

Evaluating the Impact of an International Short Term Medical Mission Through Diabetic Glycemic Control

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Background

- Surprisingly little evidence exists demonstrating improved community health outcomes as a result of care received through short term medical missions (STMMs). This study, therefore, seeks to assess the following research question: can a STMM help reduce the disease burden of diabetes in Dajabon, Dominican Republic as represented through reductions in hemoglobin A1C (HbA1c), a surrogate marker of disease management?
- An estimated 200,000 Americans volunteer for global health activities annually, the value of which is estimated at more than \$750 million.¹ Despite this enormous delivery of services to medically underserved regions, data regarding the health impact of such interventions are sparse in the medical and public health literature. When considering the vulnerable nature of those living in medically underserved communities, this lack of evidence is particularly noteworthy.
- The most thorough literature review to date (2014) pertaining to STMMs (defined as lasting less than 2 months), identified 112 studies since 1993, 95% of which lacked any significant data collection. Only 13 reported distinct outcomes more than a week post-intervention, all of which were surgical in nature. No studies were identified regarding outcomes of interventions performed by a strictly medical team.²
- This study directly tests the notion that international medical (non-surgical) volunteering improves the health of those receiving services by performing a prospective analysis of its impact on diabetic health outcomes. Diabetes represents a major disease burden in the Dominican Republic, especially among the country's northwest border with Haiti where healthcare shortages are prominent.³

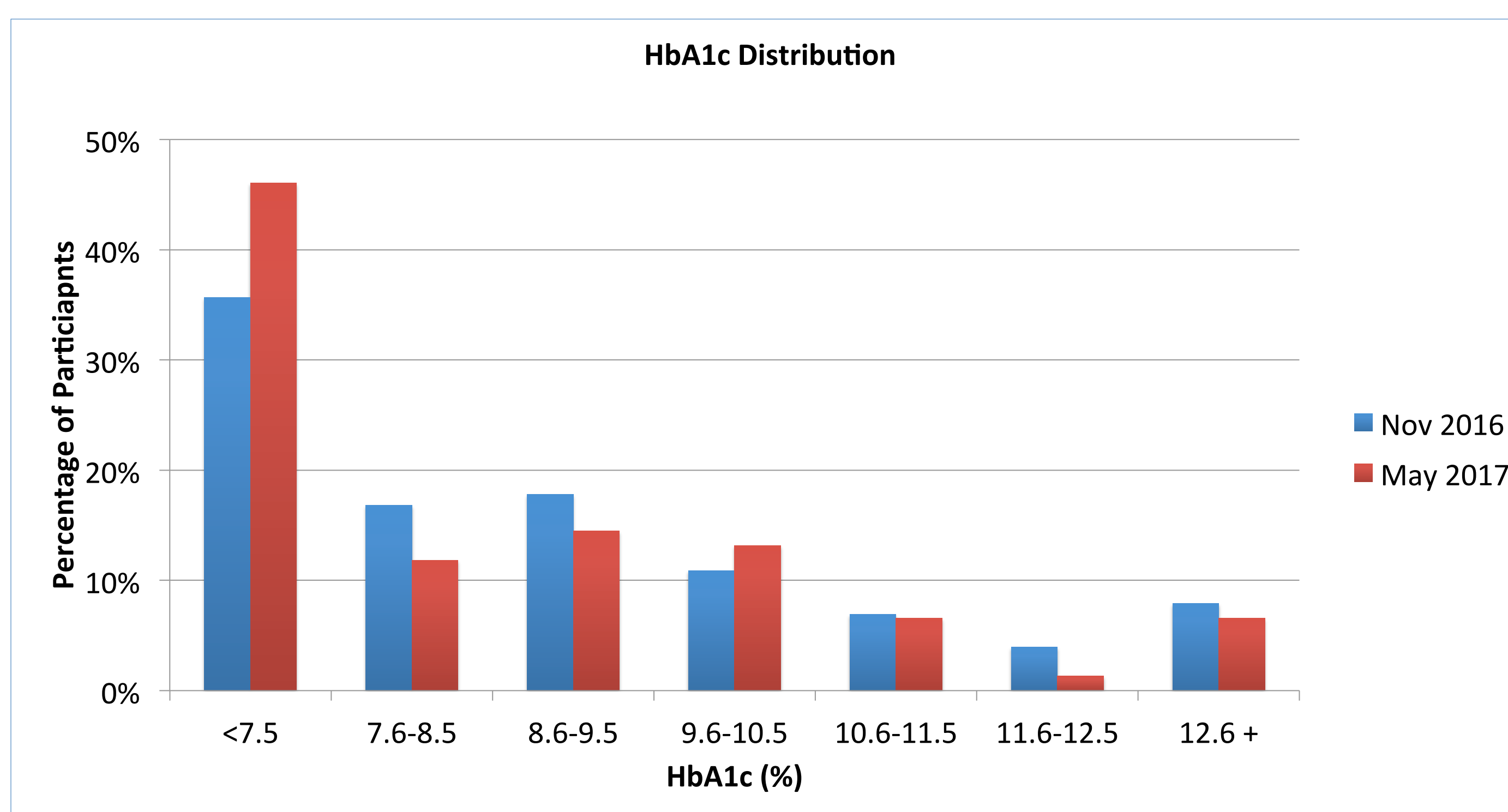


Figure 1. HbA1c distribution among participants at enrollment versus follow-up.

Methods

- Diabetic individuals in the community of Dajabon, Dominican Republic were recruited through screening services provided by Waves of Health (WOH), a 501 (C) (3) organization of clinicians and other volunteers whose mission is to supplement care in the region through biannual visits.
- Participants were recruited according to American Association of Diabetes diagnostic criteria: random blood glucose ≥ 200 mg/dL with symptomatic hyperglycemia or hemoglobin A1c (HbA1c) $\geq 6.5\%$.⁴ HbA1c is widely accepted as a measurement of average blood glucose over an 8-12 week period and associated with disease severity.⁵
- Upon enrollment, the HbA1c for each participant was measured. A survey was also administered regarding existing knowledge of diabetes and current medication regimen if applicable.
- Participants were provided with a six-month supply of medications (primarily metformin and glipizide), counseled regarding the medications and possible lifestyle adaptations, and instructed to follow-up at the WOH clinic in six months.
- At the six-month follow-up in May 2017, HbA1c's were re-measured and medications refilled. To enhance follow-up, participants received a "check-in" phone call at three months post-enrollment to address any questions/concerns and provide a reminder about follow-up dates.

Results

- During the November 2016 trip, 101 enrollees met initial criteria for inclusion. The mean age was 59.5 (SD 14.3). 53.5% (n=54) were female and 46.5% were male (n=47). Of the participants with previous knowledge of their diabetes, 18.5% (n=17) reported they did not take medications as directed. The most commonly reported reason was cost (70%). 11.1% (n=11) of enrollees were unaware they had diabetes
- In May 2017, 75% (n=76) of participants presented for follow-up care. Mean age remained the same at 59 yrs. The follow-up rate of individuals who provided phone numbers was 82% (n=50) versus 65% (n=26) (p=0.04) among those without phones. There was no significant correlation between HbA1c and likelihood to follow up.
- Mean HbA1c decreased by 0.35% from 8.71% (95% CI= 8.32-9.1, SD 2.0) to 8.36% (CI=7.89-8.83, SD 2.1) respectively (p=0.07). The median HbA1c at onset and follow-up was 8.5% and 7.7% respectively.
- The percentage of individuals with HbA1c $\leq 7.5\%$ increased by 10.4% at follow-up compared to enrollment. Of those whose HbA1c decreased, the mean decrease was 1.1%.

	Nov. 2016	May 2017
Total n	101	76
Mean Age	59.5	59.1
Male	47 (46.5%)	32 (42%)
Female	54 (53.5%)	44 (58%)
Mean HbA1c	8.71	8.36
Median HbA1c	8.5	7.7
Max HbA1c	14	14
Min HbA1c	6.5	5.6

Table 1. Participant characteristics

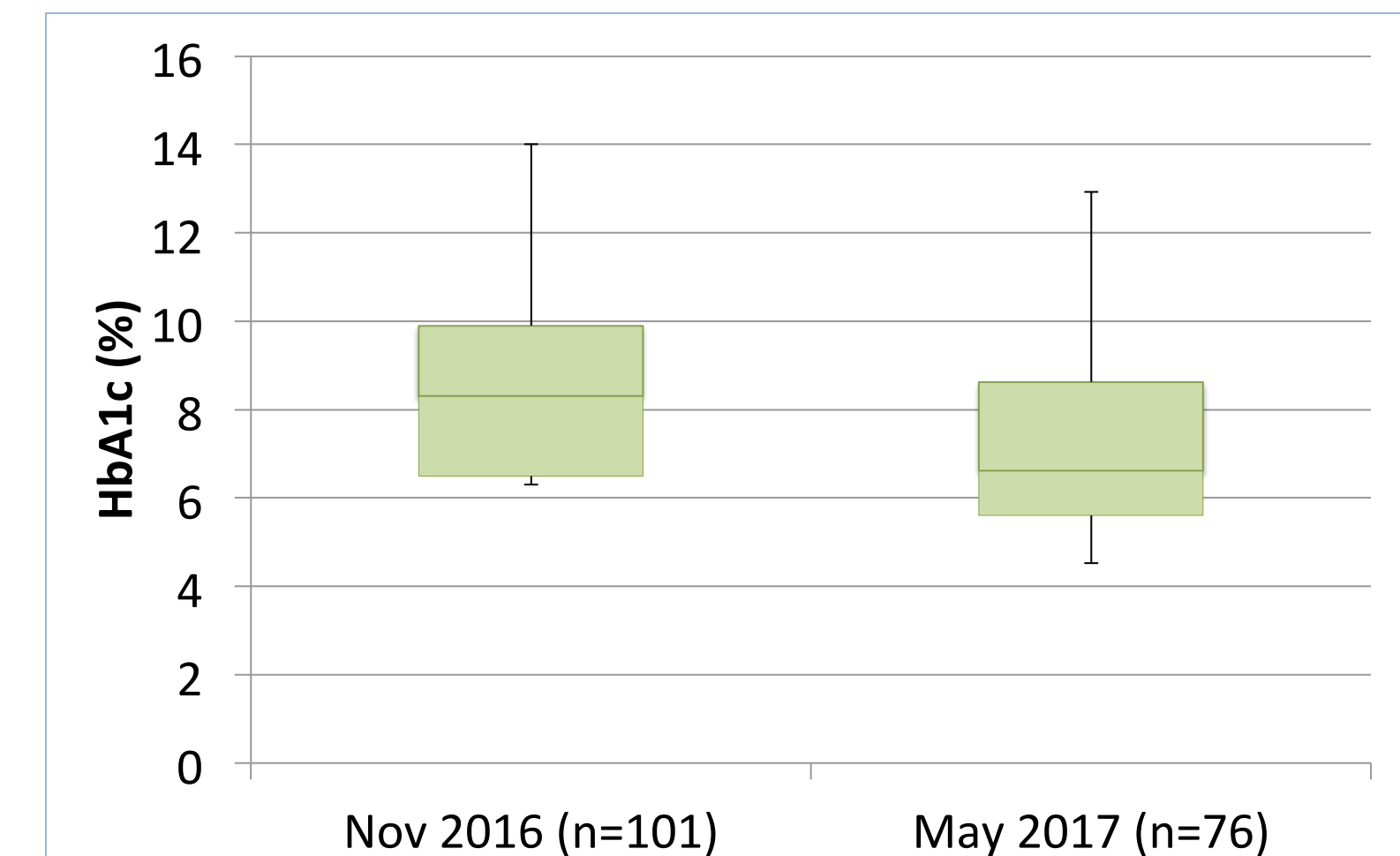


Figure 2. Box plot showing mean and median HbA1c at enrollment versus follow-up.

Discussion

- Our study analyzing the efficacy of the WOH diabetes care strategy demonstrated a non-statistically significant decrease in HbA1c (8.71% to 8.36%, p=0.7) over a 6-month period. In combination with the observation of a 10.4% increase in number of individuals with HbA1c $\leq 7.5\%$, this represents a modest realization of our goals.
- Though these results were statistically insignificant across the study population, the outcomes are likely more relevant when viewed on an individual basis. Specifically, when taking into consideration only individuals' whose HbA1c decreased, the average decrease of 1.1% suggests WOH care contributed to improved disease severity. This observation is similar to that expected given the conservative medications and treatment strategy used to prevent harmful effects associated with intensive glycemic control. These findings are important as every 1% increase in HbA1c is associated with a 20-30% increased risk for adverse cardiovascular events and an HbA1c ≥ 8 has been linked to a 150% increase risk of death from cardiovascular disease.⁶
- Poor patient follow-up is a problem commonly cited throughout the STMM literature. Our participant follow-up rate of 75% 6-months post-medical intervention is among the top quartile recorded and possibly the only follow-up statistic reported from a primary care-based STMM. A sense of familiarity with WOH stemming from close partnership with local physicians and consistent return of WOH volunteers to the clinic in Dajabon twice yearly since 2007, may have contributed to this retention rate. A significant increase in follow up among individuals offering phone numbers compared to those without phones (82% vs. 65%, p=0.04) suggests that "check-in" phone calls at the 3-month time point also contributed. Other telemedicine-like interventions may have a beneficial role in long-term diabetes management in this setting.
- Though limited by sample size, our results suggest that medical STMM's may have a meaningful clinical impact when utilizing a systematic combination of education, medical therapy, clearly documented medication instructions, and regularly scheduled missions.



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