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Family perception of the impact of Dengue: Knowledge, Attitudes and Practices

Percepción familiar sobre el impacto del Dengue: Conocimientos, Actitudes y Prácticas

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ABSTRACT:

Introduction: Vector-borne diseases are among the leading causes of comorbidity in the Latin American population, especially dengue.
Objective: To determine the management of dengue from the perspective of knowledge, attitudes and practices of families in two municipalities located in the department of Meta-Colombia. **Materials and Methods:** A quantitative paradigm, non-experimental descriptive, observational, cross-sectional design study with probabilistic, two-stage, stratified sampling with a sample of 3,703 families in their homes. A sociodemographic survey and a Knowledge, Attitudes, and Practices (KAP) instrument on dengue were applied. Information was processed using SPSS® ver. 20, Excel, and Word.
Results: The study shows a medium knowledge index (44.6%), a low attitudes index (50.8%), and a high practices index (93.1%). No statistically significant association was found among gender and the knowledge (p = 0.995) and practices (p = 0.696) indices; a statistically significant association was found among age groups and knowledge (p = 0.000) and attitudes (p = 0.002) indices.
Conclusions: Social actors have knowledge about the symptoms and management of the disease, but no recognition of the fatality risk of the disease. Families are more receptive to preventive practices when they have had a member experience the disease. Regarding gender participation in environmental care and disease control, women are more active in collective dengue control efforts.

Key words: Dengue; Health Knowledge, Attitudes, Practice; primary health care.

RESUMEN:
Introducción: Las enfermedades transmitidas por vectores están entre las principales causas de comorbilidad en la población de América Latina, en especial el dengue.
Objetivo: Determinar los conocimientos, actitudes y prácticas para el control del dengue de las familias en dos municipios ubicados en el departamento del Meta- Colombia.
Material y Método: Estudio de paradigma cuantitativo, diseño no experimental descriptivo, observacional, transversal, con muestreo probabilístico, bietápico, estratificado para una muestra 3.703 familias en su vivienda. Se aplicó una encuesta sociodemográfica y un instrumento de Conocimientos, Actitudes y Prácticas (CAP) sobre el dengue. La información se procesó en SPSS® VS. 20, Excel y Word**.**
Resultados: El estudio muestra un índice de conocimiento medio (44,6 %) y de actitudes bajo (50,8 %), con índice de prácticas alto (93,1 %); no se encontró asociación estadísticamente significante entre el género y los índices de conocimientos (p = 0,995) y prácticas (p = 0,696). Se encontró asociación estadísticamente significativa entre los grupos etáreos y los índices de conocimientos (p = 0,000) y de actitudes (p = 0,002).
Conclusiones: Los actores sociales tienen conocimiento sobre los síntomas y manejo de la enfermedad, no reconocen el riesgo de fatalidad de la enfermedad y son más receptivas en cuanto a las practicas familiares cuando se tiene la experiencia de alguno de sus integrantes con la enfermedad. En cuanto a la participación del género en el cuidado del ambiente y control de la enfermedad, las mujeres son más participativas en el trabajo colectivo del control del dengue.
Palabras clave: Dengue; Conocimientos, actitudes y práctica en salud; atención primaria de salud.

INTRODUCTION

Increased dengue incidence is a permanent concern for the World Health Organization (WHO), which considers that half the world's population is at risk of contracting it. Between 100 and 400 million infections occur each year, with vector surveillance being essential in tropical and subtropical areas, particularly in urban and semi-urban areas. In 2023, the highest number of cases was registered in history with over 6.5-million and 7,300 deaths, affecting more than 100 countries, including Colombia[(1)].

In Colombia, all four serotypes of the disease are present. In 2020, there were 78,979 cases, including 897 severe dengue cases, and 55 deaths, resulting in a fatality rate of 0.070%. In 2021, 53,334 cases were reported with 958 severe dengue cases and 43 deaths, for 0.081% fatality rate; in 2022, 69,497 cases were reported, with 1,371 severe dengue cases and 48 deaths, for 0.069% fatality rate. During the first two months of 2023, 13,678 dengue cases were registered; 7,051 had dengue without warning signs, 6,438 had dengue with warning signs, and 189 endured severe dengue; likewise, 43 deaths were reported with probable cause of this disease[(2)].

The Colombian Ministry of Health considers a progressive increase in the disease for the current year, with outbreaks in 121 of the 824 municipalities with a population at risk of contracting dengue. The department of Meta is the second department where an increase in cases above the projected number is expected; historically, Villavicencio – its capital – has been considered hyperendemic for dengue and chikungunya. On the 14th week of 2023, there were 1,506 cases, compared with 2022 (259) with a 581% increase; with an incidence rate of 295.3 for every 100.000 inhabitants (509.910 inhabitants)[(3).]

Dengue has become a public health problem, reaching above the epidemic threshold. It is fundamental to know society's behavior regarding the disease, which leads to inquiring with social actors, who comprise the family organization of two territories of the Colombian foothills significantly affected by this event. Some reports from the

Americas show that educational level is a key determinant of knowledge about the disease and its transmission[4, 5], as well as attitudes and practices, especially those involving the integration of community efforts for dengue control[6, 7]. Significant association exists with the knowledge of the symptoms (OR 2.56, 95%CI: 1.25 to 5.44) and knowledge of the transmission (OR 3.46, 95%CI: 1.69 to 7.57)[7] and with the high incidence of the disease.

The negative impact of social determinants, such as age and educational level[8,9], is related to control practices, recognition of the vector, modes of transmission, and symptoms, as well as whether one belongs to the subsidized regime of the social security system in health. However, these factors are related to risk perception[7,10]. Dengue is considered a high-cost disease at the local level and represents a significant disease burden on the Latin American economy[11,12], specifically in health systems and the population's social wellbeing. It is a complex disease due to environmental conditions, socioeconomic aspects and aspects related with the mode of transmission[8,13, 14], climate change, and the way vector-borne diseases have been addressed. Living conditions have influenced public health practices and actions, leading to proposals to enhance the surveillance system and conduct research that considers the social, ethnic, and environmental diversity of different regions[14,15, 16, 17]. The aim of the research was to determine the families' knowledge, attitudes, and practices for dengue control in two municipalities located in the department of Meta, Colombia, bearing in mind that it is an endemic disease and that this is one of the most-affected departments, which will permit establishing a baseline to develop health promotion and disease prevention strategies in the region.

METATERIAL AND METHODS

The study was conducted in two municipalities in Colombia (Villavicencio and Acacías) with greater population in the department of Meta. These were selected due to their high dengue incidence in the region. The study design was quantitative, descriptive, cross-sectional[18]. The study universe was made up of the non-institutional civilian population, residing in the two municipalities of research interest. The population is approximately 850,000 inhabitants between both municipalities (Villavicencio and Acacías). The sampling was probabilistic, two-stage. During the first stage, blocks (primary sampling units, PSU) were selected within each commune or sector in which the two cities of interest are politically divided, applying the proportionate systematic sampling (piPS) technique. During the second stage, the dwellings were selected within the blocks identified, through simple random sampling (SRS).

The sample size was determined from households in the municipalities of interest, using (SRS) and corrected for the DEFF design effect. The sample size for the blocks was then calculated and distributed among communes or sectors, with larger ones receiving larger sample sizes. Sampling errors for each commune or sector were established, and the necessary adjustments were made. Blocks within each commune or sector, and dwellings within each block, were selected. The formula was used to calculate the sample size in an SRS without Replacement, with n = 3,703 individuals responsible for the families. The inclusion criteria were: families who accepted informed consent, who lived in the municipality selected for the study and who had stayed in the selected housing unit for a minimum of six months.

The instruments applied included the sociodemographic characterization survey of the family and the information to inquire about socials, demographic, and cultural components of the families. Thereafter, the knowledge, attitudes, and practices (KAP) survey was applied, which was designed and authorized by Castañeda-Porras, 2011[19], comprised of 24 closed questions and 6 open questions. The closed questions have a dichotomous response (Yes – No), asking about knowledge, practices, and actions taken to control dengue. To apply the surveys, prior training took place on the management of the form and its proper completion. The survey was designed to conduct the study "Community Knowledge, Attitudes, and Practices in a Dengue Outbreak in a Municipality in Colombia, 2010"[19] and has been applied in three studies with population characteristics similar to the region of the department of Orinoquía, Colombia[20,21,22].

The Statistical Product and Service Solutions® (SPSS) program version 20 was used for information processing. Continuous variables were analyzed through Student's t test for data with normal distribution, in which case, the mean and standard deviation (SD) were provided. Associations among continuous variables were evaluated using Pearson's correlation or Spearman's rank correlation coefficient. To obtain the KAP indices, the variables constituting each index were first established. These variables were then transformed through a quantification process using the Optimal Scaling Technique and Categorical Principal Component Analysis. Subsequently, a Factor Analysis was performed using the Principal Component Method. Finally, respondents were classified based on the indices using the K-means algorithm.

The research was carried out in compliance with the standards for health research established in Resolution 008430 of 1993 by the Colombian Ministry of Health and followed the international research principles established in the 1975 Helsinki Declaration of the World Medical Association. For such, the informed consent was signed prior to applying the instrument to ensure free participation in the study. The study is part of a framework Project: "Perception of families on dengue control in two municipalities in the department of Meta", approved by the Bioethics committee and funded by the General Directorate of Research at Universidad de los Llanos, GESI research group, Family research young researchers, School of Public Health, Faculty of Health Sciences.

RESULTS

Sociodemographic characteristics

Table 1 indicates a predominance of women (61.6%); the most-prevalent age group was between 25 and 44 years (40.3%); common-law and married were the most-reported marital status (57.8%); the most-common socioeconomic levels were 2 and 3 (72.7%) along with educational level of incomplete and complete secondary (39.6%), followed by incomplete and complete primary (22.2%).

Table 1: Some social and demographic characteristics of the population studied.

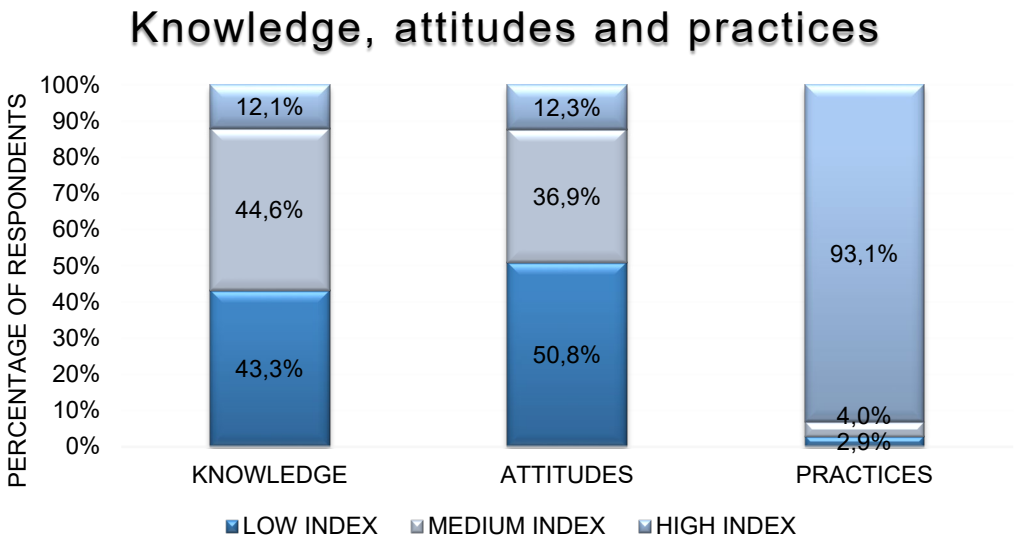
Variables	n	%
Sex of the head of the family		
Female	2,281	(61.6)
Male	1,422	(38.4)
Age range in years		
18-24	477	(12.9)
25-29	408	(11.0)
30-34	358	(9.7)
35-39	383	(10.3)
40-44	344	(9.3)
45-49	320	(8.6)
50-54	350	(9.5)
55-59	293	(7.9)
60 and more years	770	(20.8)
Socioeconomic level (strata)		
Level 1	772	(20.8)
Level 2	1459	(39.4)
Level 3	1233	(33.3)
Level 4 to 6	239	(6.5)
Educational Level		
Without studies	99	(2.7)
Incomplete primary	378	(10.2)
Complete primary	446	(12.0)
Incomplete secondary	458	(12.4)
Complete secondary	1,008	(27.2)
Technical	671	(18.1)
Incomplete university	222	(6.0)
Complete university	421	(11.4)
Marital status		
Without partner	1,565	(42.3)
With partner	2,138	(57.7)

Source: Elaborated by the authors.

Knowledge, attitudes, and practices indices

Graphic 1 shows a medium knowledge index (44.6%) and a low attitude index (50.8%), while the practice index is high (93.1%). During the data transformation process Bartlett's test showed homogeneity in variances and a good number of positive correlations (Knowledge K-squared = 3.2939e-12, df = 28; attitudes K squared = 1.6461e-12, df = 8); practices K-squared = 2.4658e-12, df = 27). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for each category indicated the suitability of proceeding with factor analysis (0.74 for knowledge, 0.74 for attitudes, and 0.68 for practices), which led to the derivation of the indices.

Graphic 1: Knowledge, attitudes, and practices indices.



Source: Elaborated by the authors.

Correlation of some sociodemographic characteristics with indices of knowledge, attitudes, and practices

Upon categorizing the participants (Table 2), association was established among some sociodemographic variables and the indices of knowledge, attitudes, and practices; using in the case of categorical variables the Chi-squared test (to establish if association existed) and Cramer's V test (to identify the intensity or magnitude of the association).

No statistically significant association was found among gender and the indices of knowledge ($p = 0.995$) and practices ($p = 0.696$); in the same manner, the practices index with the age groups ($p = 0.124$) and the attitudes index with the socioeconomic strata ($p = 0.750$). Low-magnitude statistically significant association was found (Cramer's V 0.051 $p < 0.05$) between the attitudes index and gender ($p = 0.008$).

Statistically significant association exists among age groups and the knowledge index ($p = 0.000$), with the attitudes index ($p = 0.002$); although, low magnitude was found with the knowledge index (Cramer's V 0.123 $p < 0.05$), $p = 0.000$ and the attitudes index (Cramer's V 0.074 $p < 0.05$), $p = 0.002$. Similarly, statistically significant association exists among strata groups (socioeconomic levels) and the knowledge index ($p = 0.002$) and the attitudes index ($p = 0.000$); despite finding low magnitude between the knowledge index (Cramer's V 0.073 $p < 0.05$), $p = 0.000$, and the attitudes index (Cramer's V 0.155 $p < 0.05$), $p = 0.000$. Statistically significant association was evidenced among level of studies and the knowledge index ($p = 0.000$) with the attitudes index ($p = 0.008$), and with the practices index ($p = 0.011$). Low-magnitude statistically significant relation was found among the level of knowledge (Cramer's V 0.214 $p < 0.05$), $p = 0.000$; the attitudes index (Cramer's V 0.063 $p < 0.05$) $p = 0.008$, and the practices index (Cramer's V 0.062 $p < 0.05$), $p = 0.011$. Statistically significant association was observed among living or not with a partner and the knowledge index ($p = 0.030$), the attitudes index ($p = 0.001$), and the practices index ($p = 0.001$); but with low magnitude among living with partner with the

attitudes index (Cramer's V 0.043 p < 0.05), p = 0.030, the knowledge index (Cramer's V 0.064 p < 0.05), p = 0.001, and the practices index (Cramer's V 0.062 p < 0.05) p = 0.001.

Table 2: Correlation of some sociodemographic characteristics with indices of knowledge, attitudes, and practices.

Variables and their characteristics	Knowledge index			Attitudes index			Practices index		
	Low f - %	Medium f - %	High f - %	Low f - %	Medium f - %	High f - %	Low f - %	Medium f - %	High f - %
Gender									
Female	987 (61.6)	1,019 (61.6)	275 (61.4)	1,114 (59.2)	880 (64.5)	287 (62.9)	64 (58.7)	94 (63.9)	2,123 (61.6)
Male	615 (38.4)	634 (38.4)	173 (38.6)	768 (40.8)	485 (35.5)	169 (37.1)	45 (41.3)	53 (36.1)	1,324 (38.4)
Total	1,602 (100)	1,653 (100)	484 (100)	1,882 (110)	1,365 (100)	456 (110)	109 (100)	147 (100)	3,447 (100)
Grouped age (years)									
18 - 24	191 (11.9)	223 (13.5)	63 (14.0)	287 (15.2)	144 (10.5)	46 (10.1)	19 (17.5)	18 (12.2)	440 (12.8)
25 - 29	162 (10.1)	195 (11.8)	51 (11.4)	220 (11.7)	138 (10.1)	50 (11.0)	13 (11.9)	18 (12.2)	377 (10.9)
30 - 34	125 (7.8)	179 (10.8)	54 (12.1)	187 (9.9)	125 (9.2)	46 (10.1)	5 (4.6)	18 (12.2)	335 (9.7)
35 - 39	148 (9.2)	180 (10.9)	55 (12.3)	182 (9.7)	152 (11.1)	49 (10.7)	6 (5.5)	15 (10.2)	362 (10.5)
40 - 44	130 (8.1)	169 (10.2)	45 (10.0)	165 (8.8)	124 (9.1)	55 (12.1)	8 (7.3)	7 (4.8)	329 (9.5)
45 - 49	127 (7.9)	132 (8.0)	61 (13.6)	159 (8.4)	118 (8.6)	43 (9.4)	8 (7.3)	9 (6.1)	303 (8.8)
50 - 54	149 (9.3)	167 (10.1)	34 (7.6)	157 (8.3)	142 (10.4)	51 (11.2)	10 (9.2)	12 (8.2)	328 (9.5)
55 - 59	140 (8.7)	121 (7.3)	32 (7.1)	132 (7.0)	126 (9.2)	35 (7.7)	5 (4.6)	12 (8.2)	276 (8.0)
60 and more	430 (26.8)	287 (17.4)	53 (11.8)	393 (20.9)	296 (21.7)	81 (17.8)	35 (32.1)	38 (25.9)	697 (20.2)
Total	1,602 (100)	1,653 (100)	448 (100)	1,882 (110)	1,365 (100)	456 (110)	109 (100)	147 (100)	3,447 (100)
Socioeconomic level									
Level 1	310 (19.4)	365 (22.1)	97 (21.7)	390 (20.7)	324 (23.7)	58 (12.7)	23 (21.1)	31 (21.1)	718 (20.8)
Level 2	666 (41.6)	632 (38.2)	161 (35.9)	824 (43.8)	524 (38.4)	111 (24.3)	38 (34.9)	52 (35.4)	1,369 (39.7)
Level 3	558 (34.8)	536 (32.4)	139 (31.0)	559 (29.7)	403 (29.5)	271 (59.4)	38 (34.9)	55 (37.4)	1,140 (33.1)
Level 4 to 6	68 (4.2)	120 (7.3)	51 (11.4)	109 (5.8)	114 (8.4)	16 (3.5)	10 (9.2)	9 (6.1)	220 (6.4)
Total	1,602 (100)	1,653 (100)	448 (100)	1,882 (110)	1,365 (100)	456 (110)	109 (100)	147 (100)	3,447 (100)
Educational Level									
Without studies	67 (4.2)	29 (1.8)	3 (0.7)	50 (2.7)	41 (3.0)	8 (1.8)	5 (4.6)	6 (4.1)	88 (2.6)
Incomplete and complete primary	501 (31.3)	278 (16.8)	45 (10.0)	448 (23.8)	301 (22)	75 (16.5)	31 (28.4)	45 (30.6)	748 (21.7)
Incomplete and complete secondary	671 (41.9)	654 (39.6)	141 (31.5)	755 (40.1)	527 (38.6)	184 (40.3)	40 (36.7)	49 (33.3)	1,377 (39.9)
Technical	193 (12.0)	362 (21.9)	116 (25.9)	329 (17.5)	254 (18.6)	88 (19.3)	16 (14.7)	20 (13.6)	635 (18.4)
Incomplete and complete university	170 (10.6)	330 (19.9)	143 (31.9)	300 (15.9)	242 (17.7)	101 (22.1)	17 (15.6)	27 (18.4)	599 (17.4)
Total	1,602 (100)	1,653 (100)	448 (100)	1,882 (110)	1,365 (100)	456 (110)	109 (100)	147 (100)	3,447 (100)
Marital status									
Without partner	684 (42.7)	669 (40.5)	212 (47.3)	850 (45.2)	548 (40.1)	167 (36.6)	65 (59.6)	65 (44.2)	1,435 (41.6)
With partner	918 (57.3)	984 (59.5)	236 (52.7)	1,032 (54.8)	817 (59.9)	289 (63.4)	44 (40.4)	82 (55.8)	2,012 (58.4)
Total	1,602 (100)	1,653 (100)	448 (100)	1,882 (110)	1,365 (100)	456 (110)	109 (100)	147 (100)	3,447 (100)

Source: Elaborated by the authors.

DISCUSSION

The research found predominance of women as principal family informants, with a prevalent age group between 25 and 44 years, results consistent with other studies carried out in the region[15, 23]. This highlights the ongoing role of adult women as principal caretakers in the area of health and family well-being. In addition, it was

identified that the most-frequent educational level is complete secondary, while the predominant socioeconomic levels correspond to strata 2 and 3. Similar national and international studies corroborate these findings in regions affected by dengue. Within these contexts, diverse socioeconomic factors, like age, gender, educational level, economic condition, and cultural aspects are associated with the behavior of the disease[15, 23, 24, 25]. An innovative aspect of this research is that it identified a statistically significant association between living or not living with a partner and the indices of knowledge, attitudes, and practices. However, no studies were found that establish links among knowledge, attitudes, and practices in dengue management and the condition of having or not having a partner.

The indices of knowledge and practices do not show significant correlation with gender, indicating that men and women have a medium level of knowledge in aspects, such as actions of vector control, recognition of symptoms, and care measures related with the disease. Other research has shown that, when family care is assigned to the female gender, female leaders in households tend to have greater knowledge about dengue[26]. Studies have identified that variables, like gender, composition of the household unit, and old age of the subjects are significant predictors ($p < 0.05$) of knowledge, attitudes, and practices related with the disease[27].

With respect to the socioeconomic condition, no significant relation was found with the receptivity of families, their interest in learning about the disease or their willingness to participate in vector control. Nonetheless, a low-magnitude relation was observed, where women tend to show greater receptivity and interest in the control, knowledge about the vector and the disease compared to men. Similar studies have identified that academic level and income are associated with a good level of knowledge about the disease, but not with attitudes and practices, whose variation depends mainly on the age and gender of the head of the household[26]. Additionally, international research indicates that, although approximately half of the participants demonstrate good levels of knowledge about dengue, they tend to have deficient attitudes and inadequate practices for its control[28]. Also, other studies report high levels of knowledge about the transmission and reproduction of the *Aedes aegypti*, as well as dengue prevention methods[29].

Age is correlated with medium indices of knowledge and low indices of attitude in all age groups. This suggests that, for the study herein, age does not represent a relevant factor to recognize the vector, identify breeding sites, understand transmission forms, recognize the symptoms, or implement care measures against the disease. Research conducted with young individuals has reported medium levels of knowledge and low levels in practices, highlighting fumigation as an important measure for vector control[30]. Other studies have identified a significant association between the perception of dengue risk and knowledge about the vector; likewise, antecedents of dengue diagnosis has been related to attitudes towards its control, suggesting that risk perception and previous experience with the disease could be determinants in knowledge, attitudes, and practices related to dengue[31].

Educational level, in turn, shows a relationship with medium indices of knowledge and attitudes, as well as a high index of practices, although with low-magnitude significance. This highlights the importance of family education to understand the forms of transmission, the characteristics, and proliferation of the vector, as well as to adopt care and control actions at family and community levels. In line with this, a study

conducted in Latin America (Argentina, Brazil, Colombia, and Mexico) and Asia Pacific (Indonesia, Malaysia, and Singapore) reported a low global score in knowledge and practice, but moderate in attitude[32]. These behaviors are consistent with the findings in this study, where the actions reported by the families do not always coincide with the practices observed and registered.

Marital status showed significant correlation with low indices of knowledge and attitude, indicating that having a partner or not does not influence on the level of information about dengue or on the interest to carry out care and vector control actions. A high index was found in practices among individuals with a partner, which suggests a positive impact for the implementation of practical measures.

Accessibility to the territory where the study families resided represented a significant challenge, as some communities are located in areas that are difficult to access due to conflict or lack of adequate road infrastructure. This situation may have affected data collection. In addition, external factors such as the COVID-19 pandemic, climatic changes and public health policies may have influenced participants' responses, without being able to be fully controlled for in the analysis.

CONCLUSIONS

Dengue control by families in the municipalities of the department of Meta, Colombia, is characterized by a medium level of knowledge, low in attitudes, and high in practices. Although sociodemographic and economic factors influence the receptivity and willingness to control the disease, they are not absolute determinants. Men and women have deficiencies in knowledge about the vector control and the symptoms of the disease; nevertheless, women show greater participation in collective prevention actions.

Age and marital status are not relevant factors for knowledge, attitudes, or practices, although having a partner is associated with an increase in practices. Instead, educational level has moderate influence on knowledge and attitudes, and greater impact on practices. Furthermore, the perception of risk and prior experience with dengue emerge as crucial factors to strengthen prevention and control measures.

Families recur to cultural practices to manage signs and symptoms, especially when any of their members has suffered the disease. Moreover, water storage, motivated by supply deficiencies, constitutes a vector proliferation source; however, weekly washing of containers was identified as a key prevention practice.

To optimize dengue control, interventions must focus on fostering community participation and addressing social determinants, like constant access to drinking water and improvement of environmental conditions, especially in vulnerable populations from socioeconomic levels 1 and 2. It is fundamental to enhance knowledge about the vector, promote positive attitudes, and encourage sustainable practices through health education and access to primary care services, generating proactive changes in the communities.

Lastly, complementary strategies, like Using social networks to inform young people, residual spraying in homes and comprehensive educational campaigns can

significantly contribute to controlling the disease. These findings highlight the importance of designing comprehensive strategies adapted to the sociodemographic characteristics of the communities, promoting a sustainable approach to combat dengue in endemic zones.

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