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Research Article

Development and Implementation of a Pharmacist-led, Community Engaged, Health Screening Program in an Underserved Urban Neighborhood

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ABSTRACT

Background: Health care disparities continue to exist in Milwaukee, Wisconsin, with underserved groups experiencing a higher incidence of cardiovascular disease, other chronic comorbidities, and associated risk factors. Pharmacists have the training and ability to perform physical assessment, conduct screening tests, and educate patients on the prevention and treatment of many disease states. The objective of the study was to develop a pharmacist-led, community-based health screening service to address health disparities through academic-community partnerships.

Methods: A community engagement research approach was used to partner with the target communities, determine leading chronic diseases, and develop health screening and preventive services that would most benefit the community based on the community identified healthcare needs. Operational testing of the health screening services was conducted to refine the screening workflow, train students and faculty to ensure efficient delivery of the services.

Results: Collaborations were developed with longstanding local community service organizations to strengthen and leverage resources within the study area. A point-of-care community health screening program for obesity, diabetes, hypercholesterolemia, and high blood pressure was established and launched in the target community. The services continue to be provided in the community by pharmacists and pharmacy students from the School of Pharmacy.
Conclusion: A community-based research approach was successfully used to develop and implement a pharmacist-led community health screening service intended to address health care disparities in an underserved community. This paper will describe the community-based research approach to the development and implementation of this service intended to address health care disparities.

Keywords: Community health screening; Community engagement; Development; Implementation; Socioeconomic determinants of health; Underserved population; Health care access

Abbrevations: CVD: Cardio Vascular Disease; US: United States; SDOH: Social Determinants of Health; HRSA: Health Research and Services Administration; SES: Socioeconomic Status; MCWSOP: Medical College of Wisconsin School of Pharmacy; IRB: Institutional Review Board; NDF: Next Door Foundation; IPPE: Introductory Pharmacy Practice Experiences; APPEs: Advanced Pharmacy Practice Experiences

INTRODUCTION

Hypertension and diabetes are well-documented major risk factors for Cardio Vascular Disease (CVD), a leading cause of morbidity and mortality in the United States (US) and in the state of Wisconsin [1-4]. Approximately 655,000 Americans die every year from CVD, representing 1 out of every 4 deaths in the US and 1 in 5 (11,680 deaths/year) in Wisconsin [5]. Although there is an overall decline of CVD mortality in the US and in the state of Wisconsin over the last two decades, racial/ethnic disparities in the incidence of CVD morbidity and mortality have persisted in Milwaukee County, Wisconsin [6,5]. The CVD incidence and mortality (henceforth referred to as outcomes) disparities seen in the city of Milwaukee, Milwaukee County correlate with

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geographical patterns characterized by economically disadvantaged groups of racial/ethnic minorities that are medically underserved both in urban and rural communities in the US [7,5]. The Health Research and Services Administration (HRSA) defines medically underserved areas as having too few primary care providers, high infant mortality, high poverty or a high elderly population [8,9]. Similarly, these communities have a predominance of adverse Social Determinants of Health (SDOH) including racial/ethnic segregation, income inequality, high unemployment, food insecurity, limited access to healthy food choices, health care, affordable housing, educational opportunities, and persistence of poor neighborhood conditions and physical environment [10,7]. These communities are also faced with significant inequalities driven by behavioral risk factors including lack of healthy food choices, smoking, obesity, and physical inactivity [7]. The city of Milwaukee, Wisconsin, has well documented evidence of racial/ethnic CVD outcomes disparities that are attributable to high prevalence of adverse SDOH, consistent with observations among similar underserved communities in the U.S [8,9,11-15]. Despite overwhelming evidence of higher CVD comorbidity and mortality burden among African Americans and other racial/ethnic minorities in the US, there are limited published studies that have examined the impact of community engagement programs on sustaining long-term health access and healthful behaviors aimed at reducing CVD outcomes disparities in this population [12-15].

Milwaukee is one of the forty-eight of Wisconsin's 72 counties that are designated as medically underserved by HRSA and the Wisconsin Department of Health Services [16,8,9]. According to the Robert Wood Johnson Foundation (RWJF), Milwaukee County is ranked last in health outcomes and second to last in quality-of-life indicators out of the 72 counties in Wisconsin [17,16]. Despite the overall decline in CVD and stroke mortality in Wisconsin, CVD outcomes disparities by race/ethnicity have persisted in Milwaukee, particularly for premature deaths, defined as those which occur before age 75 [3,16,17]. Published studies show that the CVD outcomes disparities in the city of Milwaukee are associated with a high prevalence of adverse Socioeconomic Determinants of Health (SDOH) consistent with what is seen in other geographical areas in the US with underserved populations [7,15]. Specifically, racial segregation, poverty, limited access to quality and affordable care, poor housing, lower educational achievement, and food insecurity are more prevalent in a cluster of racial/ethnic communities in the city. We defined SDOH as "the conditions in which people are born, grow, live, work and age" and are "the fundamental drivers of these conditions which can influence health-related behaviors and health outcomes" [18-22]. More importantly for this study is the evidence from published literature which indicates that SDOH can be significantly influenced by social policies and shape the health of communities in a powerful way [20]. For example, the 2013-2017 Brookings report concluded that Milwaukee is by far the most racially segregated city in the US [21]. The city's racial/ethnic minorities experience both historical and persistent residential segregation into geographical regions (postal codes) in the city that are characterized by low- to medium-low Socioeconomic Status (SES) [20-23,15]. These racial/ethnic geospatial and residential inequities have been shown in literature as the most robust and well-documented proportionate relationships between socioeconomic factors and poor health outcomes [7,15].

This study aimed to identify Milwaukee postal codes that were overrepresented by low SES racial/ethnic minorities with adverse SODH and to determine the impact of a pharmacist-led community health screening program on improving access to health care, reduction of adverse SDOH and associated risk factors among the underserved target population using community engagement strategies.

The study is supported by the Medical College of Wisconsin School of Pharmacy (MCWSOP) working in partnership with longstanding community service organizations in Milwaukee. The study ties into the vision of the MCWSOP: "to advance the health of local communities through innovative pharmacy education, continuous public and professional service, and diverse scholarly collaborations" [24,25]. MCWSOP offers an innovative, 3-year Doctor of Pharmacy curriculum and matriculated its first class in 2017. MCWSOP aims to graduate pharmacists who are key health service providers of preventative care, and increasing accessibility in the community to wellness screenings, immunizations, and other health services [25]. With community service as a specific tenet of its mission, the School believes in the fundamental importance of immersing faculty and students in local communities, especially areas in which community members lack access to healthcare due to location, transportation, and other socioeconomic disparities. To implement this project, MCWSOP developed a Community Health and Service-Learning Program to bring students and faculty together with community members in need of greater access to healthcare. This manuscript describes the development and implementation of a community health screening program and lessons learned over an 18-month period of ongoing community engagement activities.

MATERIALS AND METHODS

This is a prospective community engagement project using the Socioecological Model (SEM) as the conceptual framework for program design and implementation, as well as the scientific study that is based on data gathered during the implementation phase [26,27]. The nested nature of the SEM's components (individual, interpersonal, community, organizational, and public policy) allows for understanding the various and often interacting determinants of health behaviors as well as community engagement during the process of creating and implementing health programs by systematically targeting the social factors that impact the health of a target population [26-28]. After obtaining Institutional Review Board (IRB) approval to conduct a human subjects study, multiple state- and county-level secondary data sources were analyzed to identify low-to-medium socioeconomic status (SES) regions within the city of Milwaukee that were medically underserved and whose residents would most likely benefit from access to a community-based health screening program. A multidisciplinary work group (MWG) was constituted from community members, health navigators, health providers/educators, key business and faith leaders, community service organization administrators/staff, institutional leaders, researchers, and clinicians engaged in outreach programs within the target community to help provide guidance necessary in the design, implementation, and evaluation of the study. Members of the MWG met regularly with the authors and collectively shared their experiences and expertise gained from working within the target community. The MWG also introduced and facilitated initial meetings and conversations between the project team, community members, leaders, administrators, or representatives of potential partners that were already engaged in providing services in the community. This collaborative effort

helped cultivate and strengthen the community engagement research strategy in systematically identifying, incorporating, and leveraging community interests, resources, and priorities in the design and implementation of the proposed community health screening program and ultimate dissemination of the study findings.

The authors visited the targeted Milwaukee neighborhoods and conducted Community Engagement (CE) activities over a 9-month period. The purpose of these CE activities was to learn more about the community, identify potential community partners, build community-academic partnerships, and assess the feasibility of implementing the proposed program. To facilitate CE activities informal and formal one-on-one "meet and greet" discussions and small-group community listening sessions were conducted in the community. After the initial meet and greet sessions the participants drawn from community members, representatives of community-based organizations, and community navigators were invited to formal meetings and community listening sessions to discuss on potential partnerships and mutual interest in the proposed project. Additionally, during the all the CE activities (meet and greets, community listening sessions), participants were also asked to voluntarily complete a three-question survey consisting of the following: (a) What health-related issues is your community experiencing? (b) How have people in your community gone about addressing these health issues? And (c) Which of the health issues is the most important? To reach a larger audience, on-going or planned community events were identified, and the research team offered blood pressure screening at these events in conjunction with administering the 3-question survey. Information from the CE activities described above was analyzed to identify community needs. The findings were shared with the MWG for input and used to develop an evidence-based community health screening program tailored to the community-identified needs.

During the development of the health screening service the authors conducted formal meetings with a cross-section of potential partners including community members, representative from community services organizations, health providers, and businesses leaders to help tailor the service to the community identified needs. The Office of Community Engagement at the Medical College of Wisconsin (MCW) was also consulted to gain perspective on the MCW-affiliated community projects already completed or were ongoing in the target study Milwaukee neighborhoods. Telephone conversations were held with researchers at three Schools of Pharmacy to learn about their experiences in developing and providing community health services to underserved populations. The authors also conducted an on-site visit with one of them (Duquesne University School of Pharmacy) to learn first-hand from their experiences. A clinical affiliation agreement was established with Next Door Foundation (NDF), a local community service organization, with the target neighborhoods to serve as the primary community partner as well as the base of operations for the community health screening program. In addition, clinical affiliations agreements were established with other four local, low-cost health providers in the area for referral of clients in need of additional care post the health care screening. Additional two other local community service organizations, COA Youth and Metcalfe Park Community Bridges in the target zip codes have partnered with our program to jointly plan community services events and provide the health screening services offered by our program.

RESULTS

The analysis of multiple secondary data sources and community engagement activities identified four leading cardiovascular diseases (CVD) and chronic diseases including hypertension, hyperlipidemia, diabetes, and obesity. Several CVD risk factors such as physical inactivity, lack of health food choices, food insecurity, and mental illness were identified as a major concern in target underserved population. The SES regions described as “Low” are communities in Milwaukee were highly segregated racially and economically (69.5%-94.7% Black and 26.5%-47.5% below poverty level) See Table 1 below. These communities met the HRSA criteria for underserved area/populations (too few primary care providers and high poverty) and became the focus of the proposed study for four of the Milwaukee Zip codes to help address the high prevalence of CVD comorbidities, risk factors, and adverse SDOH. The 9-month community engagement efforts helped build trust in the community and partnership with several longstanding community service organizations and have greatly enhanced participant recruitment and retention for the study. The following table shows the community-based organizations, businesses, and health care providers that have partnered with the project to facilitate the implementation of the health screening program (Table 1).

Table 1: Community partners.

Community organizations	Community businesses	Free/low-cost health care providers
Area Health Education Center System (AHEC)	Cream City Foundation	*Ascension Family Health Center
City on a Hill	Fondy Food Market	*Bread of Healing Free Clinic
*COA Youth and Family Centers	Hayat Pharmacy	Gerald Ignace Community Health Center
Express Yourself	*Next Door Foundation	Outreach Community Health Centers
*Free & Charitable Clinic Collaborative	Shawn d’ Barber Shop	16th Street Clinic for the Uninsured
*Metcalfe Park Community Bridges	Y Eat Right	*Progressive Community Health Center
The Middle Ground MKE		*MCW Saturday Clinic for the Uninsured
Milwaukee public health department		Children’s Wisconsin
*Safe and Sound		
Wisconsin, Department of Health Services		

The Milwaukee SES Groups are adapted from Greer et al. Milwaukee Health Report 2013. And the Selected Milwaukee SES zip codes were developed from the analysis of the 2020 US Census data for comparison (Table 2). Next Door Foundation (NDF), a well-established early childhood education center in the target neighborhood, entered in a clinical affiliation agreement with the MCW to provide facility space to establish the office suite for the health screening services and practice site for training pharmacy students and clinical faculty. NDF also provided additional space for conducting ongoing community engagement, participant recruitment, health promotion, and education activities. Four

low-cost or free clinics were recruited to act as referral clinics for participants who needed additional care after health screening.

Student involvement

The MCW School of Pharmacy offers an accelerated, year-round, 3-year Doctor of Pharmacy curriculum consisting of eight 10-week quarters. Pharmacy students participated in this project through clinical rotations in the second and third years of their study program. Introductory Pharmacy Practice Experiences (IPPE) takes place all day each Friday throughout the first two years. The third year is entirely comprised of 10 months of full-time rotations termed Advanced Pharmacy Practice Experiences (APPEs). The students on rotation were trained and integrated into the screening services team. They performed point-of-care testing, counseled, and educated clients, attended working meetings, and participated in community health events hosted by community partners under direct supervision of faculty.

Students who participated in the project required minimal training and orientation to the screening services as they had already completed academic coursework that equipped them with the knowledge, skills, and abilities necessary to perform the screenings during the IPPE and APPE rotations. The following table details both academic preparation and the training students undergo during the rotation to ensure quality care is provided. All screenings performed by students were completed under the supervision of a faculty member who is a licensed pharmacist (Table 3).

Service development and implementation

As indicated above, analysis of the data from the community listening sessions and surveys enabled the authors to determine the screening services to be offered the individual study participants. For each screening, training, quality control, and clinical protocols were developed using national evidence-based guidelines [29-35]. These are outlined in the following table. The medical director for the project reviewed and approved all protocols. A Clinical Laboratory Improvement Amendments (CLIA) Certificate of Waiver was obtained from the Wisconsin Department of Health Services in order to conduct CLIA-waived point-of-care tests within the scope of practice by MCW faculty pharmacists and students. All client encounter information was documented in a web-based, HIPAA-compliant, pharmacy-oriented documentation systems (StrandRx, Omnisys, Dallas, TX). Marketing and promotion materials for the screening service were developed and disseminated to the community through several methods, including distribution of fliers to employees and clients of Next Door and at local community or neighborhood events (Table 4).

Table 2: SDOH Rates for Milwaukee SES Groups vs. State and US Level.

Characteristics	Milwaukee SES groups			WI	U.S.	Selected Milwaukee low SES postal codes			
	Lower	Middle	Higher			53205	53206	53210	53216
Population	3,20,585	2,94,292	2,02,078	56,86,986	30,87,45,536	10,050	28,210	28,126	32,264
Age (years)									
Median (years)	28.1	36.7	36.3	38.5	37.8	28	30.7	28.8	35.2
Gender (%)									
Male	48.4	47.8	48	49.6	49.2	42.4	46.1	46	44.5
Female	51.6	52.2	52	50.4	50.8	57.6	53.9	54	55.5
Race									
White	30.9	67.3	79.6	86.2	72.4	5	1.6	18.8	11.1
Black	29.7	22.2	12.7	12.7	12.6	84.5	98	75	81.6
Poverty (FPL) (100%)	17.5	38.1	44.44	10.8	13.5	44.6	42.2	30.2	27
Education									
Than high school	30.9	15.6	7.6	12.9	17.1	24.7	38.1	26.3	29.7
High school	29.7	33.7	18.4	33.5	27.7	33.7	30.9	43	38.5
Some college	20.9	24.4	20.6	21.9	22.5	25.7	29	23.3	24.6
Assoc. degree	5.1	6.8	5.9	7.7	6.5	7.6	9.7	7.4	9.7
College	9.1	13.6	29.5	16.4	16.8	6.6	11.4	12.6	11.4
Graduate	4.2	5.7	18.1	7.6	9.4	3.1	6.3	7.4	6.3
Ave household size	2.7	2.3	2.1	2.2	2.4	2.76	2.96	2.71	2.66
Housing occupied by renters (%)	61.7	44.8	46.4	31.9	34.9	71.1	64.3	58.6	62.2
Household income $)									
Median	29,066	45,405	55,935	52,048	49,566	23,125	22,141	34,516	34,516
Mean	38,356	53,836	74,836	64,034	66816,	32,457	32,074	47,018	47,018
No health insurance coverage (%)	27.61	-	10.62	6.5	5.7	9.3	11	8.2	9.8
Unemployment rate (%)	-	-		4.7	4.1	21.2	20.8	13.1	11.9

Table 3: MCWSOP student academic preparation for health screening services.

Academic preparation before IPPE rotation	Orientation/training during IPPE/APPE rotation
Therapeutics/pharmacology modules in diabetes, hypertension, hyperlipidemia, and other primary care areas	Review of national consensus guidelines for diabetes, hypertension, and hyperlipidemia
Communication skills: Motivational interviewing, patient counseling, patient education	Clinical screening protocols
Physical assessment including vital signs (Blood pressure, pulse, respiratory rate, eye, and foot exam	Training and verification of point-of-care testing and physical assessment skills
Point of care testing: blood glucose, lipids, infectious disease	Introduction to principles of community engagement and community-based participatory research

Table 4 : Selected community health screening protocols developed.

Disease	Point of care/CLIA waived	Clinical goals for adults >18 years old	Threshold for referral	Guideline used
Hypertension	POCT	BP<130/80 mmHg	**>130/80 mmHg ASCVD risk >10%**	ACC/AHA 2019
			<90/60 mmHg	
Hyperlipidemia	CLIA-waived	ASCVD<7.5% LDL<70 TC>200 HDL>40 males HDL>50 Females	ASCVD>7.5% Clinical ASCVD	ACC/AHA 2018
Diabetes	CLIA-waived	FPG 80-130 mg/dL PPG <180 mg/dL 2-hours	<70 mm/dL >130 mg/dL FPG >200 mg/dl PPG	ADA 2019
Obesity	POCT	BMI 18.5-24.5	>29	ACC/AHA 2018

Abbreviations: ACC/AHA: American College of Cardiology/American Heart Association Guidelines; ADA: American Diabetes Association guidelines.

The community health screening services were launched in March 2019. Operational testing and post-encounter participant surveys were conducted to assess operational readiness and client satisfaction of the screening service. Participant data was collected with every screening encounter and aggregated every 3 months. All data collected from the study were analyzed using descriptive statistics by Microsoft 365 Excel software (Microsoft Corporation, Inc., 2019).

Participant recruitment and retention

The community health screening services were launched under the marketing name of MCW Neighborhood Partners (MCWNP) at Next Door Foundation in March 2019. Initial operational testing of the health screening service and participant satisfaction surveys were conducted to assess the program readiness and opportunities for continuous quality improvement. Between March and December 2019, MCWNP provided health screening services on 35 different dates (29 Fridays and 6 joint community events). During these service dates, contact was made with 298 members of the community. Of these, 157 unique participants had at least one screening service performed. A total of 214 screening visits (including either screening at the Next-Door Foundation office or at a community event) occurred during this time. Non-participants were tallied starting in July 2019. These included community members who came to an event or recruiting table, contacted the study team, but did not choose to receive services.

DISCUSSION

The analysis of multiple secondary data sources and community engagement activities showed an intersection between significant CVD outcomes disparities and the concentration of poverty and racial/ethnic segregation among underserved African American communities in four low socioeconomic zip codes in Milwaukee. This finding concurs with one of the most robust and well-documented proportionate relationship between socioeconomic factors and poor health outcomes in the scientific literature and formed the impetus and significance of our study and its potential contribution to scientific knowledge [20-22]. Furthermore, the analysis of secondary data and community engagement activities concurred with previous findings by The Center for Urban Population Health and partner organizations published in the Milwaukee Health Report since 2009 [35]. The study stratified Thirty-five Milwaukee postal codes into five groups (low, medium low, medium, medium high and high) based on the Social Economic Status (SES) index [15,35]. The SES index combines two equally weighted components reported by individuals living within a postal code: medium income and percentage of people with a bachelor's degree [15]. The SES index has shown that individual SES and neighborhood conditions associated with poverty concentration are predictive of health outcomes in Milwaukee County [15,35]. The SES regions described as "Low" are communities in Milwaukee that are often highly segregated racially and economically (69.5%-94.7% Black and 26.5%-47.5% below poverty level) and met the HRSA criteria for underserved area/populations and became the focus of the proposed study for four of the Milwaukee Zip codes because of higher prevalence of CVD comorbidities, risk factors and adverse SDOH [16,36]. According to the 2013 Milwaukee Health Report, residents in low-SES regions in Milwaukee reported worse outcomes in 22 out of 36 measures including life expectancy, premature deaths, infant mortality, tobacco use, immunization of those age 66 and above, living in a house built before 1984, lead poisoning, and prevalence of non-healthy food outlets compared to the rest of Wisconsin and the US [16]. The four target low SES zip codes were characterized by a large proportion (69.0% to 94.6%) of racial/ethnic minorities with (i) low socioeconomic status; (ii) food insecurity and limited access to healthy food choices, (iii) minimal

or no access to lifestyle intervention programs, and (iv) limited access to high quality medical care, or not seeking usual medical care for a period over 2 years. These factors make populations in these low-SES postal codes the most vulnerable communities in the state of Wisconsin [15-17]. The four target postal codes are also in an area considered pharmacy, clinic and healthy food deserts after the closure or relocations without replacement of clinics, hospitals, pharmacies, and grocery stores in the course of the last two decades. Twelve to twenty eight percent of the adult patients under 65 years old residing in these postal codes are underinsured or uninsured minorities with limited or no access to medical care and are forced to seek primary, pharmacy or emergency care services elsewhere in the city [37,38].

Although Milwaukee has a robust network of free, low-cost, and safety-net clinics, most of these services are located outside of the target study area, making transportation a significant barrier to accessing care [38]. Overall, these details make the screening and referral services provided in this study critical upstream measures to counter the combined effects of low SES difficulties in accessing health care services among the medically underserved communities that were selected for the study [39-44].

CONCLUSION

Four leading cardiovascular diseases and chronic diseases including hypertension, hyperlipidemia, diabetes and obesity, and associated risk factors such as physical inactivity, lack of health food choices, food insecurity, and mental illness were identified as a major concern in target neighborhoods. Pertinent information obtained from the analysis of secondary data, community engagement activities and current practice guideline was used to develop and implement a culturally and linguistically appropriate community health screening program. Pharmacists can leverage expertise and experience in community engagement to design and implement evidence-based interventions aimed at impacting the health of underserved communities in ways other than traditional dispensing roles through health screening, education, and referral of clients to appropriate heath care networks. Over the next several years, long-term economic, humanistic, and clinical outcomes of the participants will be assessed.

AUTHOR CONTRIBUTIONS

Authorship must be limited to those who have contributed substantially to the work reported. For research articles with several authors, the following statements should be used "All authors have read and agreed to the published version of the manuscript". Conceptualization, and BB methodology, CC software, DD validation, AA BB and EE formal analysis, writing-original draft preparation.

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DECLARATION OF INTEREST

The authors report no declarations of interest. The authors alone were responsible for the writing and content of the paper.

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