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Profile of volunteer collaborators of triatomine information posts in Ceará

Perfil dos colaboradores voluntários dos Postos de Informação de Triatomíneos no Ceará

Perfil de los colaboradores voluntários de los puestos de información de triatomíneos em Ceará

ABSTRACT

Objectives: The study aimed to characterize the sociodemographic profile and workplace of volunteer collaborators (VCs) responsible for Triatomine Information Posts (TIPs) in Ceará; analyze their perceptions regarding surveillance with community participation; and describe their knowledge about Chagas disease and its vector. **Methods:** This is a quantitative, descriptive, cross-sectional, and exploratory study conducted with VCs from the state. A structured electronic questionnaire containing 23 questions was used. **Results:** A total of 397 responses were obtained. There was a predominance of women, greater participation of respondents aged 40 to 49 years, predominance of complete secondary education, longer time working as VCs between 2 and 5 years, and satisfactory knowledge regarding triatomines and Chagas disease. However, gaps were observed regarding participants' training. **Conclusion:** TIPs are valued by collaborators; however, these actors require further training, and greater community engagement is needed.

Keywords: *Chagas Disease; Entomological Surveillance; Community Participation.*

RESUMO

Objetivos: O estudo teve como objetivo caracterizar o perfil sociodemográfico e o local de atuação dos colaboradores voluntários (CVs) responsáveis pelos Postos de Informação de Triatomíneos (PITs) no Ceará; analisar suas percepções sobre a vigilância com participação popular e descrever seu conhecimento sobre a doença de Chagas e o vetor. **Métodos:** Trata-se de um estudo quantitativo, descritivo, transversal e exploratório, realizado com CVs do estado. O instrumento

utilizado foi um formulário eletrônico estruturado com 23 questões. **Resultados:** Foram obtidas 397 respostas. Observou-se predominância de mulheres, maior participação de respondentes entre 40 e 49 anos, escolaridade predominante de ensino médio completo, maior tempo de atuação como CV entre 2 e 5 anos e conhecimento satisfatório sobre triatomíneos e doença de Chagas. Contudo, foram observadas lacunas quanto a capacitação dos participantes. **Conclusão:** Os PITs são valorizados pelos colaboradores, porém esses atores necessitam de maior treinamento e há necessidade de maior engajamento da comunidade.

Palavras-chave: *Doença de Chagas; Vigilância entomológica; Participação popular.*

RESUMEN

Objetivos: El estudio tuvo como objetivo caracterizar el perfil sociodemográfico y el lugar de actuación de los colaboradores voluntarios (CVs) responsables de los Puestos de Información de Triatomínos (PITs) en Ceará; analizar sus percepciones sobre la vigilancia con participación popular y describir su conocimiento sobre la enfermedad de Chagas y el vector. **Métodos:** Se trata de un estudio cuantitativo, descriptivo, transversal y exploratorio, realizado con CVs del estado. El instrumento utilizado fue un formulario electrónico estructurado con 23 preguntas. **Resultados:** Se obtuvieron 397 respuestas. Se observó predominio de mujeres, mayor participación de encuestados entre 40 y 49 años, predominio de educación secundaria completa, mayor tiempo de actuación como CV entre 2 y 5 años y conocimiento satisfactorio sobre triatomínos y enfermedad de Chagas. Sin embargo, se observaron deficiencias en la capacitación de los participantes. **Conclusión:** Los PITs son valorados por los colaboradores; sin embargo, estos actores requieren mayor capacitación y es necesario un mayor compromiso de la comunidad.

Descriptores: *Enfermedad de Chagas; Vigilancia entomológica; Participación Comunitaria.*

INTRODUCTION

Chagas disease (CD) is a chronic, systemic zoonosis caused by the protozoan *Trypanosoma cruzi* and transmitted primarily by vectors—hematophagous triatomines popularly known as "kissing bugs"¹. Since 2005, it has been classified by the World Health Organization (WHO) as a Neglected Tropical Disease (NTD) due to its strong association with socioeconomic vulnerability².

In Brazil, CD continues to have a significant health impact, carrying a high burden of morbidity and mortality³. In the state of Ceará, 528 deaths attributed to the disease were recorded between 2013 and 2022⁴.

Vector surveillance activities for CD are considered a fundamental strategy for vector detection and are based on entomological surveillance. This surveillance comprises actions structured around two axes: active surveillance, in which municipal or state entomology teams conduct scheduled searches for triatomines in households; and community-based surveillance, which is currently considered a priority and is recommended for most epidemiological scenarios in Brazil. In this latter approach, the population plays an essential role in recognizing and reporting vectors through household monitoring by residents themselves; upon finding an insect suspected of being a disease vector, the resident must submit it to a Triatomine Information Post (TIP)⁵.

TIPs form an essential network for the identification of triatomines and the effective functioning of community-based surveillance. They are commonly located in health units, schools, shops, private homes, or any other location that ensures easy access for the population. In these spaces, the public submits insects suspected of being triatomines for subsequent identification in entomology laboratories⁵.

The volunteer collaborator (VC) responsible for the TIP is considered a key actor in the CD's entomological surveillance and performs a voluntary, non-profit role, being responsible for receiving and reporting the submission of suspected insects⁶.

Although TIPs are fundamental to community-based surveillance, few studies have focused on the Volunteer Collaborators responsible for them—particularly regarding their sociodemographic profiles and the challenges they face, especially concerning their knowledge of the subject matter and the activities relevant to their role.

The lack of research addressing these aspects limits the planning of continuing education initiatives and the strengthening of the state's TIP network, potentially compromising the sustainability of entomological surveillance efforts for Chagas disease.

Given this context, the present study aimed to characterize the sociodemographic profiles and operational settings of the VCs responsible for TIPs in the state of Ceará; analyze these individuals' perceptions regarding

community-based surveillance and the utility of TIPs; and describe the participants' knowledge concerning aspects of Chagas disease and its vector.

METHODOLOGY

This is a quantitative, descriptive, cross-sectional, and exploratory study conducted as a sub-study of the project “Development and validation of a monitoring tool for the municipal network of Triatomine Information Posts (TIPs),” developed by Fiocruz Minas.

The study setting comprises the state of Ceará, located in the Northeast region of Brazil, which consists of 184 municipalities; of these, 181 have at least one TIP installed.

The population consisted of 1,110 registered volunteer collaborators across the state's municipalities; the study sample was composed of those who agreed to participate by accepting the Informed Consent Form (ICF) and who completed the electronic questionnaire within the timeframe established for the research.

Data collection took place between January 5 and January 26, 2026, and involved all municipalities in the state of Ceará that had TIP implemented. The data collection instrument used was a structured electronic questionnaire comprising 23 questions, created on the Google Forms platform and based on an instrument previously used in an earlier study⁷.

The invitation to complete the form was initially issued via email through Regional Health Superintendencies (RHS), Regional Health Coordination Offices, and municipal technical staff. Subsequently, the VCs were also contacted directly via a messaging app. There was no need to conduct a pilot test of the form prior to its administration in the participating municipalities.

The instrument was organized into three sections: information regarding the TIP (3 questions); Information regarding the TIP Volunteer Collaborator (11 questions); and community-based entomological surveillance for Chagas disease (9 questions). The variables covered aspects related to TIP locations, the sociodemographic profile of VCs, and elements involving community-based entomological surveillance and general knowledge about Chagas disease. To facilitate data interpretation, some variables were grouped for analysis according to the state's Regional Health Superintendencies (RHS): SRSUL, SRFOR, SRLES, SRNOR, and SRCEN.

Data were organized in a Microsoft Excel® spreadsheet and analyzed using descriptive statistics, employing absolute (n) and relative (percentage) frequencies. Relative frequencies were calculated as the ratio of the number of responses in each category to the total number of study participants, multiplied by 100.

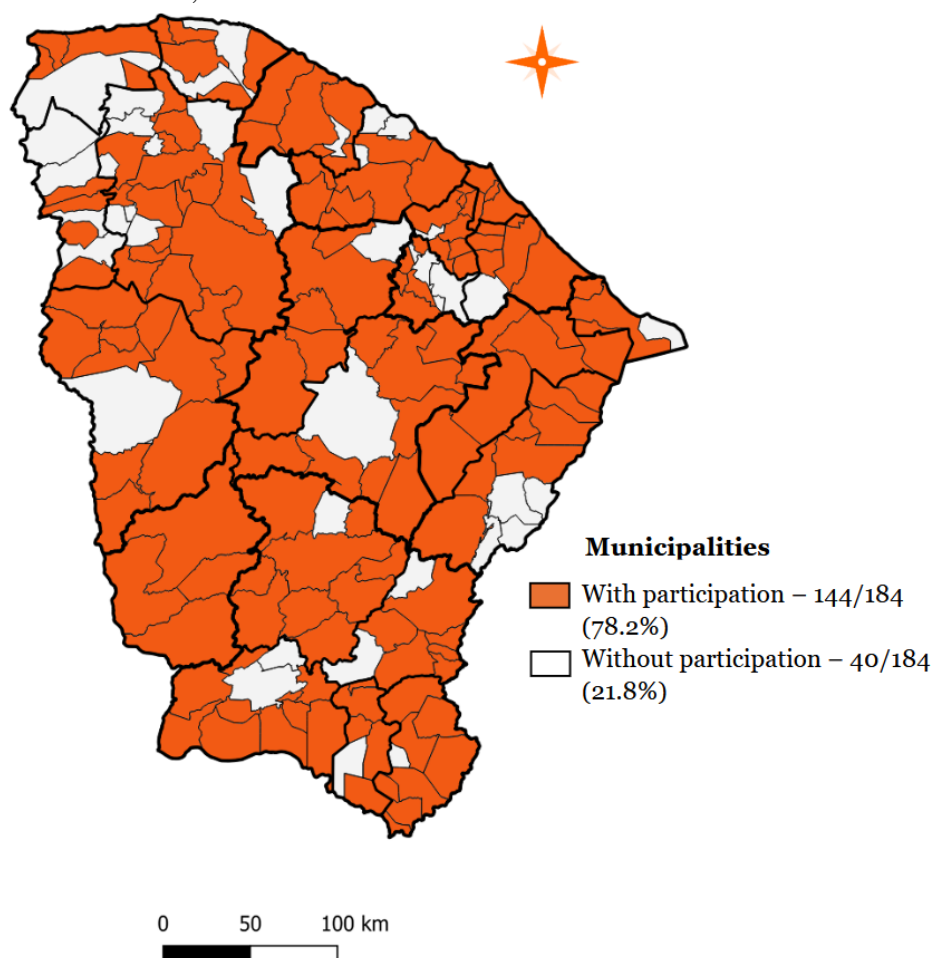
The research was conducted in accordance with the ethical principles established by National Health Council (NHC), Brazil, Resolution N°. 466/2012. The study was approved by the Research Ethics Committee of the René Rachou Institute, Brazil, (Opinion N°. 8.045.311, regarding the 3rd amendment to the

project dated December 1, 2025, originally approved on December 16, 2024 — Opinion 7.300.033). CAAE: 83611524.9.0000.5091.

RESULTADOS

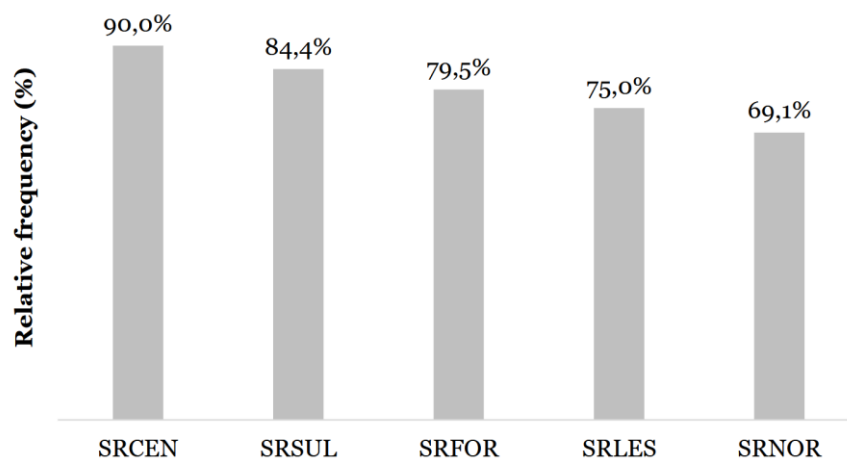
Dos 1.110 colaboradores voluntários cadastrados no estado, 35,7% (397/1110) responderam à pesquisa, sendo este o universo de análise deste estudo. As respostas foram provenientes de 144 municípios, correspondendo a 78,2% do estado (Figura 1).

Figure 1 – Municipalities represented in the study: Profile of volunteer collaborators of Triatomine Information Posts in Ceará, 2026



Source: CEVET/COVAT/SEVIG/SESA

An analysis of the distribution of participating municipalities by RHS revealed the highest proportion in SRCEN at 90% (18/20 municipalities), followed by SRSUL at 84.4% (38 of 45), SRFOR at 79.5% (35 of 44), SRLES at 75.0% (15 of 20), and SRNOR at 69.1% (38 of 55) (Figure 2).

Figure 2 – Relative frequency (%) of participating municipalities by Regional Health Superintendency, Ceará, 2026.

Fonte: Prepared by the authors.

Regarding the distribution of responses by RHS, the highest numbers were found in the SRNOR region with 33.5% (133/397) and SRFOR 31.2% (124/397), followed by SRLES 15.6% (62/397), SRSUL 13.1% (52/397), and SRCEN 6.6% (26/397).

Regarding geographic zone, the distribution of volunteer collaborators was similar between rural areas 50.6% (201/397) and urban areas 49.4% (196/397).

Regarding the location of the TIPs, a predominance was observed in Health Units 73.0% (290/397), followed by Endemic Disease Control Sectors 14.1% (56/397). Smaller proportions of TIPs were located in Municipal Health Departments (MHD) and the homes of community leaders, each accounting for 4.3% (17/397). Locations with lower occurrence rates, such as schools, Zoonosis Surveillance Units, and entomology laboratories, accounted for 2.5% of the total (10/397) and were grouped into the “others” category (Table 1).

Table 1 – Distribution of collaborators by geographic zone and location of Triatomine Information Posts according to Regional Health Superintendency, Ceará, 2026

Variable		RHS					Total	(%)
Zone		SRSUL	SRFOR	SRLES	SRNOR	SRCEN		
	Rural	11	86	30	68	6	201	50,6
	Urban	41	38	32	65	20	196	49,4
Location								
	Health Unit	24	104	48	104	10	290	73,0
	Endemic Disease Control Unit	15	7	7	16	11	56	14,1
	Residence/Leadership	2	5	4	4	2	17	4,3
	Municipal Health Department	6	1	3	5	2	17	4,3
	Others	4	3	-	2	1	10	2,5
	No answer	1	4	-	2	-	7	1,8

Source: Prepared by the authors.

At the state level, a predominance of females was observed, accounting for 58.4% (232/397) of participants, while males represented 40.8% (162/397).

When analyzing the proportions by RHS, females prevailed in SRFOR 69.3% (86/124), SRNOR 67.7% (90/133), and SRLES 67.7% (42/62). Conversely, in the SRSUL and SRCEN regions, a male predominance was observed, at 84.6% (44/52) and 76.9% (20/26), respectively.

The analysis of age groups highlighted the 40–49 age group, which accounted for 33.5% (133/397) of the participants, followed by those aged 30–39 at 31.0% (123/397). Participants aged 20–29 and 50–59 each represented 15.6% (62/397) of the total. Finally, participants over 60 years of age represented the smallest proportion, at 3.8% (15/397).

Regarding the participants' educational level, the highest proportion was observed among those with a high school education 44.1% (175/397), followed by those with a higher education degree 40.3% (160/397). Two participants 0.5% (2/397) reported having an elementary/middle school education; one had completed this level, while the other had not. For analysis purposes, these categories were grouped simply as “elementary/middle school education.”

Regarding profession, a predominance of endemic disease control professionals was observed 31.0% (123/397), this category includes endemic disease control agents (EDCA), municipal endemic disease coordinators, and endemic disease technicians. Nurses followed, representing 20.4% (81/397) of the total. The “Others” category accounted for 13.1% (52/397) of participants and included professions such as Basic Health Unit managers, biologists, veterinarians, and physiotherapists, among others. For analytical purposes, the categories “General Services Assistant,” “Administrative Assistant/Agent,” and “Receptionist” were grouped into the “Assistant/Administrative” category, totaling 14.6% (58/397) of participants. The distribution of the participants' sociodemographic profile, according to the RHS, is detailed in Table 2.

Regarding the duration of work as a VC, the highest proportion of respondents had between 2 and 5 years of experience 28.0% (111/397), followed by those with less than 1 year of experience 25.4% (101/397). Regarding the ability to advise the public on what to do when encountering an insect suspected of being a triatomine, 93.2% (370/397) of respondents stated they were capable, while only 0.8% (3/397) replied that they would not be capable. Additionally, 5.5% (22/397) of the staff reported not knowing exactly how to provide such guidance.

Regarding knowledge of the workflow for insects after they are sent to the TIP, the majority of participants, 83.6% (332/397), stated they were familiar with the procedure. Conversely, 4.5% (18/397) reported not knowing it, and 11.6% (46/397) selected the option “I don't know exactly,” resulting in a total of 16.1% of collaborators who lacked knowledge regarding this aspect to some degree.

Table 2 – Sociodemographic profile of volunteer collaborators at Triatomine Information Posts by Regional Health Superintendency, Ceará, 2026

Variable		RHS					Total	(%)
Gender		SRSUL	SRFOR	SRLES	SRNOR	SRCEN		
	Female	8	86	42	90	6	232	58,4
	Male	44	36	20	42	20	162	40,8
	No answer	-	2	-	1	-	3	0,8
Age group								
	20-29 years old	6	15	6	29	6	62	15,6
	30-39 years old	18	34	22	42	7	123	31,0
	40-49 years old	20	32	26	45	10	133	33,5
	50-59 years old	7	35	6	12	2	62	15,6
	> 60 years old	1	7	2	4	1	15	3,8
	No answer	-	1	-	1	-	2	0,5
Education								
	Elementary school	-	1	1	-	-	2	0,5
	Incomplete high school	1	2	-	5	-	8	2,0
	Complete high school	17	72	11	66	9	175	44,1
	Incomplete higher education	9	9	4	14	2	38	9,6
	Complete higher education	21	38	43	44	14	160	40,3
	Postgraduate	4	1	3	3	1	12	3,0
	No answer	-	1	-	1	-	2	0,5
Profession								
	Endemic Disease Control Professional	41	22	14	29	17	123	31,0
	Nurse	4	15	35	24	3	81	20,4
	Administrative Assistant/Support Staff	1	25	3	29	-	58	14,6
	Other	4	15	5	22	6	52	13,1
	Nursing Technician	-	19	1	29	-	40	10,1
	Community Health Agent (ACS)	-	22	3	6	-	31	7,8
	No answer	2	6	1	3	-	12	3,0

Source: Prepared by the authors

Regarding feedback on the identification of submitted insects and parasitological test results, 78.6% (312/397) stated they always received feedback, while 14.1% (56/397) indicated receiving it "sometimes," and 5.8% (23/397) stated they had never received feedback.

As for training or capacity-building to serve as VCs, 61.4% (244/397) of participants reported having received such support, whereas 38.3% (152/397) stated they had not.

Regarding topics of interest for potential training, the most frequently cited were "Habits, behavior, and identification of triatomines" (295), "Preventive measures for Chagas disease" (237), and "Entomological surveillance with community participation" (234). Additionally, "General information about the disease" (229) and "Filling out forms" (154) were indicated less frequently.

Regarding the main difficulties encountered in their role as VCs, 298 participants cited low public participation, while 158 identified insufficient training as an obstacle to performing their duties, and 96 pointed to an excessive workload as a challenge. The characterization of the VCs operational profile, knowledge regarding surveillance, and difficulties encountered is detailed in Table 3.

Table 3 – Operational profile, knowledge regarding surveillance, and challenges faced by volunteer staff at Triatomine Information Posts, Ceará, 2026

Variable		RHS					Total	(%)
		SRSUL	SRFOR	SRLES	SRNOR	SRCEN		
Duration of service at TIP	<1 year old	16	25	16	43	1	101	25,4
	1 a 2 years old	4	22	5	35	5	71	17,9
	2 a 5 years old	15	40	15	30	11	111	28,0
	5 a 10 years old	7	17	13	12	3	52	13,1
	>10 years old	8	19	10	11	6	54	13,6
	No answer	2	1	3	2	-	8	2,0
Guidance regarding suspected insects	Yes	51	115	57	121	26	370	93,2
	No	-	2	-	1	-	3	0,8
	I don't know exactly	1	6	4	11	-	22	5,5
	No answer	-	1	1	-	-	2	0,5
Destination of insects sent to the TIP	Yes	46	97	50	115	24	332	83,6
	No	1	6	5	5	1	18	4,5
	I don't know exactly	5	20	7	13	1	46	11,6
	No answer	-	1	-	-	-	1	0,3
Feedback regarding identification/p arasitological examination	Yes, always	47	89	50	105	21	312	78,6
	Sometimes	3	17	10	21	5	56	14,1
	Never	2	15	1	5	-	23	5,8
	No answer	-	3	1	2	-	6	1,5
Receive training/qualifi cation?	Yes	35	66	43	83	17	244	61,4
	No	17	57	19	50	9	152	38,3
	No answer	-	1	-	-	-	1	0,3
Training topics*	Habits, behaviors, and identification of triatomines (kissing bugs)						295	-
	Preventive measures for Chagas disease						237	-
	Entomological surveillance with public participation						234	-
	Knowledge about the disease						229	-
	Filling out forms						154	-
Major challenges as a VC*	Low public participation						298	-
	Insufficient training						158	-
	Work overload						96	-

* For this question, participants could select multiple options; therefore, only absolute frequencies were presented. **Source:** Prepared by the authors

Regarding the ability to recognize a triatomine bug, the majority of participants 82.4% (327/397) stated they were able to identify them.

Concerning triatomine feeding habits, the majority of responses were correct 93.7% (372/397); however, 6.3% (25/397) of the VCs selected incorrect options or chose not to answer.

Regarding the developmental stages of the triatomine life cycle, 68.3% (271/397) of participants correctly answered that the cycle consists of "egg, five nymphal stages, and adult," while 31.7% (126/397) answered incorrectly or did not provide an answer.

As for the transmission of Chagas disease to humans, 82.9% (329/397) of the VCs correctly stated that it occurs through contact with contaminated feces, whereas 17.1% (68/397) selected incorrect options or did not answer.

In this same context, regarding knowledge of the most common hiding places for triatomines within households, the majority of volunteers selected the option "cracks and holes in walls" (348), followed by "behind cupboards, wardrobes, and dressers, or between mattresses" (336). Less frequently, options such as "on tables, stoves, or sofas" and "in clean or dirty stagnant water" were also cited, (32) and (4), respectively.

When asked about the number of reports of suspected insects received, 49.3% (196/397) of participants reported receiving between 1 and 5 reports in the last 6 months, while 32.0% (127/397) stated they had never received a report.

Regarding the frequency of visits by the endemic disease control agent to the TIP where they operate, the majority of volunteers reported monthly visits 45.1% (179/397), followed by visits every two weeks 38.7% (126/397). Additionally, 19.1% (76/397) stated they did not receive visits from the agent.

When asked whether they considered the TIP where they volunteer important for the population regarding Chagas disease surveillance, 98.7% (392/397) of participants answered affirmatively, while the remaining 1.3% (5/397) were divided between those who answered negatively and those who preferred not to answer the question. Table 4 presents these results in greater detail.

Finally, when asked about the conceptual understanding of community-based entomological surveillance for Chagas disease, it was observed that the majority, 70.5% (280/397), of the VCs answered satisfactorily, while 29.5% (117/397) either selected incorrect options or chose not to answer the question.

Table 4 – Knowledge regarding triatomines and Chagas disease, notifications received, and perception of the importance of Triatomine Information Posts among volunteer collaborators, Ceará, 2026

Variable		SRS					Total	(%)
		SRSUL	SRFOR	SRLES	SRNOR	SRCEN		
Ability to recognize a triatomine bug	Yes	51	98	44	111	23	327	82,4
	No	1	25	18	22	2	68	17,1
	No answer	-	1	-	-	1	2	0,5
Feeding of triatomines	Blood of animals and humans	51	110	57	128	26	372	93,7
	Only human blood	-	6	2	4	-	12	3,0
	Plant sap	1	4	2	1	-	8	2,0
	No answer	-	4	1	-	-	5	1,3
Life cycle of triatomines	Egg, 5 stages of nymph and adult	46	63	40	103	19	271	68,3
	Egg, pupa, nymph, and adult	5	44	16	26	4	95	23,9
	Egg and adult	-	11	4	3	1	19	4,8
	No answer	1	6	2	1	2	12	3,0
Transmission of Chagas disease to humans	Through contaminated feces	51	91	52	112	23	329	82,9
	By the bite	-	26	9	21	1	57	14,3
	Only through saliva during the bite	-	4	1	-	-	5	1,3
	No answer	1	3	-	-	2	6	1,5
Triatomine hiding places*	In cracks and holes in the walls						348	-
	Behind cabinets, wardrobes, and dressers; between mattresses						336	-
	Behind calendars, photos, and papers pasted on walls						267	-
	On top of tables, the stove, and the sofa						32	-
	In still waters, whether clean or dirty						4	-
Number of notifications received	1–5 notifications in the last 6 months	26	53	39	66	12	196	49,3
	I never received it.	4	62	8	50	3	127	32,0
	>10 notifications in the last 6 months	9	2	10	9	6	36	9,1
	6–10 notifications in the last 6 months	11	2	5	8	5	31	7,8
	No answer	2	5	-	-	-	7	1,8
Visit by the Endemic Disease Control Agent to the TIP	Yes, every 15 days	28	45	10	32	11	126	31,8
	Yes, monthly	15	51	28	71	14	179	45,1
	No	6	19	21	30	-	76	19,1
	No answer	3	9	3	-	1	16	4,0
Importance of TIP in CD surveillance	Yes	51	122	61	132	26	392	98,7
	No	-	-	1	1	-	2	0,5
	No answer	1	2	-	-	-	3	0,8

* For this question, participants could select multiple options; therefore, only absolute frequencies were presented. **Source:** Prepared by the authors

DISCUSSION

Chagas disease remains a major public health challenge in Brazil. Efforts to control the disease must be based on technical and politico-administrative criteria within a sustainable epidemiological surveillance system; this system should incorporate horizontal strategies—aligned with the decentralized model of public control actions—alongside continuous, permanent health surveillance and active community engagement⁸.

In this regard, the extensive participation of VCs and the high proportion of municipalities participating in the study demonstrated broad coverage of the TIP network across the state. This confirms the strong presence of community-based surveillance as a strategy for monitoring Chagas disease, in line with Ministry of Health guidelines, which emphasize public participation as a cornerstone of entomological surveillance⁵.

The similar number of responses from rural and urban areas contrasts with the original concept behind the TIPs; established in the 1970s, they were designed primarily for installation in rural areas where triatomines were endemic.⁹ However, this finding aligns with Mazzardo et al.¹⁰, who reported that although Chagas disease has historically been associated with rural settings, a significant increase in its presence in urban areas has been observed in recent years, driven largely by urbanization and migration.

The study also demonstrated a predominance of TIPs installed in Basic Health Units; similar results were found in research⁹ analyzing TIPs installation sites in municipalities within Minas Gerais. In that study, the installation of TIPs in healthcare institutions was associated with the Family Health Strategy (ESF), and better maintenance of the TIPs was observed in these locations, possibly due to higher foot traffic and the population's easy access to these spaces, resulting in the continued presence and sustainability of the stations.¹⁰

Regarding the sociodemographic profile of the participants, there was a predominance of employees with high school or higher education, reflecting a relatively high level of formal education among the group, a finding likely linked to the specific professions they practice.

In terms of profession, the largest proportion of workers were those involved in endemic disease control. This aligns with other studies highlighting the role of EDCAs as key players in surveillance efforts involving community participation; they work alongside Community Health Agents (CHA) on the front lines of Primary Health Care (PHC) and are responsible for fostering a vital link between health services and the community through regular home visits, where they share information on prevention, surveillance, and control measures for Chagas disease⁹.

Data on the duration of service as TIP volunteers revealed that the majority had 2 to 5 years of experience in the role, though a significant proportion had served for two years or less. This finding may indicate turnover among the state's volunteers, highlighting the need for greater focus on their continuous training to build and maintain a network of collaborators capable of contributing to the consolidation and sustainability of the TIPs.

Most participants stated they were able to advise the public on the proper course of action upon encountering an insect suspected of being a triatomine; this suggests that the majority possessed a basic understanding of community-based surveillance and the initial operational procedures. However, 22 participants indicated uncertainty regarding how to provide such guidance, with two others choosing not to answer the question, which may point to gaps in the volunteer training process.

Regarding the processing flow of insects after they are handed over at the TIPs, it was observed that, although the majority of participants claimed to be familiar with the process, more than 16% reported not knowing or lacking sufficient clarity about it. These findings suggest that, while the volunteers (VCs) adequately handle the receipt and forwarding of suspected insects, many lack full

knowledge of the subsequent stages of this surveillance process, which include sending the sample to the reference entomology laboratory for species identification, performing parasitological stool exams, recording data, and providing feedback to the public regardless of the result. Understanding the entomological surveillance workflow involving public participation is crucial for VCs to fully perform their role in strengthening this surveillance model, as confidence in conveying information to the public can foster greater community engagement and participation.

The results of this study further revealed that 38.3% of the participants stated they had not received any type of training or preparation to serve as VCs. The lack of training for the role is identified as a major factor contributing to the discontinuation of VC activities, alongside other issues such as changes in living conditions that hinder continued volunteering, as well as the volunteers' social relationships and work situations^{9,11}.

Low public participation was most frequently cited when participants were asked about the main challenges they faced in their role as TIP community monitors. The authors identified low community participation as a key area for improvement to enhance surveillance involving the public. According to them, public engagement tends to occur only when health services provide rapid and satisfactory responses; a lack of such responses leads to dissatisfaction and discouragement, thereby weakening the process and resulting in low community adherence.⁹.

It was observed that, overall, the VCs had satisfactory knowledge regarding basic aspects of triatomines and Chagas disease, since a large proportion stated they could recognize the triatomine (82.4%), identify their correct food source (93.7%), and describe the disease's transmission to humans (82.9%), demonstrating a grasp of fundamental information about the condition.

Regarding the triatomine life cycle, the majority of participants answered correctly, although a subset provided incorrect answers, highlighting knowledge gaps when a more specific understanding of the animals' biology was required.

Regarding the receipt of notifications about suspected insects, which indicates practical experience in the role, nearly half of the participants reported receiving between one and five notifications in the last six months, demonstrating that the TIPs continue to function as active surveillance points for the population. However, the fact that approximately 32% of the VCs stated they had never received any notifications highlights the need to reconsider strategies for publicizing these posts. The community's lack of knowledge regarding the functioning, and even the existence, of TIPs is a significant aspect, identified by study participants as one of the factors that most hinder community participation⁹.

Finally, it should be noted the large proportion of VCs who considered the TIP where they work to be important for the population within the context of Chagas disease surveillance. This result highlights the volunteers' recognition of the value of TIPs as tools for bridging the gap between health services and the

community. Such a perception fosters ongoing and increasingly refined commitment, reinforcing the role of VCs as central, essential figures in strengthening the community-based surveillance strategy.

FINAL CONSIDERATIONS

This study enabled the characterization of the sociodemographic profile of the volunteer collaborators responsible for the TIPs in the state of Ceará and provided a better understanding of their perceptions regarding surveillance with community participation, as well as their knowledge concerning Chagas disease and its vector. It was found that participants recognized the importance of TIPs for disease surveillance and demonstrated satisfactory knowledge regarding basic aspects of triatomines and the disease. However, weaknesses were also identified, particularly regarding the lack of training for these volunteers and low levels of community participation.

The study has limitations that should be considered when interpreting the results, such as the potential for participant selection bias, since questionnaires were distributed online, participation by collaborators without internet access may have been hindered. Another limitation may stem from the absence of complementary methodological strategies, such as discussion circles and awareness-raising meetings with the volunteers.

As this is an exploratory study, the findings open up avenues for future research and the use of other methodological tools, enabling a deeper understanding of the data and the exploration of hypotheses raised by the results observed here.

In light of this, the findings obtained in this study proved consistent and relevant, and these findings can help inform various important actions within the context of community-participatory surveillance for Chagas disease, such as continuing health education initiatives, training sessions, workshops, and other strategies to strengthen the state's TIPs network.

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