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Implementation and Evaluation of a Recurring Interdisciplinary Community Health Fair in a Remote U.S.–Mexico Border Community

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ABSTRACT

The purpose of this project was to design, implement, and assess a recurring interdisciplinary community health fair in an underserved border town. University of California San Diego (UCSD) medical and pharmacy students, under faculty supervision, worked alongside community partners in Calexico, California to implement a health fair two miles from the US-Mexico border. Demographic and screening data were described from 293 participants from 2014-2016. Over 90% (269/293) listed Mexico as their country of birth, 82.9% (243/293) were monolingual Spanish speakers, 75.4% (221/293) had an annual household income of ≤$20,000, and 58.7% (172/293) described their health as fair or poor. Screening revealed 91.1% (265/291) were overweight or obese, 37.8% (109/288) had hypertension, 9.3% (27/289) had elevated blood sugar, and 11.4% (33/289) had elevated total cholesterol levels. This model could be replicated in other training settings to increase exposure to border health issues and connect patients to local health services.

INTRODUCTION

Community-based health fairs can be used as outreach projects for education and screening

purposes to help fill an unmet medical need (1-4). This is particularly true in underserved areas

where many are uninsured and less likely to seek routine health screenings. Academic-

community partnerships can be utilized to reach those who may otherwise not access health

care and connect them to local resources, while simultaneously providing educational

experiences in underserved medicine (5-7). Calexico is part of the Imperial County, which sits

on the border of California and Mexico, roughly 120 miles East of San Diego (8). The United

States Census Bureau estimated that the population in Calexico included 39,601 people with

97.2% of them self-identifying as Hispanic or Latino (9). From 2011 to 2015, the median

household income was $34,742, as compared to $61,818 in California, and 27.4% of the

population in Calexico qualified as living below the federal poverty level (9,10). Imperial County

has some of the lowest levels of education in adults nationwide with only 13.7% of its population

age 25 years or over having a bachelor's degree or higher (10,11).

Latinos and immigrants experience significant cultural and linguistic barriers that decrease their

access and utilization of health care services and therefore may benefit from community health

fairs that include outreach, screening, health education, and referrals to local community health

centers and government-based programs (1,12,13). Community-based health screenings may

help address unmet medical needs by providing preventive services free of charge (1). Even

with the implementation of the Affordable Care Act, 3.1 to 4 million Californians were predicted

to remain uninsured, with Latinos particularly at risk (14). Nearly two-thirds of the remaining

uninsured Californians were predicted to be Latino, with 62% of California's remaining

uninsured residing in Southern California counties (14). Calexico is an immigrant border town in

Southern California with a large undocumented population that is not eligible for full access to

care under the Affordable Care Act. It is unclear what direction current and future health care policies will take.

The University of California San Diego (UCSD) School of Medicine (SOM) had various service-learning programs addressing border health, but none that served remote border towns. The goal of this project was to engage UCSD medical students, pharmacy students, residents, and faculty in collaboration with Calexico community partners to design, implement, and assess a recurring community health fair. We sought to educate students and faculty about the health needs of this region, to serve those who may not otherwise access care, and to connect health fair participants to local resources.

METHODS

From 2013-2014, we reached out to local community health centers, social resources, business owners, and teachers to identify the needs and resources of the community in Calexico. We sought to target low-income populations who may have limited access to health care. After considering various locations, we identified a local swap meet, two miles from the U.S.-Mexico border, as the ideal location for a health fair. We worked alongside the local community clinic, Clinicas de Salud del Pueblo, to provide participants who require follow-up after the health fair with an appointment at their local clinic site. Additional organizations include Covered California, Every Woman Counts, Calexico Unified School District, and other community-based services that help sponsor or provide representatives on site. Volunteers consisted of physicians, planning committee members, medical students, pharmacy students, local organization representatives, high school students, and other non-medical volunteers.

Annual health fairs began in 2014 and were open to the public at no cost. Advertisements were posted on social media, sent in mass emails to school district employees, and flyers were handed out at the event. A large banner was also posted at the swap meet entrance a few weeks prior to the event. On the day of the health fair, all individuals interested in participating in the health screenings were asked to complete an anonymous health registration form made available in Spanish or English. The registration form included items regarding demographics, health care access, education, employment, household income and size, birth country, and breast and cervical cancer screening. Bilingual health fair volunteers were available to assist with the completion of the forms upon request. High school students measured body mass index (BMI), medical students recorded blood pressure, blood sugar and total cholesterol levels (using a CardioChek® PA device), and pharmacy students provided influenza vaccinations and samples of over the counter medications. Participants were encouraged to be fasting, but were able to be screened regardless of fasting status, and counseled appropriately regarding different diagnostic criteria for fasting versus random (non-fasting) measurements. Faculty physicians reviewed all results with participants and provided appropriate counseling and referrals.

BMI was categorized according to the World Health Organization (WHO) standards with overweight status defined as BMI $\geq$ 25 to 29.9 and obese as BMI $\geq$30 (15). Pre-hypertension was defined as systolic 120 to 139 mmHg or diastolic 80 to 89 mmHg, stage 1 hypertension as systolic 140 to 159 mmHg or diastolic 90 to 99 mmHg, and stage 2 hypertension as systolic $\geq$ 160 mmHg or diastolic $\geq$100 mmHg (16). A desirable total cholesterol level was defined as <200 mg/dL, borderline high as 200-239 mg/dL, and high total cholesterol as $\geq$240 mg/dL (17). Glucose was considered within the normal range if under 100mg/dL. Participants with fasting plasma glucose of $\geq$126 mg/dL or random blood plasma glucose of $\geq$200 mg/dL with classic symptoms of hyperglycemia were counseled that they met screening criteria for diabetes and

needed further evaluation by a clinician in a traditional health care setting (18). Those with

indeterminate blood glucose measurements (fasting or non-fasting) were considered at risk for

diabetes. Faculty physicians referred attendees with any potential health issues to make

appointments with the local community health centers for full evaluation. The health center

representatives were present at the health fairs to make appointments on-site.

For the purposes of this study, we calculated the total number of people who attended the

health fairs from 2014-2016. For categorical variables, we determined the number and percent

in each category. For continuous variables, we calculated the mean and standard deviation.

Any participant who attended the health fair and turned in a registration form was included in the

study. Exclusion criteria included those under 18 years of age. Missing data was excluded

from analysis and the denominator of respondents was decreased accordingly.

During 2017, we created a survey to assess the educational value of the health fair for

volunteers. The initial survey instrument was created with expert input, pilot tested, and revised.

The final survey instrument had eight five-point likert-scale items and two open-ended

questions. These paper survey forms were distributed on-site immediately after the health fair

to medical students, pharmacy students, and volunteers older than 18 years of age. Surveys

were returned the same day to student leaders for summary and evaluation. Mean and

standard deviations were calculated for the likert-scale items and open-ended results were

examined for recurring themes. All calculations were done using Microsoft Excel (2011). This

study was reviewed by the UCSD Internal Review Board and found to be exempt.

RESULTS

Health fair participants

A total of 312 people checked in to the health fairs from 2014-2016. Health screening forms were returned by 293 (93.9%) participants. Sociodemographics provided in Table 1 show that the average age was 53.8 (13.0) years old. For participants who reported gender, 57.9% (168/290) were female and 42.1% (122/290) were male. Nearly thee-quarters (75.4%; 221/293) of participants earned an income of $20,000 or less, and 73.7% (213/289) completed 12 years of education or less. The median number of years in school was 10 years. Nearly half (47.6%; 139/292) were unemployed, 35.6% (104/292) of participants worked full-time, and 39.6% (116/293) were uninsured. Table 1 shows that 91.8% of participants (269/293) were born in Mexico and 7.2% (21/293) were born in the U.S. The majority (82.9%; 243/293) were monolingual Spanish speakers.

Only 4.1% (12/293) perceived their health to be excellent, 37.2% (109/293) stated their health was good, and the majority (54.9%; 161/293) perceived their health to be fair. Table 2 lists the barriers to health care identified by participants. Lack of insurance was the most common barrier (26.3%; 77/293), followed by lack of money (24.9%; 73/293), and then lack of time (22.5%; 66/293). Based on screening results, 91.1% (265/291) were overweight or obese, including 34.0% (99/291) who were overweight and 57.0% (166/291) who were obese. Hypertension was recorded in 37.8%(109/288) of participants. More than half (52.9%; 153/289) had a blood glucose of < 100mg/dL, and 9.3% (27/289) met initial diagnostic criteria for diabetes (fasting glucose ≥126 or random glucose ≥200 mg/dL), and 11.4% (33/289) had elevated total cholesterol levels (≥ 240 mg/dL).

Health fair volunteers

A total of 16 volunteers returned the survey instrument designed to assess the educational value of participation in the health fair. Refer to table 3 for results. All participants strongly agreed that that their participation in the health fair was a valuable educational experience

(mean= 5.0, SD= 0.0) and felt they were serving a population in need (mean= 5.0, SD= 0.0).

Seven participants (43.8%) recorded open-ended responses to the most valuable aspects of the

health fair and areas identified included service (42.9%; 3/7), patient exposure (28.6%; 2/7), and

opportunities to practice Spanish (14.3%; 1/7). Four (25.0%) volunteers recorded areas in need

of improvement. The most common was the need for more interpreters in the pharmacy station

(50%; 2/4).

DISCUSSION

The Calexico Border Health Fair was successfully implemented and sustained through

university and community collaboration, reached its intended audience, and students felt that it

was a valuable educational experience. Although based in the United States, over 90% of

health fair participants were born in Mexico and most were monolingual Spanish speakers.

Health fair attendees had low educational attainment, were low-income, and often unemployed

or underemployed.

More than half of participants perceived their health to be fair or poor. Self-report of fair health

has a significantly increased risk of death compared with respondents reporting good health

(19,20). This is consistent with findings that suggest lower income and social status are often

linked to worse health, and lower education is also linked to poor health, higher stress, and

lower self-confidence (21). Based on health screening results, over 90% of our participants are

overweight (BMI ≥25) or obese, and more than half are obese. It is well known that elevated

BMI increases the risks for coronary heart disease, strokes, hypertension and type 2 diabetes

mellitus (22). Obesity is associated with an increase risk of morbidity and mortality and reduced

life expectancy (22). Over a quarter of the participants were hypertensive and approximately

10% met initial screening criteria for diabetes (though these measurements need to be verified

in a traditional health care setting). Elevated total cholesterol was also found in approximately 1 in 10 participants and warranted further evaluation of a fasting lipid panel in other settings. The students and faculty members volunteering in the health fairs spent a significant amount of time educating participants and helping them set reasonable self-management goals, which have been shown to result in improvements in health outcomes (23, 24).

Over one-third of health fair participants in Calexico were uninsured. This can be due to several factors including documentation status, which we did not ask due to the sensitive nature of this subject. Persons without appropriate documentation for U.S. residency do not qualify for insurance under the ACA. Many health fair participants lived in Mexico and cross into the United States for work then returned home. Similarly, of the six barriers to health care listed on the questionnaire, the most commonly reported barrier was lack of insurance, followed by lack of money, and then lack of time. This indicates that more needs to be done to disseminate information on health care options, education on low-cost sliding scale services available at community health centers, the services they can provide for free, and information on low or no-cost health insurance for those who are eligible. Majority of our participants were monolingual Spanish speakers and read in Spanish only, which highlights the importance of having resources in Spanish and staffing personnel who have an adequate grasp of the Spanish language to provide the best care for this patient population.

The majority of participants reported they knew about the health fair through Santo Tomas Swap Meet, either through the banner at the entrance, volunteers who walked around the swap meet promoting the event, or walking by the event site. This suggests that the most effective way we were able to reach the target population was not through social media or other avenues, but with on-site visual publicity. Additional possible avenues to pursue in the future could

include advertising through the radio or television to reach a wider audience, including those with limited literacy.

Many factors affect the health of individuals and their communities. Given the poverty and low education levels in the Latino documented and undocumented populations in Calexico, there is a need for health outreach programs to provide education, awareness, basic health screenings, and to connect people in the community with low cost health services in the city. Implementing this health fair education and screening model has familiarized medical professionals including students from UCSD SOM and Skaggs School of Pharmacy with Calexico, a city where medical students, pharmacy students, and residents did not previously have an established community service program.

Medical students, pharmacy students, and community volunteers felt that their participation at the event was a valuable educational experience. They unanimously agreed that they felt they were serving a population in need and would recommend this health fair as a volunteering opportunity to others. Health fairs like these provide medical professionals with opportunities to practice their clinical skills and engage those who are learning Spanish as a foreign language. The majority felt that their awareness of border health and rural health increased as a result of these health fairs, and they felt they have become more familiar with community-based resources for the underserved.

Limitations

Several limitations exist in this study that warrant further consideration. First, our sample size is small and is not representative of the entire Latino population or all the border communities in the U.S. Second, demographic data was self-reported by participants, which introduces response bias. Point-of-care finger blood tests are somewhat variable and can be particularly

inconclusive in non-fasting individuals. In addition, total cholesterol does not provide a complete assessment of cardiovascular risk. However all participants with indeterminate results were asked to follow up with a health care provider for fasting blood work. Finally, we do not have follow-up data on health fair participants who were referred to local community health centers to determine how many were seen by a local medical provider as recommended. Therefore, it is hard to ascertain the success of the health fair as an entry point for long-term, regular care. In assessing the educational impact on volunteers, only data from 2017 was gathered and may not reflect the feedback from previous health fairs.

Future direction

We have partnered with faculty physicians and medical students from UCSD SOM's Border Health Project, who have agreed to incorporate Calexico, CA as an ongoing site for their program. It will continue to involve physicians, medical students, pharmacy students, undergraduate students, volunteer interpreters, and community volunteers in a model similar to that implemented and proven to be sustainable by the Border Health Project. There is a need to obtain feedback from health fair participants and modify services accordingly. In addition, future directions could include increased frequency of local health fairs.

Pipeline programs are recognized as effective strategies to increase diversity and address shortages in the healthcare workforce, including those in rural communities (25-27). Calexico High School students worked in collaboration with university undergraduates, medical students, and pharmacy students. There may be an opportunity to further develop the mentor relationship between local Imperial Valley high schools and the UCSD School of Medicine. Recognizing the need for primary healthcare in the Imperial Valley, progress is being made in collaboration with the Scripps Family Medicine Residency program to have a Family Medicine residency elective in the Imperial Valley at the Pioneers Memorial Hospital in Brawley, California and at the

Pioneers Rural Health Clinic in Calexico, California. We hope this will continue to provide a connection for faculty and resident physicians to regularly come to the Imperial Valley.

CONCLUSION

UCSD medical students, pharmacy students, residents, and faculty supervisors were able to successfully collaborate with community partners to implement a recurring screening and educational health fair in a city roughly 120 miles away on the US-Mexico border. Trainees found this to be a valuable learning experience. We would encourage other medical, pharmacy, and interdisciplinary health professional training programs to consider expanding border health training experiences by including health fairs as part of larger border health and underserved medicine education.

ACKNOWLEDGEMENTS

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TABLE 1: Demographics of health fair participants in Calexico, California from 2014-2016.

Variable	mean (SD)
Age (years), N=290	53.8 (13.0)
Variable	**n (%)**
Gender, N=290	
Female	168 (57.9)
Male	122 (42.1)
Annual household income, N=293	
<$20,000	221 (75.4)
$20,001-$30,000	27 (9.2)
$30,001-$40,000	13 (4.4)
$40,001+	32 (10.9)
Employment, N=292	
Unemployed	139 (47.6)
Part-time	49 (16.8)
Full-time	104 (35.6)
Formal education, N=289	
HS or less (≤12 years)	213 (73.7)
More than HS (>12 years)	76 (26.3)
Country of Origin, N=293	
Mexico	269 (91.8)
US	21 (7.2)
Other	3 (1.0)
Language spoken at home, N=293	
Spanish only	243 (82.9)
Spanish more than English	29 (9.9)
Spanish and English equally	15 (5.1)
English more than Spanish	4 (1.4)
English only	2 (0.7)
Language they can read, N=292	
Spanish only	243 (83.2)
English only	3 (1.0)
Spanish and English equally	40 (13.7)
Other	1 (0.3)
None	5 (1.7)

TABLE 2: Screening results and barriers to health care identified by health fair participants in Calexico, California from 2014-2016.

Variable	n (%)
Lack insurance, N= 293	116 (39.6)
Health perception, N= 293	
Excellent	12 (4.1)
Good	109 (37.2)
Fair	161 (54.9)
Poor	11 (3.8)
Barriers to healthcare access, N=293	
Lack of insurance	77 (26.3)
Lack of money	73 (24.9)
Lack of transportation	13 (4.4)
Language barrier	13 (4.4)
Lack of available appointments	33 (11.3)
Lack of time	66 (22.5)
Other	18 (6.1)
Body Mass Index, N=291	
Normal (BMI<25)	26 (8.9)
Overweight (BMI≥25-29.9)	99 (34.0)
Obese (BMI≥30)	166 (57.0)
Blood pressure, N=288	
Pre-hypertensive	125 (43.4)
Stage I hypertension	85 (29.5)
Stage II hypertension	24 (8.3)
Blood sugar, N=289	
Fasting <100 (normal)	73 (25.3)
Fasting 100-125 (risk of diabetes)	28 (9.7)
Fasting ≥126 (high)	14 (4.8)
Non-fasting <100 (normal)	80 (27.7)
Non-fasting 100-200 (inconclusive)	81 (28.0)
Non-fasting ≥200 (high)	13 (4.5)
Total cholesterol, N=289	
<200 (desirable)	188 (65.1)
200-239 (borderline high)	68 (23.5)
≥240 (high)	33 (11.4)

TABLE 3: Mean values (SD) and percentages based on five-point Likert scale items to assess educational value amongst volunteers in 2017

Item	mean (SD)	% Agree or strongly agree
Participation in the Calexico Border Health Fair was a valuable educational experience	5.0 (0)	100
There was adequate supervision of students during the health fair	4.8 (0.40)	100
Participation in the event helped me become more familiar with community-based resources for the underserved	4.8 (0.40)	100
This health fair increased my awareness of border health	4.9 (0.25)	100
This health fair increased my awareness of rural health	4.9 (0.34)	100
I felt I was serving a population in need	5 (0)	100
I felt my participation made a difference in this community	4.7 (0.70)	88
I would recommend this health fair to others as a volunteering opportunity	5.0 (0)	100