JRMC Journal of Regional Medical Campuses

Student-Directed Community Cardiovascular Screening at a Regional Campus – Before and After a Pandemic

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DOI: https://doi.org/10.24926/jrmc.v8i1.6357
Journal of Regional Medical Campuses, Vol. *8*, Issue 1 (2025)

Published by University of Minnesota Libraries Publishing

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Student-Directed Community Cardiovascular Screening at a Regional Campus – Before and After a Pandemic

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Abstract

Introduction
The 2020 pandemic of coronavirus-19 (COVID) resulted in declaration of states of emergency, leading to mandatory lock downs. Healthcare entered an unprecedented time as all elective procedures, some routine office visits, and screening efforts stopped with only life-saving services available. This study compared community cardiovascular disease (CVD) screening results before and after the cessation of the screenings required by pandemic limitations.

Methods
Under the supervision of a regional dean, clinical medical students hosted CVD screenings in a rural Western Kentucky community at food banks, homeless shelters, and community resource fairs from 2017 through the present. Measurements included blood pressure and fingerstick total cholesterol and blood glucose. Abnormal results were followed up with an "on-the-spot" telehealth appointment or participants were referred to community health resources including the student-directed in-person free clinic. Measurements were compared pre- and post-COVID using chi-square.

Findings:
Both those with a previous diagnosis of hypertension and diabetes mellitus as well as the entire screened population showed a significant increase in frequency of CVD risk values post-COVID. Those with a previous diagnosis of hyperlipidemia showed no difference, but for the entire screened population, there was a significant 25% decrease in abnormal values for total cholesterol.

Conclusions
Post-COVID CV risk values were significantly increased in this screened population. As our health system continues to recover, these results further support the importance of careful community-wide planning before the next pandemic occurs.

Introduction

Health screenings aimed at risk factor identification for cardiovascular disease (CVD) provide an opportunity for intervention and prevention of CVD in rural communities. Medical students providing these services to communities allows a unique opportunity for serving rural populations.[1] The pandemic of Coronavirus-19 (COVID-19) infection that began in the Spring of 2020 led to an unprecedented era in healthcare as all elective and screening measures were stopped with only life-saving services being available. For many, this pandemic marked a transition from in person primary care visits to the utilization of telehealth as well as delayed medical encounters of all kinds.

A National Cancer Institute report focused on Community Health Centers and their role in screening and early diagnosis of colorectal cancer in poor or

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underinsured populations.[2] Following the stay-at-home mandate, patients reported avoiding or delaying their medical care. In turn, there was a decrease in patient visits, including for preventive care, during the pandemic due to hesitancy to leave home.[2] Individuals also shifted their priority from screenings and preventative care towards employment, housing, and food security and away from routine medical care and participation in screenings.[3,4] COVID-19 provided greater barriers to healthcare in underserved communities and lower income populations as telehealth became the main avenue for preventive care and chronic disease management. The shift to telehealth decreased screenings in lower income populations that resulted in delayed diagnosis and treatment.[4]

A 2023 study in England, Scotland, and Wales between April 2018 and July 2021 reported that during the COVID-19 pandemic, control of hypertension, hyperlipidemia, and diabetes mellitus worsened due to decreased screening and diagnosis leading to an overall greater risk of cardiovascular disease related events.[5] A 2023 report from England compared screenings for 6 categories in 2019 compared to 2020 to review the effect the pandemic had on preventative and chronic services. They found a decrease in screening for tobacco use from 85.8% to 83.4%, and a decrease of 81.5% to 79.4% for aspirin use for ischemic vascular disease suggesting the long term result might be an increase in CV disease.[5,6]

In this report, we compared community CVD screening results prior to their interruption in March 2020 with those begun again in February 2022. If poorer control of CVD risk factors including blood pressure (BP), total cholesterol, and blood sugar (BS) was found, this would be expected to be followed by an increase in CVD incidence in this underserved population. Our findings may provide perspective for planning strategies tailored to this population.

Methods

The regional medical campus is located in Western Kentucky in a town with a population of approximately 20,000.[1] Since 2017, third year and fourth year medical students at the regional campus have screened community members for CVD risk factors, including hypertension, fingerstick BS, and total cholesterol. A student-led free clinic had been established in 2004 to provide medical care in this community for those who are uninsured or underinsured and did not have an established primary care provider. Medical students, on a rotating basis, served as Clinic Directors and performed the screenings at local food banks, homeless shelters, county resource fairs, and the community YMCA. A screening station was set up where individuals were waiting in line to receive free goods or services unrelated to our screening. A community volunteer or medical student walked the line explaining the screening. The first step was a simple health risk assessment and was administered verbally if needed. The health risk assessment recorded past medical history of CVD illnesses or events, level of physical activity, quality of diet, tobacco product usage, health insurance coverage, and use of a primary care provider (PCP). A single finger stick measured total cholesterol and BS. BP was measured with an inexpensive oscillometric automatic machine. The students only provided lifestyle advice and not medical advice, but they did suggest if an appointment with the PCP sooner than planned might be advisable. If the participant did not have a PCP, the student explained how the student-directed free clinic worked and scheduled the patient to be seen if needed. The participants were given a card with their BP and test values. If needed and /or the participate agreed, an on-the-spot telehealth visit with the regional dean was conducted by the student.[7]

BP, total cholesterol, and BS measurements were compared pre-COVID-19 defined as before March 2020 and post COVID-19 defined as from February 2022 until August 2024 and significance of $p<.05$ was used with chi-square analysis. **Table One** describes the demographics of the screened persons.

Table 1: Demographics of Population Screened

Gender	pre-COVID N[1]=408	post-COVID N[1]=547	
Male	145 (35.5%)	173 (31.6%)	0.204

Age at time of Screening	pre-COVID N[1]=396	post-COVID N[1]=549	
18-59	258 (65.2%)	310 (56.5%)	0.007
60+	138 (34.8%)	239 (43.5%)	

Medicaid Covered	pre-COVID N[1]=230	pre-COVID N[1]=230	
Yes	129 (56.1%)	269 (53.9%)	0.582

[1]N excludes missing information. In the pre-COVID time, not all questions were asked of all participants.

DOI: https://doi.org/10.24926/jrmc.v8i1.6357

Results:

Table One shows there was no difference in self-identified gender and the post-COVID sample was slightly older. Medicaid coverage, used as a socioeconomic proxy, showed no difference.
Table Two shows the distribution of the persons pre-COVID (n=431) and the persons post-COVID (n= 559) that we screened. The first row in each category was those who reported a previous diagnosis, and the second row was all the persons screened.

In persons with a previous diagnosis of hypertension and systolic greater than 140 or diastolic greater than 90, there was a statistically significant increase pre-covid-19 to post-covid-19 ($p<0.001$). There was also a statistical difference in persons with previous diagnosis of hypertension and systolic greater than 150 or diastolic greater than 100 ($p<0.0002$). In the general screened population, neither were statistically significant, but the higher levels of BP were close to significantly higher ($p=.067$).

With previous diagnosis of hyperlipidemia, neither group had a statistically significant difference. In the population screened, both cholesterol levels ≥ 160mg/dL and ≥ 180mg/dL showed a statistically significant lower frequency ($p<0.001$).
With both BS ≥ 110 and >125, the frequency was significantly higher for both the screened population ($p=0.007$ and .0001) and with previous diagnosis of diabetes mellitus ($p=0.002$ and .00007).

Table 2: number of individuals affected in our screenings

	Systolic ≥140 OR Diastolic ≥90			Systolic ≥150 OR Diastolic ≥100		
	Pre-Covid N= 431	Post-Covid N=559		Pre-Covid N=431	Post-Covid N=559	
Previous Dx	97/431 (22.5%)	191/559 (34%)	$\chi^2 = 16.05$ $p < 0.001$	57/431 (13.2%)	126/559 (22%)	$\chi^2 = 14.016$ $p = 0.0002$
Population	208/431 (48.26%)	298/559 (53%)	$\chi^2 = 2.485$ $p = 0.11$	112/431 (26%)	175/559 (31%)	$\chi^2 = 3.345$ $p = 0.067$
	Blood Cholesterol ≥160 mg/dL			Blood Cholesterol ≥180 mg/dL		
	Pre-Covid N= 375	Post-Covid N=522		Pre-Covid N= 375	Post-Covid N=522	
Previous Dx	55/375 (14.7%)	76/522 (14%)	$\chi^2 = 0.002$ $p = 0.96$	43/375 (11.5%)	46/522 (8%)	$\chi^2 = 1.72$ $p = 0.19$
Population	218/375 (58.1%)	175/522 (33%)	$\chi^2 = 53.68$ $p < 0.001$	159/375 (42.4%)	101/522 (19%)	$\chi^2 = 56.33$ $p < 0.001$
	Blood Glucose ≥110 mg/dL			Blood Glucose ≥125 mg/dL		
	Pre-Covid N= 374	Post-Covid N=519		Pre-Covid N= 374	Post-Covid N=519	
Previous Dx	64/374 (17.1%)	134/519 (25%)	$\chi^2 = 9.548$ $p = 0.002$	49/374 (13.1%)	114/519 (22%)	$\chi^2 = 11.44$ $p = 0.0007$
Population	130/374 (34.8%)	227/519 (43%)	$\chi^2 = 7.303$ $p = 0.007$	82/374 (21.9%)	183/519 (35%)	$\chi^2 = 18.521$ $p <0.0001$

Discussion

The results show clear changes after the resolution of the pandemic. The significantly increased frequency of poor control in those with known hypertension could be due to less PCP interaction, less healthy lifestyle, or difficulty obtaining medications during the worst of the pandemic. The close to significant increases in the entire screened population would likely have the same causes.

The lower frequency of elevated total cholesterol levels of both >160 and >180 could also be due to lifestyle issues such as lower fatty food intake from reduced access to restaurant food. Restaurant levels of salt should have had the opposite effect on BP, but higher intake of canned food at home may have increased daily salt intake during the worst of the pandemic. Total cholesterol may have been affected by lower triglycerides from skipping a meal just prior to screening, and screening for cholesterol subcomponents may have discerned this.

Both measures of hyperglycemia were significantly increased in the post covid group. Those already diagnosed with diabetes may have not been able to follow up with their PCP as often or obtained their usual medications. That the entire screened population showed this increase could again be from higher caloric intake and less physical activity during the worst of the pandemic. These worsening CV risk factors could also be from the stress and dislocation associated with the pandemic. With healthcare trending more towards virtual visits, those in rural communities with poorer Internet connections and perhaps lower technology literacy may have suffered more than the general U.S population. With the fear of serious illness looming, detection of new diseases or control of existing ones may not have been high priorities for the under resourced population included in screening efforts.

Limitations/Strengths

Previous diagnoses were only by patient report, and all measures were independent of recent meals. Any extrapolation of these findings must be only to similar populations and methods. Higher frequencies of CVD risk factors could be partially explained by the slightly older post-COVID sample, but these differences would be expected to be small. In the previous

publication from this effort[7], the prevalence of these CVD risk factors in those screened lined up closely with that of the entire county, and this is a strength.

Conclusion

Post-COVID CVD risk factors were significantly increased in this screened population. As our health system continues to recover, these results further support the importance of careful community-wide planning before the next pandemic occurs.

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