

Academic Research

Utilization Patterns and Perceptions of Mobile Health Clinics in Batey Libertad, Dominican Republic

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Mobile health clinics have become a popular means of providing care to low-resource areas in high-, middle- and low-income countries. In low- and middle-income countries, there is limited evidence for the effectiveness of mobile clinics as an alternative healthcare model for marginalized populations. A cross-sectional study was conducted on mobile health services in a Dominican agricultural community, Batey Libertad. This study describes the characteristics of the population that had previously utilized mobile health clinics as well as the perceptions of these mobile health clinics. Household surveys were conducted at each of the 173 households in Batey Libertad. The main variables of interest were previous mobile clinic use and patient perceptions, operationalized using ordered opinion-based comparisons. Bivariate analyses were conducted to find significant associations between these outcomes and socioeconomic and demographic variables. Socioeconomic and demographic variables with significant associations were then included in unconditional logistic regression models. Findings suggest that mobile clinics are utilized less by young adults and males. Overall perceptions of mobile health clinics were very positive. Based on these results, mobile health clinics in Batey Libertad should work to expand their outreach to males and young adults. In general, mobile health clinics should evaluate the coverage of their services in the communities they wish to serve. Future studies should seek to both verify these findings and also further evaluate mobile health care as a potential tool in reducing healthcare access inequities.

Introduction

Mobile clinics are temporary or seasonal units of healthcare professionals that aim to attend to patients in the patients' own communities. Globally, mobile health clinics have become an alternative model of healthcare to traditional permanent clinics or hospitals, providing both primary and specialty care to rural and marginalized communities.¹ Mobile clinics can range in the type of services they provide, the regularity of their visits and the experiences of the health professionals involved.^{2,3,4,5} In areas with limited health infrastructure, mobile health clinics are often coordinated by charitable organizations and staffed by volunteers, who are often international health professionals associated with a medical organization or faith-based organization.³ In many contexts, they are referred to as medical mission trips. These clinics are usually free, and they can be stationed in a community for as short as a few hours to as long as a week in length. They provide services depending on the abilities of the medical professionals who volunteer to staff them. When the volunteer healthcare professionals are unable to provide a certain service, they refer the patient to another provider, a local practitioner or perhaps one related to a future mobile clinic. However, most mobile health clinics are not coordinated with one another, so patient information is not shared. Consequently, there is no official documentation of which clinics visit which communities or when these visits occur.⁶

A limited number of studies have been conducted to evaluate the services provided by mobile health clinics in low- and middle-income countries. Most present studies have been basic assessments of patient demographics, presenting symptoms displayed, diagnoses made and medicines dispensed, with no broader assessment of the quality or effectiveness of the services.^{5,4,7} In contrast, more in-depth studies have been conducted in high-income countries. These studies indicate that mobile clinics can effectively target and provide care to high-risk populations such as drug users who use needles or HIV-positive patients engaged in prostitution.^{8,9} In addition, mobile clinics have been found to be a successful alternative model of care for immigrant women in high-income countries.⁸ These studies and others, mostly conducted in the United States and England, suggest that mobile clinics may be a useful model

of care for marginalized populations.⁸ Although the same may apply to marginalized communities and populations in low- and middle-income countries, the data from such settings are limited.

The Dominican Republic is a large recipient of international volunteer medical professionals who serve in mobile health clinics due to its proximity to the United States. Two organizations that provide such care in the Dominican Republic are the Institute of Latin American Concern (ILAC) and the Batey Relief Alliance. Currently, the Batey Relief Alliance directly serves 60,000 patients each year. The frequency of mobile health clinics depends on the number of organizations and groups of volunteers who volunteer their time to staff these clinics.⁹ ILAC is offering at least 6 programs for medical professional volunteers in 2016.¹⁰ Within the Dominican Republic, mobile clinics often serve bateys, migrant communities throughout the country that account for a total population of at least 200,000 people and are primarily composed of Haitians or Dominicans of Haitian descent.^{11,12}

A three-month observational study conducted on mobile medical vans in a batey in the southeastern part of the Dominican Republic concluded that mobile healthcare might be an effective mechanism for providing acute and preventative care in these areas. The majority of patients served were 8 years of age or younger, with multiple presenting symptoms. Qualitative data from healthcare workers and community members identified the need for an integrative healthcare delivery infrastructure to offer pediatric treatment and provide education in bateys.¹³

Mobile clinics offer an important alternative to typical healthcare since Haitians or Dominicans of Haitian descent are often subject to discrimination within the Dominican Republic. The shared island, Hispaniola, has long been marked by violence between Haitians and Dominicans. Many Dominicans still remember the 22 years of Haitian occupation over 165 years ago. In 1937, the Dominican dictator Rafael L. Trujillo committed the worst atrocities in the island's history, massacring 12,000 Haitians or Dominicans of Haitian origin in the Northwest region of the country.¹⁴ In 1978, the UNESCO Commission on Human Rights announced that Haitian migrant workers were being sold for human labor and that, since 2000, the Dominican government has forcibly rounded-up up to 12,000 migrant workers and settlers of

Haitian origin each year.¹⁴ Bateys are often home to these migrant workers or descendants of migrant workers, and residents of bateys are usually geographically and economically isolated, with limited access to health care.^{11,15} As a result, the bateys suffer worse health outcomes than other parts of the Dominican Republic. The infant mortality rate in bateys is 41 per 1000 live births compared to the national average of 33 per 1000 live births, and the incidence of diarrheal illness in bateys is 10% higher than the national average.¹⁶

With this context in mind, this cross-sectional study investigated which individuals in bateys utilize mobile healthcare services and how they perceive mobile health clinics relative to the formal healthcare system. The overall goal was to better understand the effectiveness and potential of the mobile healthcare model in providing care to marginalized populations in this context.

Methods

Setting

This study was conducted in Batey Libertad in the Valverde province of the Cibao region of the Dominican Republic from June to July of 2014. Every year for about the last ten years, four to six mobile clinics have visited the Batey Libertad community of about 1,100 people. The closest small town to Batey Libertad, Esperanza, is about 10 minutes away and reachable by private or public transportation for the equivalent of approximately 0.50 USD, where the community members have access to a public hospital, a public walk-in clinic (called a policlinic) and an assortment of private clinics. The public hospital works on a first-come, first-served basis and is commonly perceived as under-resourced and overcrowded. The policlinic takes a limited number of patients each day, which requires getting in line early in the morning and still may not guarantee a meeting with the physician. The private clinics offer a higher quality of care and can be more time-efficient, but their costs make them inaccessible to many.

Sampling Method

The sample for this study consisted of adults (≥ 18 years) who resided in Batey Libertad from June to July of 2014. Inclusion criteria included the competence to consent. Participants were limited to one adult per household in order to obtain a feasible representative sample within the study period. If a household had more than one adult present, the household could voluntarily select one participant since there were no criteria based on sex or age. As a result, the potential for selection bias to be introduced should be considered in the findings. Full saturation of the eligible population was achieved by interviewing one representative from each household in the batey during the time of the study. All 173 eligible participants consented to participating. Participants were interviewed based on personal experiences and were not asked about the experiences of other household members.

Households were identified based on a census performed by members of Yspaniola, an education non-governmental organization (NGO) working in the batey. A household was defined as a living space, either a stand-alone structure or as a unique entryway within a larger compound. Households were visited starting from the north side of the batey and working south. Data were collected both in the morning and the afternoon, and if no one was home to participate, households were revisited at another time during the study period. To account for high rates of illiteracy, verbal consent was obtained in the preferred language of the participant (Haitian Creole or Spanish). Questionnaires were also administered in the participant's preferred language. An interpreter from the batey was hired to conduct the Haitian Creole interviews and accompanied the research team for each interview in order to clarify any questions and to ensure no household was missed. Confidentiality was maintained by giving unique identifying codes to each survey participant with the code key locked separately.

This study design received approval by the Institutional Review Board of Yale University.

Data Collection Tool

The questionnaire was developed from four different validated survey instruments used in previous studies.^{17,18,19,20} Questions from these four instruments were then combined in different ways to create four main parts: demographic information, health seeking behaviors, perceptions and evaluation of mobile health clinic services and general discrimination perceptions in different aspects of daily life. The data on perceptions of discrimination are not used in this study. Relevant questions

were constructed in a variety of forms including open-ended, scales, comparisons, yes/no, etc. Each question and response was recorded by hand by one of the two field investigators using the data collection tool. Each week, all responses were entered into a FileMaker Pro database. Data were transferred to a laptop that was password-protected.

The questionnaire was first translated from English to Spanish by a native Spanish speaker on the research team, and then translated to Haitian Creole by the interpreter. Both translations were validated through pilot testing with two local members of Batey Libertad who were then excluded from study participation. The questionnaire in Spanish and Haitian Creole can be found in the Appendix.

Measures

The independent variables of interest included self-identified nationality, family descent, age, level of education, gender, household size, employment and a calculated socioeconomic proxy variable. Socioeconomic status was assessed based on the possession of a checklist of items suggested by community leaders to reflect an income gradient. These items ranged from mobile phone to a car. Socioeconomic status in this study was selected to reflect extreme poverty and was thus defined as a binary variable of having at least one possession compared to no possessions. Self-identified nationality and family descent were both used as measures of ethnic background since the Dominican Republic has a long history of discrimination based on skin color.^{15,17} Three levels of nationality were constructed: Haitian, Dominican-Haitian, and Dominican, while Haitian descent was coded separately as a binary variable based on self-reported description of a family tree. Age, level of education, household size and employment were all coded as categorical, multi-level variables.

In order to describe mobile clinic usage patterns two criteria were used. The first criterion was mobile clinic attendance, which was measured with a binary variable representing whether or not a subject could recall ever having been to a mobile clinic. The next outcome of interest was perceptions of mobile clinic care. This outcome was operationalized with ordered opinion-based comparisons. The first perceptions involved comparing mobile clinics to Dominican local service, looking at overall quality of care between the types of facilities and medical knowledge of foreign versus Dominican healthcare providers. Perceptions of mobile clinics' ability to provide care and trust in foreign healthcare providers were also measured. For these opinion-based questions, previously validated scales and formats were employed, using the responses "Always, Sometimes, or Never" or "Better, Same, Worse" based on the nature of the question.¹⁷

Data Analysis

Data were cleaned and exported from the FileMaker Pro database for analysis using statistical software StataSE v 12.1. Demographic and socioeconomic information was expressed as frequencies and percentages. Bivariate analysis using Pearson's chi-squared test and unconditional bivariate logistic regression were conducted to investigate the association of demographic and socioeconomic variables with mobile clinic attendance. Variables with associations found to be statistically significant ($p < 0.05$) were then included in an unconditional logistic regression model to estimate the adjusted strength and magnitude of these associations with mobile clinic attendance. Perceptions of mobile health clinics were expressed as frequencies and percentages. Bivariate analyses using Pearson's chi-squared test were conducted to describe the association between the perceptions and demographic and socioeconomic variables. Variables found to be significant in bivariate analysis were then included in an ordinal logistic model, chosen based on the ordinal nature of the perception questions. Because the reference category in some instances had a zero frequency, the proportional odds assumption could not be tested but because the outcome was designed to be ordinal, this model was still used.

Results

Study Population

Of the 173 household representatives that participated in this study, 62.4% ($n=108$) were females. Over half of the population was between 25-45 years old (55.5%; $n=96$) and less than 10% (8.1%; $n=14$) were more than 60 years old. The two most common occupations were agricultural work (32.6%; $n=56$) and domestic work (40.7%; $n=70$) with 74.1% of women performing domestic work and 80% of men perform-

ing agricultural work. More than 70% of the population did not complete primary school (n=126). The majority of individuals self-identified as Haitian (75.2%; n=131), while 21.4% identified as Dominican (n=37) and 2.9% (n=5) identified as Dominican-Haitian. [Table 1].

Mobile Health Clinic Utilization Patterns

Of the sample of 173 adults, 100 individuals (57.8%) had at one point visited a mobile health clinic. While 74.0% (n=74) of mobile clinic visitors were female, only 45.8% (n=33) of non-mobile clinic visitors were female (p<0.05). There was also a significant difference in the age structures of the populations of those who attended a mobile clinic and those who did not, with those who had attended a mobile clinic being older (p<0.05). A higher proportion of adults who had not attended a mobile clinic self-identified as Haitian compared to those who had attended a mobile clinic (86.1% compared to 68.0%; p=0.024). A similar trend was observed for those who declared Haitian descent. Among mobile clinic non-visitors, 91.7% were of Haitian descent compared to only 76.0% of mobile clinic visitors (p=0.024). Household size was found to be significantly associated with mobile clinic use as well (p=0.027). Specifically, 55% (n=55) of mobile clinic users had a household size of four or more compared to only 31.9% (n=22) of mobile clinic non-users. Of these individuals who had not visited a mobile clinic, 22.2% (n=16) lived alone while only 14% (n=14) of mobile clinic users lived alone.

In the constructed unconditional logistic model [see Appendix after tables and figures for full table of unadjusted associations], only gender and young age were found to be significant explanatory variables for mobile clinic use. No significant difference was found for socioeconomic status. Males were found to have an odds of visiting a mobile clinic that was 0.35 (95% CI 0.15-0.80) times the odds of females attending a mobile clinic, after adjusting for age, household size, economic status, self-identified nationality, and Haitian descent. The youngest adults were also significantly less likely to have attended a mobile clinic than older adults, after adjusting for the other covariates. Adults ages 25-45 years had an odds of attending a mobile clinic 5.86 times (95% CI 2.00-17.12) greater than the odds of attendance for adults 18-24 years. Adults ages 46-60 years and adults ages 60 years and over also had significantly higher odds of attending a mobile clinic than the youngest adults. [Table 3]. No significant difference was found in the self-reporting of various symptoms between males and females or of individuals in different age intervals [Table 4].

Perceptions of Mobile Health Clinics

Overall, mobile clinics were perceived very positively, as being of high quality and serving the needs of the batey population. These results were especially interesting in comparison to the overall negative perceptions of the local Dominican healthcare system. For 70.7% of the surveyed population, the last visit to the doctor for a consultation or appointment took six or more hours including travel, wait, and appointment time, although most visits were at a distance less than twenty minutes away. For more than half of the population, the most recently visited healthcare facility was a public policlinic. Only 51.1% of those that visited this policlinic described the quality as good. In comparison, 91.9% of participants described the quality of mobile clinics as good or better. Moreover, 75.9% of respondents reported that they thought the quality of healthcare in mobile health clinics is better than in Dominican facilities [Table 5]. These positive perceptions of mobile clinic services extended to the foreign healthcare professionals staffing them. About 88% of respondents said they always trust the foreign doctors in mobile health clinics, while about 72% reported that the medical knowledge of doctors in mobile clinics is greater than that of Dominican doctors [Table 5].

Moreover, across all demographic and socioeconomic variables, there were no significant differences in levels of trust in the foreign doctors staffing mobile clinics. In addition, no significant associations were found between demographic and socioeconomic variables and perceptions of mobile clinic treatment quality compared to treatment quality in Dominican hospitals.

In the bivariate analysis, significant differences across gender and Haitian descent were found for perceptions of the medical knowledge of foreign doctors compared to Dominican doctors. Both of these factors were found to be significant when adjusted for each other in an ordinal logistic model. Specifically, 77.8% of those with Haitian descent perceived foreign doctors to have greater medical knowledge than Dominican doctors compared to less than 50% of study participants not of

Haitian descent (p=0.002). This difference corresponded with those of Haitian descent having an odds of perceiving foreign medical professionals to have greater knowledge 3.27 (1.33- 8.05) times the odds of those without Haitian descent. Moreover, 85.1% of males perceived foreign doctors to have better medical knowledge compared to only 64.8% of females (p=0.012) [Table 6]. Similarly, males had an odds of perceiving foreign medical providers to have greater knowledge that was 2.68 (1.05-6.83) times the odds for females [Table 7].

In addition, significant bivariate associations were found between perceptions of mobile clinic ability to provide care and self-identified nationality (p=0.031), as well as with employment (p=0.007). Table 6 shows that 55.3% of those who self-identified as Haitian perceived that mobile clinics had the ability to always provide the care they needed, compared with 31.4% of Dominicans and 20.0% of Dominican-Haitians. However, when self-identified identity was included in the ordinal logistic model adjusting for employment, it was no longer significantly associated with perceptions of ability to provide care [table 7]. Employment remained significant. Agricultural workers perceived that mobile clinics could always provide the care they needed significantly more compared to domestic workers after adjusting for self-identified nationality. Specifically, agricultural workers had an odds of perceiving mobile clinics to have greater ability that was 3.10 (1.31-7.33) times that of domestic workers. Students were also significantly less likely to perceive that mobile clinics were always able to provide the needed care compared to domestic workers, but the number of students in the sample was extremely small, so this finding should be interpreted with additional caution (n=4).

Discussion

This study aimed to describe the interactions of the community members of a batey with mobile health clinics. Understanding the utilization patterns of mobile health clinics can help identify those populations that are most at-risk of not receiving adequate medical care

Healthcare in rural and marginalized communities, such as bateys, can be extremely limited, especially when social barriers exist that inhibit populations from freely using mainstream healthcare facilities. Mobile health clinics have been previously identified as potential ways of serving the most marginalized in high-income countries,^{8,21,4,22} but only 58% of this study population had previously used a mobile health clinic. In addition, some sub-populations, specifically young adults and males, were found to underuse mobile health clinic services. It is possible that young adults or males have fewer health concerns for which to seek care, but no significant difference was found between the self-report of symptoms (both past and current symptoms) for these groups [Table 4]. Bateys are known to be traditionally home to migrant workers, who are often young and male.^{13,23} This study did not directly ask participants whether they were migrant workers. However, because this study found that young age and being male were significantly associated with lack of mobile clinic use, further studies should specifically include identifying questions about migrant worker status. This type of further investigation could help determine if migrant workers are a population that is missed in mobile healthcare provision. Employment status cannot be used as a proxy since many migrant workers may be currently unemployed or have transitioned to other work from that of which they originally came for. This study distinguishes itself from previous studies on mobile healthcare because it did not involve convenience sampling of individuals who actually attended a mobile health clinic but allowed a broader assessment of utilization patterns to be assessed through a valid sample of an entire community, using a census-like method.

Overwhelmingly, respondents had very positive perceptions of the quality of mobile healthcare. Agricultural workers are often migrant workers who do not have proper documentation. Thus, they could also be largely excluded from the Dominican health system, which might incline them to perceive that mobile clinics are always able to provide the needed care because they are their only option.^{15,25} Moreover, differences observed in perceptions on the medical knowledge of foreign doctors also could be related to marginalization from the formal healthcare system. Those that self-identify as Haitian could have had prior negative experiences seeking care in the formal sector or could have been disenfranchised by other experiences of discrimination. There are many individuals of Haitian descent who were born in the Dominican Republic or feel they deserve Dominican citizenship, and thus do not self-identify

as Haitian, potentially explaining why self-identified nationality was not also significant in bivariate analysis. Negative experiences with Dominican doctors, such as bigoted comments and dismissive attitudes for those who appear Haitian, have been documented and are more common in public facilities,¹⁵ perhaps explaining why those of Haitian descent are more likely to feel that foreign doctors have better medical training than Dominican doctors.²⁴ It is unclear why there are significant discrepancies between males and females, but no significant differences between those who work in agriculture compared to those who do not. Future research should explore why these differences could be prevalent in order to determine if they reflect actual differences in medical service provided or reflect the way in which treatment is delivered and how respected or accepted the patients feel with certain doctors compared to others.

These conclusions must be taken with caution, considering the study's limitations, the first of which is the study's cross-sectional nature. Because bateys are typically migrant, unrecognized communities, a snapshot description of current conditions could be unrepresentative of other points in time, and this batey could be unrepresentative of other bateys. Another possible limitation to the generalizability of this study is that Batey Libertad has a strong presence of foreigners and NGOs in multiple sectors beyond health, especially focusing on education and youth empowerment. Other bateys or marginalized, rural areas may not see this same degree of international presence. However, because participants often have relationships with foreigners outside the health-services context, they could trust that this project was being conducted independent from a health organization and that their answers would not compromise their future care. The study design attempted to maximize representation by obtaining one adult representative from each relevant household, a census of the households rather than all adults, due to time constraints. These households were allowed to self-select due to feasibility constraints, which could have introduced selection bias. Moreover, the education levels were extremely low in the study population. This raises the possibility that health literacy was also low, and responses to health-related questions must be interpreted with this mind.

Moreover, the purpose of this study was exploratory in nature with many independent variables of interest. The models were constructed based on what variables were found to have significant associations since there is little evidence on the subject suggesting which variables to include. With the numerous independent variables in mind, the findings must be interpreted carefully since there were no a priori hypotheses to test and multiple comparisons were conducted with statistical correction. Further research should attempt to replicate the associations found to be significant.

Conclusions

These findings have relevance to both current mobile clinics and the implementation of future ones as well. First, these findings sug-

gest that mobile health clinics should seek to gain knowledge of who is using their services in order to evaluate the extent to which they are helping to provide care to those who lack it. Second, these findings suggest that mobile clinics serving Batey Libertad should expand their outreach to males and young adults or they should aim to partner with another organization to ensure that these individuals receive adequate healthcare.

Overall, participants had extremely positive perceptions of mobile health clinics, as negative perceptions were less than three percent by each measure. Understanding these perceptions can also bring a new perspective to the debate over the ethicality of medical mission trips and short-term mobile clinics involving delegations of foreign volunteers, which have gained popularity as a type of service or training experience.^{3,7,25} This study attempted to bring to light how the beneficiaries feel about the presence of these sporadic services.

In terms of long-term healthcare solutions for bateys, there have been discussions of developing a more integrated primary care center system,¹³ but little progress has been made. The results of this study further support the need for a more permanent health facility in Batey Libertad, and other similar bateys since mobile health care attendance still seems underutilized. Moreover, similar studies must be conducted in other bateys in the region in order to draw more comprehensive conclusions about the state of healthcare in the region and how those who wish improve access and coverage can best do so. Future studies could also further explore the underlying reasons for underutilization of mobile clinics, such as if marketing or timing could be improved to better reach those not currently using the mobile clinics. These findings should not be extrapolated to other contexts due to the unique social conditions of bateys and the varying aspects of mobile health care providers. However, this study should inspire similar endeavors in other contexts in order to better understand the effectiveness, quality and acceptance of a large type of service provider that often goes unevaluated. This understanding of a potential tool in reducing healthcare access inequities could contribute to the global work of working towards universal health coverage.

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