

Household Hygiene Behaviors, Perceived Responsibility for Vector Control, and Vulnerability to Rat and Mosquito Sightings in Disadvantaged Urban Communities

Bárbara Inês Arcanjo Xavier^{1*}, Diogo César de Carvalho Santiago², Hernán Darío Argibay¹, Maria Eduarda Oliveira Dias³, Adrielly da Costa Dantas⁴, Railander Henrique Deiró Souza⁴, Indiara dos Santos Silva⁵, Victor Coutinho Santos^{5,6}, George Gonçalves Machado^{1,7}, Juliet Oliveira Santana^{5,7}, Fabiana Almerinda G. Palma¹, Nivison Nery Jr⁵, Fábio Neves Souza¹, Max T. Eyre⁸, Cleber Cremonese¹, Federico Costa^{1,5,9} & Adedayo Michael Awoniyi^{1*}

Supplementary Material IIIa: Results of descriptive and univariable ordinal logistic regression assessing associations between rat sighting frequency and key individual explanatory variables.

Characteristic	Frequency of rat sighting				Fisher's Exact Test	Univariable statistics	
	Daily (n=59)	Sometimes (n=29)	Rarely (n=27)	Never (n=21)			
Study community					0.021		
Nova Sussuarana	11 (18.6%)	11 (37.9%)	8 (29.6%)	3 (14.3%)		Ref	
Arenoso	14 (23.7%)	4 (13.8%)	10 (37.0%)	4 (19.0%)		0.97 (0.41, 2.31)	>0.9
J. Santo Inácio	12 (20.3%)	8 (27.6%)	8 (29.6%)	6 (28.6%)		1.19 (0.51, 2.75)	0.7
Calabetão	22 (37.3%)	6 (20.7%)	1 (3.7%)	8 (38.1%)		0.54 (0.22, 1.30)	0.2
Household altitude	43.1 (8.3)	44.8 (7.6)	42.2 (9.6)	44.8 (8.0)	0.659	1.01 (0.97, 1.05)	0.7
Land surface temperature	31.6 (0.8)	31.8 (0.5)	32.1 (0.7)	32.0 (0.9)	0.003	1.93 (1.23, 3.08)	0.005
Age of HoH	47.3 (15.7)	52.3 (15.7)	53.9 (11.7)	56.6 (16.3)	0.003	1.03 (1.01, 1.05)	0.006
Sex of HoH					0.187		
Female	42 (71.2%)	14 (48.3%)	17 (63.0%)	15 (71.4%)		Ref	
Male	17 (28.8%)	15 (51.7%)	10 (37.0%)	6 (28.6%)		1.18 (0.63, 2.22)	0.6
*Highest level of education of HoH					0.899		
Never studied	5 (8.6%)	1 (3.4%)	1 (3.7%)	2 (9.5%)		Ref	
Primary education	16 (27.6%)	11 (37.9%)	9 (33.3%)	8 (38.1%)		1.61 (0.40, 7.13)	0.5
Secondary education	32 (55.2%)	14 (48.3%)	15 (55.6%)	11 (52.4%)		1.27 (0.33, 5.45)	0.7
Bachelor degree	5 (8.6%)	3 (10.3%)	2 (7.4%)	0 (0.0%)		0.78 (0.14, 4.52)	0.8
*Occupation of HoH					0.776		
Formal worker	12 (21.6%)	6 (20.7%)	6 (23.1%)	7 (35.0%)		Ref	

Informal worker	18 (32.1%)	7 (24.1%)	5 (19.2%)	3 (15.0%)	0.46 (0.18, 1.15)	0.16
Retired	10 (17.9%)	7 (24.1%)	8 (30.8%)	6 (30.0%)	1.13 (0.46, 2.81)	0.8
Unemployed	16 (26.6%)	9 (31.0%)	7 (26.9%)	4 (20.0%)	0.65 (0.27, 1.57)	0.3
*Household per capita monthly income					0.234	
Less than 249 USD	50 (87.7%)	24 (82.8%)	20 (76.9%)	13 (68.4%)	Ref	
More than 249 USD	7 (12.3%)	5 (17.2%)	6 (23.1%)	6 (31.6%)	2.24 (1.00, 5.07)	0.051
Backyard used for gardening					0.288	
No	33 (55.9%)	17 (58.6%)	10 (37.0%)	9 (42.9%)	Ref	
Yes	26 (44.1%)	12 (41.4%)	17 (63.0%)	12 (57.1%)	1.61 (0.87, 2.99)	0.13
Means of waste storage before final disposal					0.837	
Open bin	12 (20.3%)	7 (24.1%)	7 (25.9%)	7 (33.3%)	Ref	
Closed bin	15 (25.4%)	7 (24.1%)	8 (29.6%)	6 (28.6%)	0.80 (0.34, 1.91)	0.6
Open sack bag	13 (22.0%)	6 (20.7%)	3 (11.1%)	1 (4.8%)	0.37 (0.13, 1.00)	0.053
Closed sack bag	19 (32.2%)	9 (31.0%)	9 (33.3%)	7 (33.3%)	0.74 (0.32, 1.70)	0.5
*HH waste disposal practices					0.164	
Municipal pickup	22 (37.3%)	14 (48.3%)	18 (66.7%)	11 (55.0%)	Ref	
Community central bin	24 (40.7%)	13 (44.8%)	6 (22.2%)	7 (35.0%)	0.55 (0.28, 1.08)	0.083
Others	13 (22.0%)	2 (6.9%)	3 (11.1%)	2 (10.0%)	0.32 (0.11, 0.85)	0.028
*Waste type most difficult to manage					0.101	
Solid	16 (32.0%)	8 (30.8%)	10 (37.0%)	7 (43.8%)	Ref	
Glass	4 (8.0%)	7 (26.9%)	7 (25.9%)	4 (25.0%)	1.65 (0.66, 4.16)	0.3
Electronic	10 (20.0%)	5 (19.2%)	1 (3.7%)	0 (0.0%)	0.29 (0.09, 0.85)	0.029
Others	20 (40.0%)	6 (23.1%)	9 (33.3%)	5 (31.3%)	0.66 (0.29, 1.50)	0.3
Perceived rat sightings as normal					0.107	
No	49 (83.1%)	26 (89.7%)	27(100.0%)	19 (90.5%)	Ref	
Yes	10 (16.9%)	3 (10.3%)	0 (0.0%)	2 (9.5%)	0.34 (0.10, 1.00)	0.060
Perceived helplessness toward rat sightings					0.507	
No	49 (83.1%)	25 (86.2%)	25 (92.6%)	20 (95.2%)	Ref	
Yes	10 (16.9%)	4 (13.8%)	2 (7.4%)	1 (4.8%)	0.44 (0.16, 1.15)	0.10
*Prior participation in hygiene awareness programs					0.296	
No	31 (52.5%)	16 (55.2%)	17 (65.4%)	15 (75.0%)	Ref	
Yes	28 (47.5%)	13 (44.8%)	9 (34.6%)	5 (25.0%)	0.56 (0.29, 1.05)	0.074
Backyard hygiene conditions					0.531	

	Clean	23 (39.0%)	16 (55.2%)	12 (44.4%)	10 (47.6%)		Ref	
	Unclean	36 (61.0%)	13 (44.8%)	15 (55.6%)	11 (52.4%)	0.019	0.77 (0.41, 1.43)	0.4
	*Concern about backyard status							
	Always	49 (83.1%)	22 (75.9%)	26 (96.3%)	13 (61.9%)		Ref	
	Sometimes	10 (16.9%)	7 (24.1%)	1 (3.7%)	8 (38.1%)	0.457	1.44 (0.64, 3.22)	0.4
	Rodenticide use for rat control							
	No	29 (49.2%)	16 (55.2%)	18 (66.7%)	13 (61.9%)		Ref	
	Yes	30 (50.8%)	13 (44.8%)	9 (33.3%)	8 (38.1%)	0.125	0.62 (0.33, 1.16)	0.13
	Perceived body responsible for rat control							
	Individual household	7 (11.9%)	10 (34.5%)	7 (25.9%)	8 (38.1%)		Ref	
	The community	26 (44.1%)	9 (31.0%)	8 (29.6%)	5 (23.8%)		0.33 (0.14, 0.73)	0.008
	The government	26 (44.1%)	10 (34.5%)	12 (44.4%)	8 (38.1%)		0.47 (0.21, 1.01)	0.055
	*Solid waste present in the backyard					0.685		
	No	12 (21.1%)	3 (11.5%)	6 (22.2%)	5 (23.8%)		Ref	
	Yes	45 (78.9%)	23 (88.5%)	21 (77.8%)	16 (76.2%)		0.92 (0.42, 2.09)	0.8
	Health awareness barriers to backyard cleanliness							
	No	59 (100.0%)	29 (100.0%)	26 (96.3%)	20 (95.2%)	0.3	Ref	
	Yes	0 (0.0%)	0 (0.0%)	1 (3.7%)	1 (4.8%)		8.46 (0.73, 39.0)	0.094
	Lack of time as a barrier to backyard cleanliness							
	No	53 (89.8%)	25 (86.2%)	24 (88.9%)	19 (90.5%)	0.3	Ref	
	Yes	6 (10.2%)	4 (13.8%)	3 (11.1%)	2 (9.5%)		1.02 (0.38, 2.66)	>0.9

11 ¹n (%); Mean (SD)

12 ²Kruskal-Wallis rank sum test

13 Abbreviations: CI = Confidence Interval, OR = Odds Ratio, HH=Household, HoH=Head of Household

14 *Variables containing missing data

15

16

17

18

19

20

21

22 **Supplementary Material IIIb: Final Model Selection - Rat sightings**

	Poison for rat control	Rat sightings seen as normal	Neighborhood	Age of HoH (continuous)	Prior participation in hygiene awareness programs	Waste type most difficult to manage	Perceived body responsible for rat control	Backyard used for gardening	AICc
Model 1			+	+	+	+	+	+	295.4
Model 2	+		+	+	+	+	+	+	295.6
Model 3 (selected)			+	+	+	+	+		295.6
Model 4		+	+	+	+	+	+	+	295.8
Model 5	+		+	+	+	+	+		296

23 HoH - Head of Household; HH - Household

24