistan throughout the whole year, with incidence reaching its highest point during the monsoon season. Its first time identification in Pakistan was observed in 1985 as an undifferentiated fever in youngsters under the age of 16 at the time. In the city of Hubb, Baluchistan, 75 cases and 57 deaths were recorded in the year 1995. (Paul et al. 1998). In certain parts of Pakistan, the dengue virus may be found at any time of year. Karachi and Lahore, Pakistan's two most populated cities, are the worst-hit areas, with instances recorded every year. Pakistan suffered the biggest dengue outbreak in the country's history, with more than 20,000 cases and 300 fatalities officially recorded which experts believe is underreported. It was Lahore, Faisalabad, Rawalpindi, and Sargodha that had the most cases, followed by Lahore. A total of 196 incidents were recorded in Karachi, Sindh.

According to the National Institute of Health (NIH) in Islamabad, Pakistan, there were 22,938 cases of dengue fever in 2017, over 3,200 cases in 2018, 24,547 cases in 2019, and 3,442 cases in 2020. In the cities of Lahore, Rawalpindi, and Islamabad, the number of cases is expected to rise in 2021.Since October 8, 2021; the number of dengue fever cases in Islamabad has steadily gone up, according to the district health officer. This is putting a lot of pressure on the city's public and private institutions. Pakistan has a population of approximately 210 million people and can be found in South Asia at 30.37° north, 69.34° east. Pakistan's tropical and subtropical climates are ideal breeding grounds for the dengue virus (Riaz et al., 2006; Habibullah & Ashraf, 2013). A spike in the number of cases of dengue fever occurs during Pakistan's monsoon season due to the heavy rains (Ahmad et al. 2017).

Figure 1: Number of Dengue cases reported every year from Pakistan
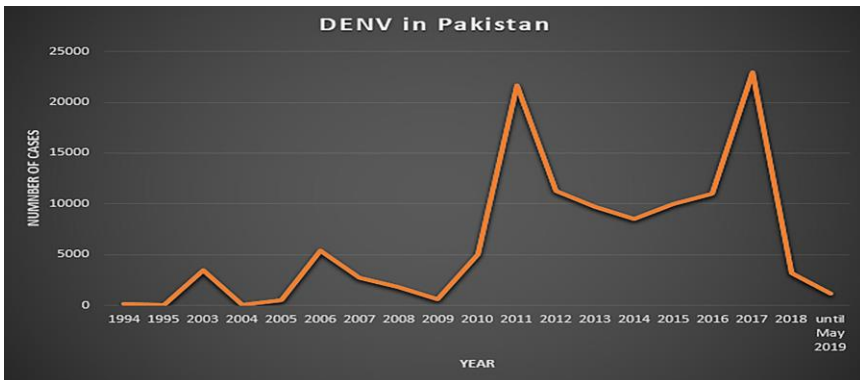
Source: Wahid (2019)/Journal of Medical Virology

Multiple studies have shown a correlation between climate change and dengue fever, and more recent research and estimations based on climate have ranked Pakistan as one of the top 10 countries most negatively affected by climate change. According to the findings of recent studies, a rise in dengue sickness is associated with not only higher temperatures but also higher levels of humidity. Climates in Pakistan range from tropical to semi-tropical, and the country also has deserts and areas that experience colder temperatures in the north. Recent research (Haider et al., 2015; Ebi & Nealon, 2016; &

Lai, 2018; Prasittisuk et al., 1998; Kuno, 2009) on how well the disease can handle different stresses shows that the level of dengue fever in Pakistan has gone from being considered moderately severe to being considered extremely severe.

Siddiqui et al. (2016) visited six randomly chosen towns in Pakistan and interviewed two persons (a male and a woman) from each family using a standardized questionnaire. A brochure containing information about DF was distributed. Dengue knowledge and practices were examined by a multivariate logistic regression analysis. There were 608 Karachi citizens (average age 33 years) surveyed; 8%, 72% and 21% had high, medium and low socioeconomic level respectively. The average score was 72% with SD (10) out of 14 points. On a scale of 1 to 17, the average preventative practice score was 10. Precisely how many people knew about dengue (OR=1.802; 95% CI=1.19–2.71; p = 0.005), how confident they felt in their own abilities (OR=2.810), and how much they relied on television for information (OR=3.202; 95% CI=1.97–5.17) were all significant predictors of how much people knew about dengue. Self-efficacy and perceived danger (OR = 1.982; 95% CI = 1.34–2.91; p = 0.000) were also significant predictors of dengue prevention activities, as was knowledge of the disease (OR = 1.581; 95% CI = 1.05–2.37; p = 0.028).

Coelho et al. (2014) have released the findings of a novel surveillance and alarm system they designed. Dengue outbreaks and tweets were shown to have a significant linear correlation, with a minimum number of tweets discovered. Coelho et al. (2014) say that these results led Rio de Janeiro's city to set up a "situation room" that gets data from the city's monitoring systems in real time.

Harish et al. (2018) studied knowledge of the transmission of dengue fever, diagnosis of the illness and its consequences, and prevention strategies among the families of people hospitalized for dengue fever. Families of dengue patients hospitalized at the Pediatrics Department, KIMS Bangalore, during a long period of 6- months' time period were surveyed in this cross sectional study. Dengue was considered a serious disease by

71% of respondents, and 84% were in favor of seeing a doctor if they were sick with it. 58 percent of respondents used mats and coils for self-safety, with bed nets coming in second at 19%. Television, radio, and newspapers all played major roles in raising awareness.

Statement of Problem:

This research study aims to analyses the perceived effectiveness of public service messages about dengue and their impact on residents in the province of Punjab, Pakistan. The research is going to utilize Health Belief Model (HBM) for measuring the relationship of independent and dependent variables. The study is quantitative in nature by using survey research design as a tool for data collection.

Martiniuk et al. (2010) studied the impact of an epilepsy public service message on fifth-grade students, they found that people who had seen the PSA were more likely to have a better understanding of epilepsy and a more positive attitude about it than those who hadn't. Secondly, the use of a cohort design to study an intervention like PSA has inherent flaws. As a result of the lack of randomization of research participants, cohort designs are less optimal for the assessment of therapies since they are more susceptible to bias. It is important to mention that in this study, public service messages are assessed in order to evaluate the knowledge, attitudes, and practices of the general and ill populations with regard to the health belief model constructs. Individual attention, preventive behavior and information services were examined in another study by Raza et al. (2020) using public service announcements. The study only looks at how public service announcements affect people's perceptions of demographic factors. This research measures constructs of Health Belief Model.

Mayimuna (2011) studied both animated and human-character PSAs, researched public service announcements for Dengue prevention. An experimental study was conducted to examine the efficacy of utilizing animated characters in a public service announcement (PSA) to prevent dengue. Public service messages about Dengue are the focus of current research on disease

prevention knowledge, attitudes, self-efficacy, and practices after having an exposure of public service messages.

Nan (2008) looked at the relationship between an individual's general attraction to a public service announcement (PSA) and their type of confidence in the subject that was presented. According to the findings of this research, attitudes are significantly impacted by their positive attitude toward a public service announcement (APSA). The degree of this beneficial impact varies from person to person and environment to environment due to the diversity of individual and contextual factors. There was just a small sample of students in this study, which examined the impact of enjoying a public service announcement on problem attitudes. There has been a noticeable research specifically addressing the persuasive effects of public service announcements (PSAs), given their widespread use and social significance. For example, Stephenson (2003), Morgan, Palmgreen, & Stephenson, Hoyle & Lorch (2003), Meyer, Roberto, & Atkin, (2003), Andsager, Austin, & Pinkleton (2001), Stephenson & Palmgreen (2001) and Godbold & Pfau, (2000). Message effectiveness may be explained by a variety of factors including the perceived susceptibility (Stephenson, 2003; Stephenson & Palmgreen, 2001) of a message, the degree of perceived severity (Andsager et al., 200), and whether or not an example or statistical proof is presented (Limon & Kazoleas, 2004).

Objectives of Research:

This research study aimed to explore the following objectives;

1) To measure the perceived effectiveness of public service messages Dengue among residents of province of Punjab
2) To explore the knowledge and level of awareness about Dengue with regard to exposure to public service messages
3) To examine the attitudes of respondents towards Dengue with regard to their knowledge about the disease
4) To examine the preventive practices of the respondents to avoid Dengue with regard to perceived susceptibility and perceived severity of the disease

5) To investigate the perceived barriers and perceived benefits about Dengue in the context of health beliefs for developing self-efficacy among respondents

6) To measure the impact of media exposure, participation in health awareness activities about Dengue on knowledge about the disease

Method & Instrument:

This research aimed to analyze and evaluate the effects of public service messages about Dengue in province of Punjab. The study measured the perceived effectiveness of public service messages, knowledge, attitudes towards Dengue and preventive measures in the context of health belief model constructs. This research study is theoretically linked with the approach of the Health Belief Model. The researcher chose a survey research design for the data collection from the general population groups through a multistage sampling technique. The data was collected from two union councils (one urban and one rural) from each of the randomly selected divisions/districts/tehsils of the province of Punjab. A systematic random sampling technique was applied while drawing the sample from each of the union councils after obtaining the list of households in the respective union councils. Dengue patients were chosen using the convenient sampling method from the top districts where Dengue prevalence rate was higher. They were accessed in the DHQ hospitals after getting permission from the Director General of Health, Lahore, through an official letter. A pre-constructed questionnaire translated into the national language, Urdu, was used to collect data. The reality of the questionnaires was validated after a pilot study, and the statistical reliability of the independent and dependent variables was measured using a reliability test of Cronbach's alpha. All the variables were ensured to be reliable after obtaining the alpha value within an accepted range (0.71). A total sample of 540 respondents including 684 normal respondents and 140 Dengue patients. The obtained questionnaires which were completed in all respects, were 503, while the rest of the questionnaires were excluded as some of them were damaged in handling while remaining were incomplete or left blank by the participants. The data was analyzed using SPSS-25 & STATA 14

MP. Chi Square, ANOVA, Correlation, Simple Linear and Multiple Linear Regression was performed to test the assumptions.
Findings:

Table 1: Socio Demographic Characteristics of the sample:

Variable	Normal (f) %	Dengue Patients (f) %	Total
Gender	-	-	-
Male	195 (72%)	75 (28%)	270
Female	189 (81%)	44(19%)	233
Age group	-	-	-
18-24 years	6 (46%)	7 (54%)	13
25-34 years	64 (65%)	34 (35%)	98
35-44 years	55 (66%)	28 (33%)	83
45-54 years	95 (66%)	48 (34%)	143
55 or Above	164 (99%)	2 (1%)	166
Occupation	-	-	-
Student	58 (70%)	25 (30%)	83
Unemployed	25 (81%)	6 (19%)	31
Employed	198(81%)	46(19%)	244
Housewife	57(76%)	18(24%)	75
Own Business	46(66%)	24(34%)	70
Marital Status	-	-	-
Unmarried/Single	112 (84%)	22 (16%)	134
Married	249 (72%)	97 (28%)	346
Widow/Widower	11 (100%)	0 (0%)	11
Separated/Divorced	12 (100%)	0 (0%)	12
Education Level	-	-	-
Illiterate/Can't read & Write	6 (46%)	7 (54%)	13
Primary/Middle	64 (65%)	34 (35%)	98
Matriculation	55 (66%)	28 (33%)	83
Intermediate	95 (66%)	48 (34%)	143
Graduate	164 (99%)	2 (1%)	166
Postgraduate/Higher	6 (46%)	7 (54%)	13
Background	-	-	-
Urban	161 (60%)	108 (40%)	269
Rural	223 (95%)	11 (5%)	234
Joint Family System	-	-	-
Yes	214 (73%)	79 (27%)	293
No	170 (81%)	40 (19%)	210
Dengue Infection in Family	-	-	-
Yes	54 (40%)	82 (60%)	136
No	330 (90%)	37 (10%)	367

Exposure to PSM	-	-	-
Yes	373 (76%)	119 (24%)	492
No	11 (100%)	0 (0%)	11
Participation in Dengue awareness	-	-	-
Yes	75 (42%)	105 (58%)	180
No	309 (96%)	14 (4%)	323

N=503

Figure2: Sources of Public Service Messages about Dengue

Sources of Public Service Message About Dengue (N=492,n=1968)

Newspaper 650
321
211
Banners/Post... 197
174
167
132
Social Media 116
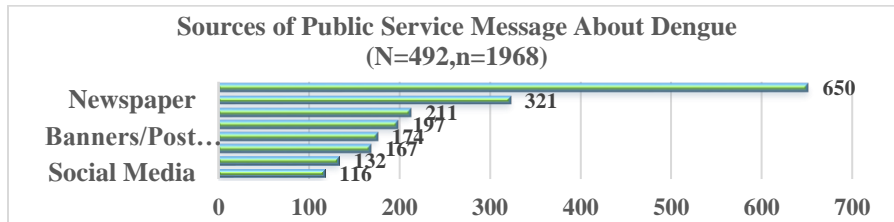
Figure 3: Information material received about Dengue awareness

Information Received about Dengue (n=1419)

Face to Face Advice 435
Awareness Message 350
Brochure/Leaflet/Pamphlet 302
Health Promotion Material 225
Other 107
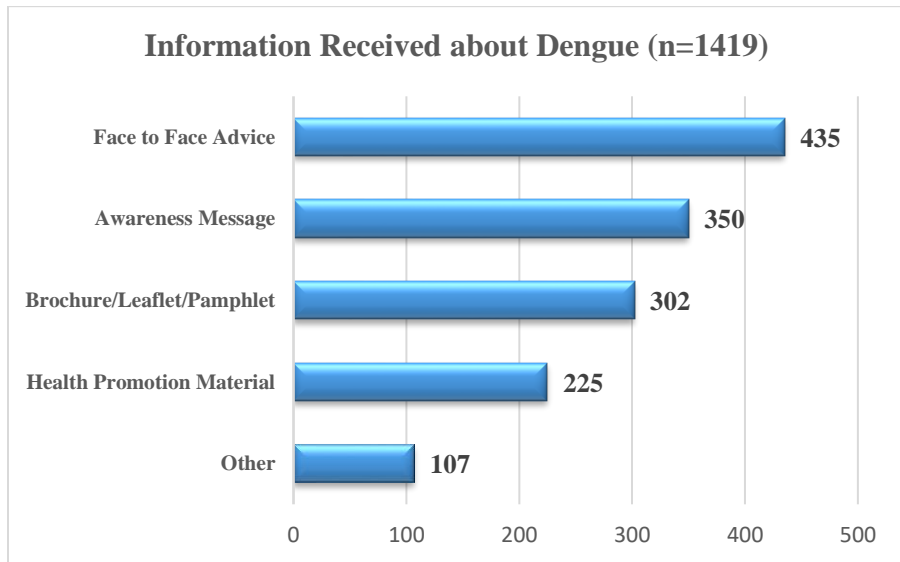
Table 2: Results of the alphas (α) values of Reliability Test of Cronbach's Alpha (Dengue)

Variables	No of Items	Cronbach's alpha Value
Perceived effectiveness of PSM about Dengue	8	0.961 (N=503)
Attitudes towards Dengue	5	0.680 (N=503)
Practices to avoid Dengue	5	0.731 (N=503)
Perceived Severity about Dengue	5	0.705 (N=503)
Perceived Susceptibility about Dengue	5	0.710 (N=503)
Perceived Benefits about Dengue	5	0.781 (N=503)
Perceived Barriers about Dengue	5	0.732 (N=503)
Self-efficacy towards Dengue	5	0.754 (N=503)

H₁: The perceived effectiveness of public service messages about Dengue would significantly differ between normal and diseased respondents with Dengue.

H₀: The perceived effectiveness of public service messages about Dengue would not significantly differ between normal and diseased respondents with Dengue.

Table 3: Effectiveness of Public Service Message about Dengue

Respondents	N	Mean	SE of Mean	Std. Deviation	Minimum	Maximum
Normal	384	29.1927	.30835	6.04244	.00	35.00
Dengue Patients	119	31.9580	.23338	2.54583	26.00	35.00
Total	503	29.8469	.24731	5.54647	.00	35.00

The statistical analysis table reflects the comparison of mean score of perceived effectiveness of public service message about Dengue among normal and diseased respondents. The mean perceived effectiveness of the public service message among normal respondents was (M=29.19, SD=6.04, SE=.30) while the mean score

of Dengue patients was (M=31.95, SD=2.54, SE=.23) which was higher as compared to normal individuals in the sample.

ANOVA

			Sum of Squares	df	Mean Square	F	Sig.
Perceived Effectiveness of Public Service Message Vs. Type of Respondents	Between Groups	(Combined)	694.683	1	694.683	23.598	.000
	Within Groups		14748.529	501	29.438		
	Total		15443.213	502			

P<0.05*

The ANOVA table of statistical significance clearly communicates that there was a significant difference in perceived effectiveness of the public service message between normal and Dengue patients. The ANOVA results where (F=23.59, DF-1, p-value=0.00) which is <0.05. Hence, the assumptions stands approved statistically having significant difference.

H₂: There would be significant difference of knowledge about Dengue among people living in Punjab with regard their demographic characteristics.

H2₀: There would be no significant difference of knowledge about Dengue among people living in Punjab with regard their demographic characteristics.

Table 4: Knowledge about Dengue among people with different demographic characteristics

Variable	High	Average	Low	Very Low	(Chi Sq) x² (df) α
Respondent Type	-	-	-	-	-
Normal	8 (2%)	191(50%)	63(16%)	122(32%)	

Dengue Patients	14(12%)	105(88%)	0	0	x^2=256.9, df=3, α<0.005 **
Gender	-	-	-	-	-
Male	19(7%)	124(46%)	95 (3%)	32 (12%)	x^2=74.9, df=3, α<0.005 **
Female	3 (1%)	44(19%)	96(41%)	90 (39%)	
Education Level	-	-	-	-	-
Illiterate/Can't read & Write	0	7 (54%)	2 (15%)	4 (38%)	
Primary/Middle	0	34(35%)	27(28%)	37 (37%)	
Matriculation	0	32(39%)	25(30%)	26 (31%)	
Intermediate	12(8%)	46(32%)	50(35%)	35 (25%)	
Graduate	10 (6)	49 (30)	87 (52)	20 (12)	x^2=52.9, df=12, α<0.005 **
Postgraduate/Higher	0	7 (54%)	2 (15%)	4 (31%)	
Background	-	-	-	-	-
Urban	21(8%)	140(52%)	77(29%)	31 (11%)	x^2=127.7, df=3, α<0.005 **
Rural	1 (.4%)	28 (12%)	114(49%)	91 (39%)	
Dengue Infection in Family	-	-	-	-	-
Yes	12(9%)	75 (55%)	30(22%)	19 (14%)	
No	10(3%)	93 (25%)	161(44%)	103(28%)	x^2=55.3, df=3, α<0.005 **
Participation in Dengue awareness	-	-	-	-	-

Yes	16(9%)	103(57%)	37(21%)	24(13%)	x^2=96.7, df=3, α<0.005 **
No	6 (2%)	65 (20%)	154(48%)	98(30%)	

N=503

Table 5: Mean knowledge about Dengue among people with different demographic characteristics (N=503)

Variable	N	Mean	SD	SE	Minimum	Maximum	ANOVA
Respondent Type	-	-	-	-	-	-	-
Normal	384	6.8073	2.01025	.10259	3.00	14.00	
Dengue Patients	119	9.8571	1.03568	.09494	9.00	13.00	(F=252.6) p<0.05)*
Gender	-	-	-	-	-	-	-
Male	270	8.3630	2.08235	.12673	3.00	14.00	(F=96.1) p<0.05)*
Female	233	6.5622	2.02074	.13238	3.00	13.00	
Education Level	-	-	-	-	-	-	-
Illiterate/Can't read & Write	13	7.3077	2.21302	.61378	4.00	10.00	
Primary/Middle	98	6.8469	2.23539	.22581	3.00	11.00	
Matriculation	83	7.1084	2.15277	.23630	4.00	11.00	
Intermediate	143	7.7133	2.41947	.20233	4.00	12.00	
Graduate	166	8.0000	2.00303	.15547	5.00	14.00	(F=241.3) p<0.05)*
Postgraduate/Higher	13	7.3077	2.21302	.61378	4.00	10.00	
Background	-	-	-	-	-	-	-
Urban	269	8.5762	2.11576	.12900	4.00	14.00	(F=634.4) p<0.05)*
Rural	234	6.3248	1.71501	.11211	3.00	12.00	
Dengue Infection in Family	-	-	-	-	-	-	-
Yes	136	8.5956	2.18879	.18769	4.00	13.00	(F=46.1) p<0.05)*

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	N	Mean	SD	SE	Min	Max	
No	367	7.1335	2.12997	.11118	3.00	14.00	
Participation in Dengue awareness	-	-	-	-	-	-	-
Yes	180	8.6722	2.16325	.16124	4.00	13.00	(F=85.2) p<0.05)*
No	323	6.8916	2.02101	.11245	3.00	14.00	

H₃:	The knowledge about Dengue has a significant impact on the respondents 'attitudes towards it.
H3₀:	The knowledge about Dengue has no significant impact on the respondents 'attitudes towards it.

Table 6: Pairwise correlations of Knowledge & attitudes towards Dengue

Variables	(1)	(2)
(1) Knowledge about Dengue	1.000	
(2) Attitudes towards Dengue	0.743*** (0.000)	1.000

*** p<0.01, ** p<0.05, * p<0.1

The above table of pair wise correlation of the variables knowledge about Dengue and attitudes towards Dengue indicates the significant positive correlation between two variables. This indicates signification association between these variables as with an increase in knowledge about the disease increased positive attitudes towards Dengue disease among the respondent. The correlation between knowledge and attitudes towards Dengue was (r= .74) that indicates that both variables were positively correlated.

Table 7: Simple Linear regression Model of attitudes & knowledge about Dengue

Attitude	Coef.	St.Er. r.	t-value	p-value	[95% Conf	Interva l]	Si g
Knowledge	.379	.046	8.18	0.000	.288	.47	***
Constant	15.185	.364	41.68	0.000	14.469	15.9	***

Mean dependent var	18.040	SD dependent var	2.476
R-squared	0.418	Number of obs	503
F-test	66.864	Prob > F	0.000
Akaike crit. (AIC)	2279.465	Bayesian crit. (BIC)	2287.906

*** p<.01, ** p<.05, * p<.1

The above table of simple linear regression model indicates that there was a positive and signification impact of knowledge about Dengue on the respondents' attitudes towards Dengue. Where (R^2=.418, F=66.86, β=.37, p-value =0.000) indicates that the independent variable knowledge has brought 41.8% change in the attitudes of respondent which was statistically significant and positive as p-value <0.05. Thus, this hypothesis is strongly supported statistically and the null is rejected.

H4: There perceived susceptibility, perceived severity of Dengue has a significant impact on the preventive measures to avoid Dengue.

H4$_0$: There perceived susceptibility, perceived severity of Dengue has no significant impact on the preventive measures to avoid Dengue.

Table 8: Pairwise correlations of Perceived Susceptibility, Perceived Severity & practices to avoid Dengue

Variables	(1)	(2)	(3)
(1) Practices to avoid Dengue	1.000		
(2) Perceived Susceptibility	0.535**	1.000	
(3) Perceived Severity	0.312**	-0.214*	1.000

*** p<0.01, ** p<0.05, * p<0.1

The pair wise correlation between practices and perceived susceptibility was moderate (r=.53). Similarly, the correlation between practices and perceived severity of Dengue was (.31) which was weak but positive.

Table 9: Simple Multiple Linear regression of Practices, Perceived Susceptibility & Perceived Severity about Dengue

Practices to avoid Dengue	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Perceived Suscep.	.284	.057	4.97	0.000	.172	.396	***
Perceived Sev.	.056	.039	-1.46	.144	-.132	.019	
Constant	12.552	1.383	9.07	0	9.834	15.27	***

Mean dependent var		17.511	SD dependent var	3.209
R-squared		0.059	Number of obs	503
F-test		15.694	Prob > F	0.000
Akaike crit. (AIC)		2574.806	Bayesian crit. (BIC)	2587.468

*** p<.01, ** p<.05, * p<.1

The above table of simple multiple linear regression model indicates that there was a positive and signification impact of perceived susceptibility of the disease on the practices. But the impact of perceived severity on the preventive measures to avoid Dengue was not significant ($\beta2$=.05, p-value=.144) which is >0.05 and was insignificant. But the overall results of the multiple linear regression where both independent variables' (Perceived Susceptibility & Perceived Severity) impact was measured on practices, indicates that (R^2=.059, F=15.69, $\beta1$=.57, p-value =0.000) <0.05, there was a 5.9% change because of both independent variables in the preventive practices of the respondents to avoid Dengue infections. As this change was small but significant, thus, this hypothesis is partially supported and the null is rejected.

H₅: The perceived barriers and perceived benefits of Dengue has a significant impact of the self-efficacy to execute positive behavior towards Dengue.

H5₀: The perceived barriers and perceived benefits of Dengue has no significant impact of the self-efficacy to execute positive behavior towards Dengue.

Table 10: Pairwise correlations of Self efficacy, perceived benefits and perceived barriers about Dengue

Variables	(1)	(2)	(3)
(1) Self Efficacy	1.000		
(2) Perceived Benefits	0.610**	1.000	
(3) Perceived Barriers	-0.167*	-0.214*	1.000

*** p<0.01, ** p<0.05, * p<0.1

The above table of pair wise correlation reflects the significant positive correlation between three variables. The correlation between perceived benefits and efficacy was (r=.61). Similarly, the correlation between perceived barriers and self-efficacy of Dengue was (-.16) which was weak and negative.

Table 11: Simple Linear multiple regression of Self efficacy, perceived benefits and perceived barriers about Dengue

Self-Efficacy	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Perceived Benefits	.362	.05	7.20	0.000	.263	.46	***
Perceived Barriers	-.359	.034	10.60	0.000	.293	.426	***
Constant	7.301	1.216	6.00	0.000	4.911	9.69	***

Mean dependent var	19.634	SD dependent var	3.090
R-squared	0.316	Number of obs	503
F-test	68.890	Prob > F	0.000
Akaike crit. (AIC)	2445.130	Bayesian crit. (BIC)	2457.792

*** p<.01, ** p<.05, * p<.1

The above table of simple multiple linear regression model indicates that there was a positive and signification impact of perceived benefits of the disease on the self-efficacy where ($\beta 1$=.36, p-value=0.000) <0.05. On the contrary, the impact of perceived barriers on the self-efficacy about Dengue was ($\beta 2$ =-.35, p-value=0.000) which is <0.05 and was significant but inverse. However, the overall results of the multiple linear regression where both independent variables' (Perceived Benefits & Perceived Barriers) impact was measured on self-efficacy, indicates that (R^2=.316, F=68.89, $\beta 1$=.36, $\beta 2$=-.35, p-value =0.000) <0.05. It can be concluded that there was 31.6% change because of both independent variables on the self-efficacy about Dengue. As this change was small due to inverse effects of perceived barriers but was significant, thus, this hypothesis is accepted and the null is rejected.

H6:   The media exposure and frequency of participation in health related awareness about Dengue has a significant impact on its knowledge.

H6₀: The media exposure and frequency of participation in health related awareness about Dengue has no significant impact on its knowledge.

Table12: Pairwise correlations of knowledge, frequency of participation and media exposure about Dengue

Variables	(1)	(2)	(3)
(1) Knowledge	1.000		
(2) Frequency of participation	0.615**	1.000	

| (3) Media Exposure | 0.769** | 0.433* | 1.000 |

*** p<0.01, ** p<0.05, * p<0.1*

The pair wise correlation between knowledge and frequency of participation in health awareness activities about Dengue was (r=.61). Similarly, the correlation between knowledge and media exposure was (.76) which was strong and positive. Thus, it can be said that increased participation and media exposure resulted in improved knowledge about the disease.

Table 13: Simple Linear multiple regression of knowledge, frequency of participation and media exposure about Dengue.

Knowledge	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Frequency of participation	.552	.076	7.25	0.000	.402	.701	***
Media Exposure	.667	.05	8.12	0.000	-.104	.092	
Constant	7.101	.258	27.52	0	6.594	7.608	***
Mean dependent var	7.529	SD dependent var		2.240			
R-squared	0.699	Number of obs		503			
F-test	27.555	Prob > F		0.000			
Akaike crit. (AIC)	2191.272	Bayesian crit. (BIC)		2203.934			

*** p<.01, ** p<.05, * p<.1*

The above table of simple multiple linear regression model indicates that there was a positive and signification impact of frequency of participation about Dengue awareness activities/sessions on the knowledge where (β1=.55, p-value=0.000) <0.05. Similarly, the

impact of media exposure on the knowledge about Dengue was ($\beta2$ = .66, p-value=0.000) which is <0.05 and was significant and positive. However, the overall results of the multiple linear regression where both independent variables' (frequency of participation & media exposure) impact was measured on knowledge about Dengue, indicates that (R^2=.699, F=27.55, $\beta1$=.55, $\beta2$= .66, p-value =0.000) <0.05. It can be concluded that there was 70% change because of both independent variables on the knowledge about Dengue. As this change was large and significant, thus, this hypothesis is strongly accepted and the null is rejected.

Discussion & Conclusion

This research study evaluated the effects of public service messages about Dengue and found that the majority of the respondents perceived public service messages as effective, reliable, believable, and clear and persuasive. The degree of effectiveness of such messages was higher among Dengue patients as compared to normal individuals. This impact might be due to the government's efforts as they utilized every channel to sensitize the public about the risks of Dengue infections. It was also found that the knowledge about Dengue was low to average among normal people but was indicated to be higher among dengue patients. The results also revealed that male respondents had more awareness as compared to females. Similarly, people living in urban areas were more sensitized as compared to people living in remote areas. This might be due to limited access to healthcare facilities while living in far-off places where even media access is limited as well. However, there were also misconceptions about dengue especially among those who had low or poor knowledge about the disease. The most common misconception about dengue was that it was transmitted by flies/bees. The research study is going to endorse Rashrash et al. (2016), Barzegar et al. (2016), and Syed et al. (2010), who came to similar conclusions about the knowledge of the diseases limiting the preventive measures towards avoiding the risks of infection. The most common positive attitudes towards dengue were that it was serious enough to adopt preventive behavior. Similarly, most people suggest getting treated at hospitals as compared to treating it at home. Moreover, the people were in agreement towards taking all possible measures to avoid it by not considering it only the government's responsibility. Almost all of the respondents believed

it was a curable disease. Perceived susceptibility and perceived severity forced people to adopt preventive measures, while perceived barriers were negatively correlated with self-efficacy. The barriers include unaffordability to get treatment and poor access to treatment facilities in their areas. To conclude, the impact of media exposure and the frequency of participation in Dengue health awareness sessions/activities had a significant impact on knowledge about Dengue, and there was a strong and positive correlation between media exposure and participation in health awareness about Dengue with knowledge about the disease.

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