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***Pulga* (Flea Market) Contributions to the Retail Food Environment of *Colonias* in the South Texas Border Region**

Wesley R. Dean, Ph.D.

Assistant Research Scientist, Social and Behavioral Health Comidas Saludables & Gente Sana en el Sur de Tejas Program for Research in Nutrition and Health Disparities School of Rural Public Health Texas A&M Health Science Center MS 1266 College Station, TX 77843-1266

Joseph R. Sharkey, Ph.D., M.P.H., RD

Associate Professor, Social and Behavioral Health Director, Comidas Saludables & Gente Sana en el Sur de Tejas Director, Texas Healthy Aging Research Network (TxHAN) Collaborating Center Director, Program for Research in Nutrition and Health Disparities Director, Texas Nutrition and Obesity Policy Research Network Collaborating Center School of Rural Public Health Texas A&M Health Science Center MS 1266 College Station, TX 77843-1266 Telephone: 979.458.4268 Fax: 979.458.4264 jrsharkey@srph.tamhsc.edu

Julie St. John, M.P.H.

South Texas Regional Director, Center for Community Health Development Comidas Saludables & Gente Sana en el Sur de Tejas Texas A&M School of Rural Public Health 330 W. Hudson Rd. San Benito, TX 78586 Phone: 956-202-2976 Fax: 956-399-8740 jastjohn@srph.tamhsc.edu

Abstract

Accounts of the retail food environment have been limited by research that focused on supermarkets, grocery stores and restaurants as the principal food sources for consumers. Little is known about alternative retail food-sources, especially in rural and underserved areas such as the *colonias* along the South Texas border with Mexico. Many *colonias* are located near *pulgas* (flea markets). This is the first study to examine this alternative food source for *colonia* residents. This study's purpose is to provide preliminary data on food availability in this unstudied element of the retail food environment. Five *pulgas* were identified for study by local informants. Two separate teams of two *promotores* (indigenous community health workers) conducted observations, wrote field notes, and surveyed vendors in each *pulga*. Traditional foods, prepared foods, and fresh fruit and vegetables were available in the observed *pulgas*. Traditional foods included staples, meal items, and snacks and sweets. Prepared foods were available in small stands run by independent operators, and each *pulga* had permanent restaurants which served prepared foods. A large variety of fresh fruit and vegetables were also available. An emphasis on supermarkets and grocery stores will provide an incomplete account of the retail food environment. Further studies should attempt to provide a more complete account by identifying alternative retail sources used by local residents. One such alternative retail food-source, the *pulga*, provides a range of traditional food stuffs, prepared food items, and fruits and vegetables that complement conventionally studied aspects of the retail food environment.

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(Corresponding author and author for reprints) Telephone: 979-862-1229 Fax: 979-458-4264 wdean@srph.tamhsc.edu.

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Keywords

Colonias; retail food environment; pulgas; South Texas

INTRODUCTION

The consumption of healthy foods such as fruits and vegetables, and foods low in fat and sugar plays a role in the prevention and management of a number of chronic diseases.^{1, 2} The retail food environment impacts healthy food intake. Accessibility, defined as proximity to supermarkets or grocery stores, has been associated with higher intake of fruits and vegetables.³⁻⁷ Food availability studies examine the variability of food among stores within a retail food environment.⁸⁻¹⁰ Although little is known about the availability of healthy food in rural areas,^{9, 11, 12} residing or shopping in an area with a wide variety of fruits and vegetables has been positively associated with greater fruit and vegetable intake.^{3, 5, 7, 9, 13}

Traditionally studied retail food environment components include supercenters, supermarkets, grocery stores and fast-food and full-service restaurants.^{8, 11, 14} The scope of this research has been expanded to consider the accessibility and availability of food items in nontraditional components of the retail food environment including dollar stores and mass merchandisers,^{8-10, 15} and farmers' markets.^{16, 17}

One relatively unstudied rural food environment is the one shared by Mexican and Mexican-American residents of *colonias* in South Texas.¹⁴ *Colonias* are defined by the Texas Office of the Attorney General as “substandard housing developments, often found along the Texas-Mexico border, where many residents lack basic services such as drinking water, sewage treatment, and paved roads.”¹⁸ Ward's seminal study describes *colonias* as informal low-income communities of trailers and self-built housing located in extra-jurisdictional areas.¹⁹ Many *colonias* are located near *pulgas*. Observations from interviews and prior studies, including a recent community assessment of *colonias* in South Texas identified the importance to *colonia* residents of *pulgas* as a food source.^{20, 26} This study is the first to describe this alternative food source for *colonias* by cataloguing the foods available from vendors operating within *pulgas*.

METHODS

Setting

This study was conducted in five *pulgas* located near clusters of *colonias* in the Alton, Mercedes, and San Carlos areas of Hidalgo County, South Texas. Hidalgo County has a 2005 poverty rate of 43.6%; one of the ten poorest counties in the U.S.²¹ Percentages of adults with diabetes in South Texas are higher than the rest of the U.S. and the percentage of Hispanics with diabetes is higher in South Texas than in the rest of Texas. The prevalence of obesity is higher in South Texas than in the rest of Texas and nationally.²² The Mexican Americans and Mexican immigrants living in this area are among the most difficult to reach and disadvantaged communities in the U.S.²³ Hidalgo County suffers from persistent poverty defined by the USDA-ERS as 20% of the county below the poverty line across the last thirty years, here measured from the 1970 Census.²⁴ Of the approximately 1524 *colonias* and 400,000 *colonia* residents in Texas, 60% of the *colonias* are estimated to be in Hidalgo County.¹⁹ Ward describes the population of *colonias* in South Texas as largely composed of American citizens of Mexican origin.¹⁹ According to 2000 data, the towns of Alton, San Carlos and Mercedes were respectively 97.9%, 97.1% and 90% Hispanic or Latino which differs from the national estimate of 12.5%. The percentages of families below

the poverty line in the 2000 U.S. census were 38.7%, 60% and 30.4% respectively for the same towns. These estimates also differed from the national estimate of 9.2%.²⁵

Sample, Survey and Data Collection

Five *pulgas* were identified for study through consultation with community informants including project affiliated *promotores* as popular among *colonia* residents near Alton, Mercedes and San Carlos, TX. *Pulgas* are private facilities and their owners or operators were approached by *promotores* for permission to collect data from vendors. One *pulga* owner refused to allow a survey of vendors in their *pulga* and gave no reason for this refusal. Within the *pulgas*, vendors rent tables and booths to sell produce and other items including clothing, shoes, music, and household goods. Vendors within participating *pulgas* were sampled if food items for sale were observed. Of 217 vendors approached by *promotores*, 141 vendors among the four remaining *pulgas* completed a survey with a response rate of 65.0%. Some vendors were too busy making sales to participate. Food vendors in Texas are regulated and monitored by the county health departments. Individuals who sell food items prepared off-site must operate from a licensed food-service operation. *Promotores* had to assure some vendors they did not work for the health department, and some vendors may not have participated because of their concerns about this authority. The *promotores* also suggested many vendors may be fearful of engaging with individuals who could represent the U. S. Immigration and Customs Enforcement.

The survey was adapted from a previous Spanish-language instrument designed to study mobile food vendors in *colonias*.²⁶ It included items to capture foods sold, other food characteristics, and vendors' demographic characteristics. A literature review on popular foods in the region, discussions with *promotores* and other local residents, and site visits augmented the lists of food items on the survey. The instrument was not tested for reliability against preexisting instruments as no such instrument exists, however the instrument does have face validity based on pretesting and revision with community experts.

The *promotores* involved in this project were all local residents and native speakers of Spanish with proven skills at outreach among the resident population of local *colonias*. The *promotores* participated in one day of training that included recruiting and consenting participants, administering the survey, conducting observations, and writing field notes. Research teams approached the owner or manager of the *pulga*, presented an information sheet available in English and Spanish describing the study's purpose, and requested permission to conduct the study on *pulga* grounds. To capture the widest variety of vendors, *pulgas* were visited twice, once on a weekday and once on a weekend day. Within each *pulga*, each team of researchers approached a vendor, described the study purpose, asked the vendor to review the information sheet, offered a five dollar participation incentive, and administered a vendor survey, or accepted a refusal. Some *pulga* vendors sold on both days, but were only surveyed once. In addition to administering surveys, *promotores* took photographs and observational notes. Results from this observational data are reported elsewhere.²⁷ Procedures and instruments used in this study were approved by the Texas A&M University Institutional Review Board.

Survey Instrument

Sociodemographic characteristics included gender, age, years of education completed, national origin and if vendor resided in a *colonia*. *Business characteristics* included number of years as a *pulga* vendor, one way distance from vendor's residence to *pulga*, percentage of household income derived from *pulga* sales, employment status as a *pulga* vendor (full time or not), family participation, and whether vendors marketed at more than one *pulga*.

Food items marketed included *taqueria/tacos*, *tamales*, *menudo* (tripe soup), hot dogs, *nieves* (ice cream), *raspas* (snow cones), *elotes* (corn with cheese, mayonnaise and chile), *churros* (sugary fried dough), *frutas/verduras* (fruits and vegetables), *frutas y aguas frescas/refrescos Mexicanos* (fruit waters, and Mexican and American soft drinks), *animales granjas-chivos, vacas, marranos, aves*, etc. (farm animals-goats, cattle, pigs, and poultry), *carnitas or chicharrones de puerco* (roasted pork and deep fried pork skin), and an “other” category. Other responses were combined with the initial categories to create categorical variables for fruits and vegetables; *taquerias*; prepared hot foods; frozen sweet items; sweet and fried items; salty snacks; candy; bread and tortillas; sweetened breads; herbs and spices; live goats, cattle, pigs, and poultry; and juice. Separate categories were created for sodas and *aguas frescas* (sugar-sweetened fruit waters), and an inclusive category for all sugar-sweetened beverages. Food characteristics included food source and traditional character of food item.

Data Analysis

Frequencies and percentages were calculated separately for each *pulga*, and used to describe the demographic characteristics of the 141 participant vendors and items for sale at their stands. All analyses were conducted using STATA (version 11, 2009, STATA Corp., College Station, TX).

RESULTS

Demographic characteristics of the *pulga* vendors for the four *pulgas* can be seen in **Table 1**. The majority of surveyed *pulga* vendors were women. The overall mean age was 42.8 years (range across the four *pulgas* from approximately 39 to 45 years) and years of education was 7.9 years. The majority was born in Mexico, and resided in a *colonia*. Vendors had spent approximately six to eight years selling products in the *pulgas*. Although most responses were fairly similar across the four *pulgas*, notable differences were present for the percentage of household income and full-time employment connected to the *pulga*.

Several foods were recorded for the other category in the foods item. Other responses reclassified as prepared foods included *pollo de mole* (chicken in a chile and chocolate sauce), *burritos*, *tortas* (Mexican sandwiches), *chiles rellenos* (battered and fried chiles stuffed with meat or cheese), *sopes* (thick corn tortillas with toppings), *barbacoa* (beef cheek), *caldo* (soup), *cabrito* (goat meat/kid), *tostadas* (fried corn tortillas with toppings), *gorditas* (thick corn tortillas stuffed with meat or vegetables), *pupusas* (Salvadoran meat pies), *tamales Salvadoreños* (Salvadoran tamales steamed in banana leaves), *spiropapas* (spiral potatoes), and *frijoles* (beans). Other cold and sweet deserts included shakes and *paletas* (popsicles). Other fruits and vegetables included garlic, *nopales* (cactus), *tunas* (prickly-pear fruit), *mangos*, and watermelon. Other salty snacks included *chicharrones* (fried starch resembling fried pork skin), *nachos*, *botanas* (fried appetizers), peanuts, and *semillas* (nuts such as pumpkin seeds). Other sugar-sweetened beverages included American and Mexican soft drinks.

Items sold by vendor (including the other category) for each *pulga*, and combined for the entire sample are shown in **Table 2**. Sugar-sweetened beverages were the most common item available (41.8% of vendors surveyed), followed closely by fresh fruits and vegetables (39.7%), salty snacks (27.7%), prepared hot foods (22.7%), and candy (22%). *Taquerias* selling tacos and other items were also common with 21 opportunities for purchase distributed across all four *pulgas*. Notably absent were eggs, and dairy products were represented by three vendors selling cheese. Cheese and eggs were available in prepared food items.

Characteristics of foods sold in the *pulgas* are not shown in table form. Approximately 40% of the vendors (n=57) sold food produced in Mexico, and approximately 48% of vendors (n=67) described their food items as traditional Mexican foods. Vendors who marketed fresh fruits and vegetables mainly purchased produce from a wholesaler (89.6%, n=43); five vendors purchased their produce for sale from retail outlets (6.3%). No vendors sold their own fruits and vegetables and one (2.1%) purchased fruits and vegetables from local farmers.

DISCUSSION

This study extends knowledge of the retail food environment, and is apparently the first study to examine the availability of fruits and vegetables, salty and sweet snacks, traditional foods, and prepared foods within *pulgas*. It is also one of the few studies that examines the retail food environment of South-Texas *colonias*.¹⁴ This analysis discovered a variety of food options available in the *pulgas*. The findings indicate a large proportion of the available food items to be traditional elements of the Mexican and Mexican-American diet.

Demographic characteristics indicate that *pulga* vendors are not only similar to *colonia* residents in regards to their Mexican origins, but are also largely residents of *colonias*. The ties of vendors to nearby *colonias* are further suggested by the relatively short distance travelled by vendors from home to their stands in the *pulga*.

Although some variations exist in the percentage of income derived by vendors from *pulga* sales and the percentage of vendors who are fully employed as vendors, these results indicate the importance of *pulga* vending to the livelihood of vendor families. This importance is further suggested by the large number of vendors who work with fellow family members in their stalls, and who sell in multiple *pulgas* throughout the week. The number of years employed as vendors also indicates some stability to this form of employment.

Research on food availability has extended its characterization of the retail food environment from traditional outlets such as supermarkets and grocery stores^{8, 11, 14} to non-traditional outlets including dollar stores, farmers' markets, and fruit stands.^{8-10, 15-17} By focusing on food availability in *pulgas*, this research agenda has been furthered by enriching the variety of food sources available in South Texas. Any picture of this retail food environment that disregards *pulgas* will have ignored a potentially important source of fruits, vegetables, and other foods.

This study has some limitations. As the first such study of this aspect of the retail food environment, it only examines four *pulgas*. Thus, this assessment of the availability of fruits, vegetables and other foods may not speak to the regional availability of these items in *pulgas*. However, these are the only *pulgas* located near clusters of *colonias* in the Alton, Mercedes, and San Carlos areas. This study cannot address differences between participants and those who refused. As some vendors were too busy to participate, more successful vendors may be underrepresented in the sample. This assessment focuses on availability and vendor characteristics, and cannot speak to important issues from the consumer perspective including the accessibility and utilization of *pulgas*. Finally, price data was not collected, prohibiting an assessment of item affordability, although the *promotores* observed that many customers shopped at *pulgas* because food was cheaper than in conventional outlets. Nevertheless, this study indicates that *pulgas* do make available a variety of food options, including fruits and vegetables, and traditional food items, to nearby *colonia* residents.

CONCLUSION

The *pulgas* make available to *colonia* residents a variety of culturally important and appropriate foods including imported Mexican goods and traditional Mexican and Mexican-American food items, such as prepared dishes and ready to eat items.²⁸ While many of these items are available from conventionally studied components of the retail food environment such as supermarkets, the *pulga* setting is an appealing one that bears a strong resemblance to the Mexican markets familiar to many residents of South Texas *colonias*.^{28, 29}

This study is preliminary work that examines the food environment of *pulgas* in one county in South Texas, however anecdotal evidence and reports from *promotores* and other research informants suggest that *pulgas* are becoming commonplace in locations with large populations of Mexican immigrants throughout the U.S., especially along the border with Mexico, and in large urban centers such as Los Angeles, San Diego, Houston, and Austin.²⁹ A complete account of the retail food environment in South Texas, and in other U.S. locations with large Mexican immigrant populations calls for a closer and more extensive examination of *pulgas*.

It is important for policy makers and local practitioners to be aware of the full set of available retail food options. Initial results indicate the potential importance of *pulgas* to the retail food environment of *colonia* residents. Thus, practitioners in locations that incorporate *pulgas* into the retail food environment should ask clients if they shop at *pulgas*, and what food items they purchase there. In turn, further research on the retail food environment in largely Mexican American and Mexican-immigrant locations such as South Texas should establish how often residents shop at *pulgas* and what items they purchase. While *pulgas* sell many of the same items one can find at a supermarket or a farmers' market, they are dissimilar. Unlike farmers' markets, *pulgas* are not a direct conduit between producers and consumers. Furthermore, products available in many farmers' markets and ubiquitous in supermarkets such as eggs and dairy products were mostly unavailable in *pulgas*. Unlike many products in supermarkets, nutritional information is not provided on labels in *pulgas* with the exception of prepackaged items purchased elsewhere for resale, suggesting that clients who purchase prepared foods from *pulgas* may require dietary advice in a different form from that provided for those who shop primarily in supermarkets. Perhaps the most important observation from a health and nutrition perspective is that many vendors sell fresh fruits and vegetables, although this should be tempered by the even larger number of vendors selling less-healthy items such as sugar-sweetened beverages and fried foods. Thus, *pulgas* provide another option to purchase fruits and vegetables for low-income and poverty-level clients who may have limited transportation and difficulty accessing other retail outlets. *Pulgas* may also provide an important avenue for nutritional interventions such as the establishment of Electronic Benefit Transfer terminals to allow Supplemental Nutrition Assistance Program recipients to take advantage of local *pulgas*.

Practitioners who wish to implement nutritional interventions in *pulgas* should be cognizant of the demographic profile of *pulga* vendors and respectful, well-informed and socially integrated with this largely Mexican-immigrant cultural milieu, preferably by employing locally engaged community representatives such as the *promotores* who were involved in this research project. The potential linkages between *pulga* vendors and *colonia* residents may be advantageous to those implementing nutritional interventions as *pulga* vendors may understand the consumers who stand to benefit from these interventions to be members of their own community. Finally, based on the relative importance of *pulga* vending to the overall livelihood of vendor families, practitioners should show a cautious regard when implementing nutritional interventions that could impact the sales of *pulga* vendors. An

unsuccessful intervention may not only fail to improve consumer well being, but may also harmfully impact a *pulga* vendor's family.

Further study of the *pulgas* as an element of the retail food environment will provide policy makers with a more accurate depiction of the options available to promote healthy eating among *colonia* residents. Such research will facilitate the crafting of more finely-tuned policies to assure the availability of healthy food items to the disadvantaged *colonia* neighborhoods of South Texas.

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NOTES

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Sociodemographic and business characteristics of vendors in each *pulga* reported as means with standard deviations [mean \pm s.d.] or percentages and n [% (n)].

Table 1

	Pulgas					Total (n=141)
	Pulga 1 (n=41)	Pulga 2 (n=23)	Pulga 3 (n=34)	Pulga 4 (n=43)		
Sociodemographic characteristics						
Female, % (n)	80 (33)	70 (16)	65 (22)	77 (33)		73.8 (104)
Age in years, mean \pm s.d.	43.9 \pm 14.6	42.4 \pm 14.3	39.3 \pm 11.8	44.6 \pm 14.2		42.8 \pm 13.8
Education in years, mean \pm s.d.	9.1 \pm 4.1	7.4 \pm 3.6	8.8 \pm 3.6	8.2 \pm 3.5		7.9 \pm 4.2
National origin, % (n)						
U.S.	8.1 (3)	18.2 (4)	17.2 (5)	15.8 (6)		14.3 (18)
Mexico	92 (34)	81.8 (18)	79.3 (23)	79.0 (30)		83.3 (105)
El Salvador	0	0	0	5.3 (2)		1.6 (2)
Nicaragua	0	0	3.5 (1)	0		0.8 (1)
Colonia resident, % (n)	87.8 (36)	86.96 (20)	64.7 (22)	76.7 (33)		78.8 (111)
Business characteristics						
Years as vendor	6.1 \pm 6.7	6.7 \pm 5.2	6.3 \pm 9.0	5.5 \pm 6.7		6.1 \pm 7.1
Distance from home in miles, mean \pm s.d.	13.9 \pm 14.6	13.2 \pm 13.4	11.4 \pm 9.5	15.7 \pm 12.7		13.7 \pm 12.7
Full time vendor, % (n)	12.2 (5)	8.7 (2)	58.8 (20)	62.79 (27)		38.3 (54)
Income from vending, % (n)	33.2 \pm 41	32.5 \pm 21.7	68.2 \pm 26.9	59.0 \pm 35.8		48.8 \pm 33.2
Family participation						
\geq 1 relative employed, % (n)	68.3 (28)	91.3 (21)	44.1 (15)	53.5 (23)		61.7 (87)
\geq 1 children employed, % (n)	0	0	5.9 (2)	0		1.4 (2)
Sell at multiple <i>pulgas</i> , % (n)	19.5 (8)	82.6 (19)	32.4 (11)	51.2 (22)		44.0 (60)

Table 2

Proportion and (n) of food vendors selling particular items in each of four pulgas

Stall Type by Item Sold	Pulga Name (n)					Total (141)
	Pulga 1 (41)	Pulga 2 (23)	Pulga 3 (34)	Pulga 4 (43)		
Fresh fruits and vegetables	24.4 (10)	47.8 (11)	61.8 (21)	32.6 (14)		39.7 (56)
Prepared hot food items						
Taquerias	12.2 (5)	21.8 (5)	5.9 (2)	20.9 (9)		14.9 (21)
All prepared hot foods	17.1 (7)	30.4 (7)	17.7 (6)	27.9 (12)		22.7 (32)
Snack items						
Frozen sweet items	4.9 (2)	13.0 (3)	5.9 (2)	14.0 (6)		9.2 (13)
Sweet and fried items	(0)	4.4 (1)	(0)	2.3 (1)		1.4 (2)
Salty snacks	14.6 (6)	17.4 (4)	41.2 (14)	34.9 (15)		27.7 (39)
Candy	14.6 (6)	13.0 (3)	23.5 (8)	32.6 (14)		22.0 (31)
Breads						
Bread and tortillas	7.3 (3)	8.7 (2)	2.9 (1)	2.3 (1)		5.0 (7)
Sweetened breads	4.9 (2)	(0)	(0)	9.3 (4)		4.3 (6)
Drinks						
Sodas	34.2 (14)	30.4 (7)	5.9 (2)	37.2 (16)		27.7 (39)
Sugar-sweetened fruit waters	39.0 (16)	34.8 (8)	14.7 (5)	18.6 (8)		26.2 (37)
Total sugar-sweetened beverages	56.1 (23)	43.5 (10)	17.7 (6)	46.5 (20)		41.8 (59)
Juice	2.4 (1)	(0)	(0)	2.3 (1)		1.4 (2)
Live goats, cattle, pigs, and poultry	12.2 (5)	4.4 (1)	(0)	(0)		4.3 (6)
Herbs and spices	(0)	8.7 (2)	(0)	2.3 (1)		2.1 (3)