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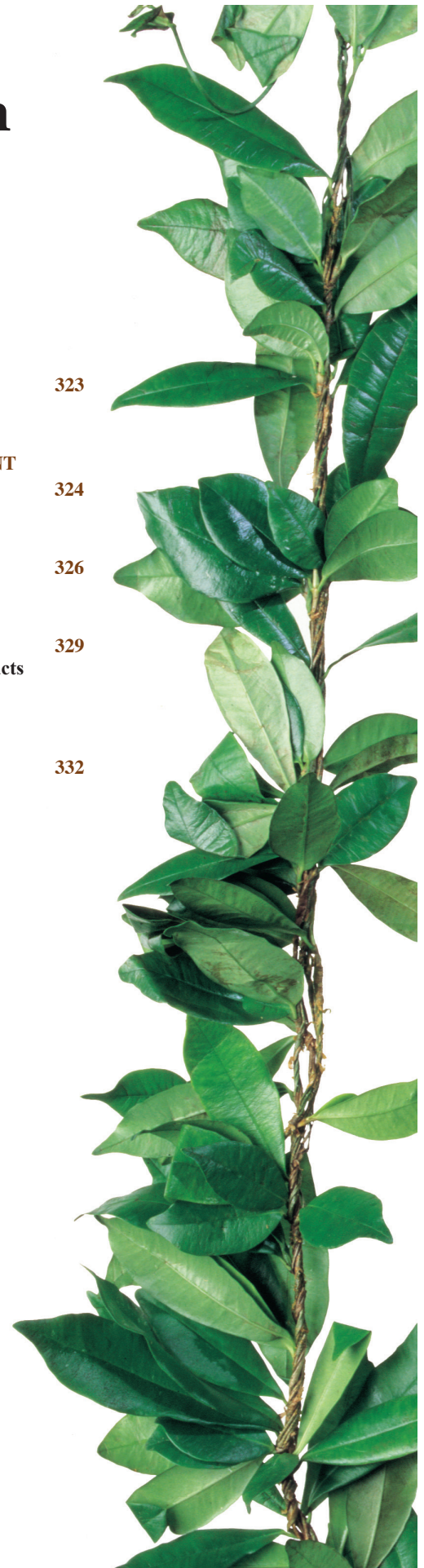
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HAWAII JOURNAL WATCH

KAREN ROWAN MS

Highlights of recent research from the University of Hawai'i and the Hawai'i State Department of Health

DIFFERENCES IN CARDIOVASCULAR DISEASE RISK ACROSS HAWAII'S MAJOR ETHNIC GROUPS

Individuals' demographic and psychosocial risk factors explain a significant proportion of the differences in cardiovascular disease (CVD) risk across the major ethnic groups in Hawai'i. Researchers including Andrew Grandinetti PhD, of the Office of Public Health Studies, conducted a secondary data analysis of the Kohala Health Research Project dataset and calculated Framingham Risk Scores (FRSs) for 1146 individuals in Hawai'i. In the fully adjusted model, which accounted for age, depression, social support, and acculturation, there were no significant differences in FRS across male Native Hawaiians, Filipinos, Japanese, and non-Hispanic whites. Among females, Filipinos had a significantly higher 10-year risk of CVD compared with non-Hispanic whites. The researchers concluded the FRS should be recalibrated for Native Hawaiian and Filipino populations, and that better understanding of the factors that contribute to variation in CVD risk is needed.

- Ing CT, Ahn HJ, Kawakami R, Grandinetti A, Seto TB, Kaholokula JK. Ethnic and gender differences in 10-year coronary heart disease risk: A cross-sectional study in Hawai'i. *J Racial Ethn Health Disparities*. 2020;doi: 10.1007/s40615-020-00851-2.

HOW COVID-19 HAS IMPACTED CANCER RESEARCH

The coronavirus disease 2019 (COVID-19) pandemic has impacted cancer research as well as the care of oncology patients at comprehensive cancer centers. Researchers including Muller Fabbrì, MD, PhD, of the UH Cancer Center detailed the approaches that cancer centers are adopting in order to continue clinical and research activities during this time. Office visits for patients not on active therapy may be conducted by telemedicine. Patients requiring hospital admission are undergoing nasal swab tests for the virus; decisions to proceed with cancer treatments for patients who are positive but asymptomatic are made on a case-by-case basis. Research facilities are limiting the number of scientists present in labs, and many animal experiments requiring complex, intensive regimens have been postponed. The researchers concluded that there have been drastic reductions in preclinical studies, but the pandemic will likely accelerate the integration of digital technologies in cancer care.

- Terracciano D, Buonerba C, Scafuri L, et al. Perspective: Cancer patient management challenges during the COVID-19 pandemic. *Front Oncol*. 2020;10:1556. doi:10.3389/fonc.2020.01556.

ACCURATELY MEASURING BLOOD PRESSURE IN JAPANESE MEN

For Japanese men, blood pressure readings taken at home may differ from those taken at a health care provider's office, even if the office reading is taken after a brief rest. Researchers including Kamal Masaki MD, of the John A. Burns School of Medicine,

analyzed blood pressure readings from 1056 men in Japan, ages 40 to 79. The researchers calculated the difference in systolic blood pressure (Δ SBP) between the home blood pressure measurements taken each day for a week with measurements taken in-office after a quiet, 5-minute rest in chair. Results showed a broad distribution of Δ SBP, with an SD of 13.5 mm Hg. Participants who smoked or had high BMIs had larger Δ SBPs. The findings suggest that both home and office blood pressure measurements, with sufficient rest time, are important to avoid underestimating actual blood pressure levels.

- Kadowaki S, Kadowaki T, Hozawa A, et al. SESSA Research Group. Differences between home blood pressure and strictly measured office blood pressure and their determinants in Japanese men. *Hypertens Res*. 2020; doi: 10.1038/s41440-020-00533-w.

EYE DROPS THAT STAY PUT

An experimental eye-drop formulation that forms a thin layer of gel on the eye allows better absorption of medication and longer contact time between the medication and the eye surface. Researchers including Abhijit Date PhD, of the Daniel K. Inouye College of Pharmacy, developed the formulation using a low concentration of a thermosensitive gelling polymer, which forms a gel at a certain temperature. The hypotonic nature of the formulation caused the eye drops to absorb water upon contact with the eye surface, resulting in a thin, clear, uniform layer of gel. In animal experiments, the topical application of gel resisted clearance from blinking and caused no irritation or toxicity. It also delivered the drug to the posterior part of the eye; currently, drugs can only be delivered to the posterior eye by injections. The researchers concluded that formulations that undergo this type of gelation could also be used to deliver medications to other mucosal tissues.

- Kim YC, Shin MD, Hackett SF, et al. Gelling hypotonic polymer solution for extended topical drug delivery to the eye. *Nat Biomed Eng*. 2020;doi:10.1038/s41551-020-00606-8.

LIVED EXPERIENCES OF WOMEN WITH POSTPARTUM DEPRESSION

The lived experiences of women with postpartum depression (PPD) who experience suicidal ideation can inform the development of preventive measures and interventions. Researchers including December Maxwell, PhD, of the Myron B. Thompson School of Social Work, utilized a research method called qualitative interpretive meta-synthesis, which involves analyzing quotations gathered in previous research, to study women's experiences. Results showed women felt they had to hide their emotions or pretend all was well to adhere to cultural expectations. They also said motherhood was more work than they expected, and they had less help than they expected. Women felt their lack of sleep and sense of losing control over areas of their lives contributed to their suicidal ideation. On the other hand, support from partners, friends, and family helped women cope. From the findings, the researchers developed a model of the Interpersonal Theory of Suicide specific to women with PPD.

- Praetoriusa R, Maxwell D, Alam K. Wearing a happy mask: Mothers' expressions of suicidality with postpartum depression. *Soc Work Ment Health*. 2020;18(4):429-459.

***Capnocytophaga canimorsus* Aortitis in an Immunocompetent Host**

Patrycja A. Ashley MD; Daniel A. Moreno MD; and Shellie K. Yamashita MD

Abstract

Capnocytophaga canimorsus is a commensal organism of canine and feline oral flora known to cause severe infections most frequently reported in immunocompromised hosts. We describe a case of bacterial aortitis secondary to *C. canimorsus* in an 80-year-old immunocompetent female, who presented with fever, non-specific lower back, and pelvic pain. Infection was confirmed with positive blood cultures and serial imaging.

Keywords

Capnocytophaga, aortitis, zoonosis, dog bite

Abbreviations and Acronyms

MIC = Minimum inhibitory concentration

Introduction

Capnocytophaga canimorsus is a slow-growing, gram-negative rod, commensal to the oral flora of canines and felines. It is a known human pathogen causing severe infections, most frequently occurring after dog bites or cat scratches, with the former being the most prevalent.¹ Transmission through contact with animal saliva has also been described, as well as cases with no known animal exposure.² Additionally, asplenia, alcohol abuse,² and HIV infection³ have been found to predispose to this zoonosis. Various infections have been described to date, with sepsis being the most common clinical presentation.¹ Others include endocarditis, meningitis, infectious arthritis, and mycotic aneurysm. We present a case of *Capnocytophaga* aortitis in an immunocompetent host.

Case Report

An 80-year-old female presented with subjective fevers, chills, and a 1-week history of dull, ill-defined lower back, bilateral buttock, and pelvic pain. The patient had a history of coronary artery disease, diabetes mellitus type II, and a recent flare of nummular eczema on her bilateral lower and upper extremities, for which she was prescribed steroid cream. No significant family, social, or travel history were elicited. The patient had a pet dog, no history of animal bites or scratches, and no other exposures. On physical examination, she was afebrile, there was mild tenderness to palpation to the paraspinal muscles in her lower back, and self-inflicted excoriations on her bilateral forearms. The remainder of her exam was unremarkable. Her erythrocyte sedimentation rate was noted to be 119 mm/hr (ref-

erence range: 0–25 mm/hr) and C-reactive protein was 7.7 mg/dL (upper reference limit: <0.8 mg/dL). Blood cultures turned positive after 4 days of incubation with gram-negative rods that were later identified as *Capnocytophaga canimorsus* by mass spectrometry. Transthoracic echocardiogram was negative, magnetic resonance imaging of the hips showed degenerative joint disease, but no signs of infectious arthritis; imaging of the lumbar spine showed no spine changes, but revealed enhancement around the infrarenal aorta consistent with early bacterial aortitis. Surgical intervention was not indicated, and medical management was recommended.

Pending sensitivities, the patient was started on ciprofloxacin, but after 10 days of treatment, there was no improvement of her symptoms, and she developed new abdominal fullness and pressure. Given the prolonged growth of the bacteria on the cultures, characteristic for *Capnocytophaga*, the patient was empirically switched to ceftriaxone as an outpatient. Imaging to assess for resolution was performed 2 weeks later, which found ill-defined areas of soft tissue attenuation surrounding the suprarenal and infrarenal abdominal aorta, suggesting that her aortitis had progressed. Ceftriaxone resistance was confirmed on blood cultures at day 24. Due to the fastidious nature of *Capnocytophaga*, we were only able to obtain sensitivities to 4 antimicrobial agents: ceftriaxone with a minimum inhibitory concentration (MIC) of ≥ 4 $\mu\text{g/mL}$, meropenem (MIC ≤ 0.06 $\mu\text{g/mL}$), penicillin (MIC ≤ 0.06 $\mu\text{g/mL}$), and ciprofloxacin. The patient refused further intravenous antibiotics limiting therapeutic options outside of the fluoroquinolones class. The MIC for ciprofloxacin was ≤ 0.12 $\mu\text{g/mL}$ indicating sensitivity. The patient was once again started on ciprofloxacin, and after an additional 4 weeks of therapy, reached a complete resolution of her symptoms. Follow-up abdominal computed tomography with intravenous contrast at 3 and 6 months since the initial presentation showed no evidence of active aortitis or aortic aneurysm. It was not entirely clear how the patient acquired the infection, but after a careful review searching for any exposures, she stated that she allowed her pet dog to lick the excoriations brought on by her eczema. The lick by her dog is the presumed source of her infection.

Discussion

Capnocytophaga canimorsus is an occasional human pathogen that carries with it a high mortality rate.^{1,4} While the most common form of infection is bacteremia, great vessel infection is an extremely rare manifestation. To date there have been 4 cases of

aortic infection due to *Capnocytophaga canimorsus* described in the literature: 1 case of prosthetic aortitis in an HIV positive patient,³ and 3 cases of *Capnocytophaga* mycotic aneurysm of the aorta following dog exposures which were listed as either scratches or dog bites.⁵⁻⁷ Our patient had none of the typical risk factors, demonstrating that *Capnocytophaga canimorsus* can cause aortitis in immunocompetent patients without underlying aortic disease and without resultant mycotic aneurysm formation. It may present with poorly localized, non-specific pain, which can delay the diagnosis. A high index of suspicion is essential to diagnose and initiate treatment promptly. The slow-growing character of this bacteria makes the process of obtaining sensitivities difficult; hence, therapy is dictated mostly by a clinical response with the caveat that symptoms may be slow to respond despite appropriate coverage. Though there are no in-depth studies to dictate the length of treatment, the widely held consensus is a minimum of 6–12 weeks of antimicrobial therapy.⁸

It is important to note that fluoroquinolones are associated with an increased risk of aortic aneurysm and dissection. Recognizing that fluoroquinolone use and aortitis are 2 independent risk factors for aneurysm formation and dissection, it might be reasonable to use alternative antimicrobials and reserve fluoroquinolones for cases with no other available therapeutic option. Notably, based on the patient's choice of oral antibiotic therapy, we were limited to the fluoroquinolone class.

Capnocytophaga canimorsus was previously considered to be universally susceptible to fluoroquinolones; however, there are reports of resistance. In 1 study, more than half of studied strains were resistant to ciprofloxacin.⁹ Resistance to β -lactam antibiotics is variable, best studied in immunocompromised patients, ranging from 1 out of 28 studied strains⁹ to as high as 18 out of 24 strains¹⁰ and associated with prior exposure to β -lactam antibiotics,¹⁰ which our patient did not have. Despite *Capnocytophaga canimorsus* resistance to ceftriaxone in our case, a third-generation cephalosporin is still a viable option in the empiric treatment of infectious aortitis.

Conflict of Interest

None of the authors identify any conflict of interest.

Authors' Affiliations:

- Kaiser Permanente Internal Medicine Residency Program, Honolulu, HI (PAA, DAM)

- Department of Infectious Disease, Kaiser Moanalua Medical Center, Honolulu, HI (SKY)

Correspondence to:

Patrycja A. Ashley MD; 2828 Paa St. #3D04, Honolulu, HI 96819;

Email: patrycja.a.ashley@kp.org

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10. Maury S, Leblanc T, Rousselot P, Legrand P, Arlet G, Cordonnier C. Bacteremia due to *Capnocytophaga* species in patients with neutropenia: high frequency of beta-lactamase-producing strains. *Clin Infect Dis*. 1999 May;28(5):1172–4.

Hawai'i's First Published Case of *Eggerthella lenta* Sepsis

Taylor K. Peter-Bibb BA and Jinichi Tokeshi MD

Abstract

Human bacteremia with Eggerthella lenta is rare. Upon review of the literature, the largest case series includes only about 100 cases, and optimal management of the condition is still unclear. This case report describes a patient diagnosed with E. lenta septicemia due to acute diverticulitis in 2019. This is the first published report of sepsis caused by E. lenta in the state of Hawai'i.

Abbreviations and Acronyms

GI = gastrointestinal

PCP = primary care physician

MRSA = methicillin-resistant *Staphylococcus aureus*

Introduction

Eggerthella lenta is a gram-positive, non-motile, non-spore-forming, obligate anaerobic bacillus that was first isolated from human feces by Arnold H. Eggerth in 1935.¹ Its optimal growth temperature is 37°C with arginine stimulating its growth.² Originally termed *Eubacterium lentum*, it was reclassified into its own genus and renamed *Eggerthella lenta* based on 16S rRNA genetic sequencing performed by Kageyama and colleagues in 1999.³ Belonging to the *Actinobacteria* genus and *Coriobacteriaceae* family, it is a normal resident of the human gastrointestinal tract microbiome.⁴ *E. lenta*'s complete genomic sequence was published in 2009 and is closely related to the more recently described *Paraeggerthella hongkongensis* and *Eggerthella sinensis*.⁵ Review of the literature revealed no previous published examples of *E. lenta* sepsis in the state of Hawai'i and relatively few published case reports (the largest case series consisting of 107 cases). Most but not all of these cases occurred in patients with underlying gastrointestinal disease (eg, Crohn's disease),⁶ systemic immunosuppression, and malignancy.^{4,7} *E. lenta* has also been implicated in periurethral abscess,⁸ endometritis,⁹ intrauterine device-related pelvic abscess,¹⁰ post-appendectomy intra-abdominal abscesses,¹¹ brain and liver abscesses, necrotizing pneumonia, and osteomyelitis of the radial bone.^{12,13} Bacteremia with *E. lenta*, when present, is always significant given its high associated mortality (22%–43%).^{14,15}

Case Report

The patient is a 94-year-old Japanese male with a complex past medical history and recent admission for methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia who was in the usual state of poor health until the morning of admission. His

other medical issues include diverticulitis, diabetes mellitus type II, essential hypertension, stage 3 chronic kidney disease, hyperlipidemia, benign prostatic hyperplasia, chronic gout, and bilateral hearing loss. He was brought to his primary care physician (PCP) by his son and certified nurse assistant due to rigors, cough productive of scant clear sputum, rhinorrhea, and 3 episodes of non-bilious, non-bloody emesis. In his PCP's office, he had a temperature of 102°F, heart rate of 103 beats per minute, respiratory rate of 22 breaths per minute, and right abdominal tenderness without rebound or guarding on exam. His PCP recommended further workup in the emergency department, which included a complete blood count significant for 14 500 white blood count cells/μL (normal range: 4000–11 000 cells/μL). Abdominal computed tomography without contrast revealed numerous colonic diverticula with pericecal inflammatory change. The patient was admitted for sepsis secondary to presumed acute diverticulitis. Blood and urine cultures were sent, and he was empirically started on an intravenous antibiotic regimen of vancomycin, ceftriaxone, and metronidazole.

Urine culture and sensitivity returned with MRSA. One of the 2 blood cultures was positive for *Eggerthella lenta*. His antibiotic regimen was changed on hospital day 3 from ceftriaxone and metronidazole to ertapenem for coverage of *E. lenta*. The patient subsequently developed hyperactive delirium and had a witnessed tonic-clonic seizure of approximately 1-minute duration. These events were presumed to be adverse reactions to the initiation of ertapenem; thus, ertapenem was discontinued after administration of a single dose. Vancomycin was continued to treat his MRSA-caused urinary tract infection, and the ceftriaxone/metronidazole combination was restarted to target *E. lenta* bacteremia and to maintain broad coverage given the patient's age and hemodynamic instability. Vancomycin was discontinued after repeat urinalysis confirmed resolution of urinary tract infection on hospital day 7. Repeat blood cultures 3 and 9 days after admission confirmed eradication of *E. lenta* bacteremia. Given resolution of bacteremia and sustained hemodynamic stability, ceftriaxone and metronidazole were discontinued after a total of 12 days. The patient recovered to his pre-hospitalization baseline health status and was discharged home under the guidance of his certified nurse assistant and son. He is still alive at the time of composition and has continued to follow up regularly with his primary care physician, resuming his pre-hospitalization biannual examinations without subsequent reinfection or evidence of secondary complications, such as end-organ damage.

Discussion

Eggerthella lenta is a rare but serious cause of community-acquired bacteremia. The high associated mortality makes early identification and appropriate treatment essential. This patient's case highlights the importance of considering *E. lenta* in septic patients with known comorbid gastrointestinal pathology. On admission, this patient met the criteria for sepsis, met 4 out of 4 systemic inflammatory response syndrome criteria, had a presumed infectious etiology of acute diverticulitis, and had a quick Sequential Organ Failure Assessment Score of 1 out of 3. The diverticular source put this patient at risk for bacteremia with gastrointestinal (GI) flora, including *E. lenta*.

In the past, the most significant obstacle to diagnosis was the difficulty of isolating *E. lenta* from collected samples. *E. lenta* is fastidious and difficult to culture, which has likely led to its underreporting and underestimation of its prevalence. In the case of our patient, *E. lenta* was isolated from a set of routine blood cultures. The increasing laboratory application of 16S ribosomal RNA sequencing techniques has facilitated a more accurate and rapid identification.¹⁴ With these new techniques, the most significant obstacle to diagnosis today is a failure to consider *E. lenta* bacteremia as a potential etiology. Although *E. lenta* may sometimes be isolated by routine blood cultures alone, RNA sequencing techniques are much more sensitive. As such, practitioners should maintain a high index of suspicion for *E. lenta* in patients with a presumed GI source of infection. In patients with a moderate or high probability for *E. lenta* bacteremia, such as a patient with sepsis secondary to a presumed GI source, we recommend that practitioners include *E. lenta* RNA sequencing, in addition to routine blood cultures, due to its associated high mortality rate.

Another challenge in the management of patients with *E. lenta* bacteremia is determining appropriate antibiotic therapy. The use of antimicrobial susceptibility testing for anaerobic bacteria, such as *E. lenta*, is restricted to specialized reference laboratories. Thus, in clinical practice, antibiotic selection is made empirically. Additionally, bacteremia secondary to gastrointestinal disease is frequently polymicrobial, necessitating an antibiotic regimen with broad antimicrobial coverage.

In 2001, Stinear, et al, identified the *vanB* locus via rapid-PCR sequencing of the *E. lenta* genome, demonstrating that the bacteria is capable of developing vancomycin resistance, through a mechanism similar to vancomycin-resistant enterococci.¹⁶ There are limited published data on antimicrobial sensitivity of community-acquired *E. lenta* to guide clinical management. One notable study performed by Gardiner, et al, (2014), investigated 23 cases of *E. lenta* isolate-confirmed bacteremia and determined the following antimicrobial susceptibility testing profile: all were susceptible to amoxicillin-clavulanate, ceftioxin, metronidazole, piperacillin-tazobactam, ertapenem, and meropenem. Also, 91% were susceptible to clindamycin, 74% were susceptible to moxifloxacin, and 39% were susceptible to penicillin.¹⁷ All of the isolates were resistant to ceftriaxone.¹⁷ None of them were resistant to vancomycin, as evidenced by the presence of *van* genes A or B.¹⁷ A retrospective cohort study in 2018 demonstrated increased mortality in patients with *E. lenta* bacteremia treated empirically with piperacillin-tazobactam monotherapy.¹⁴ This finding is consistent with those from a previous study in Sweden.¹⁸ Thus, we recommend that amoxicillin-clavulanate, ceftioxin, metronidazole, or the carbapenems be used as first-line therapy for *E. lenta* bacteremia, and monotherapy with piperacillin-tazobactam or ceftriaxone be avoided.

Conclusions

Eggerthella lenta is a rare but significant cause of community-acquired bacteremia that is frequently associated with underlying gastrointestinal disease. A high index of suspicion should be maintained for *E. lenta*, and specialized testing with RNA sequencing should be performed in high-risk patients. Isolation of *E. lenta* in blood cultures should be assumed significant and prompt a workup for gastrointestinal disease if no preexisting source pathology is known. Amoxicillin-clavulanate, ceftioxin, metronidazole, and the carbapenems appear to be reliable empiric antimicrobial options; ceftriaxone, however, is associated with high rates of resistance and should be avoided as monotherapy. Piperacillin-tazobactam should also be avoided as empiric monotherapy.

Conflict of Interest

None of the authors identify any conflict of interest.

Authors' Affiliation:

- John A. Burns School of Medicine, University of Hawai'i, Honolulu, HI

Correspondence to:

Jinichi Tokeshi MD; 405 N. Kuakini St. #707, Honolulu, HI 96817;

Email: jinichi.tokeshi@gmail.com

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SOCIAL WORK IN ACTION

Social Connectedness and Homelessness Amidst a Pandemic: Are the Social Impacts of Quarantine on Homeless Populations Being Adequately Addressed?

Amanda Yoshioka-Maxwell PhD, MSW

Social Work in Action is a solicited column from the social work community in Hawai'i. It is edited by HJMPH Contributing Editor Sophia Kim PhD, of the Myron B. Thompson School of Social Work at the University of Hawai'i at Mānoa.

Introduction

The effects of the COVID-19 pandemic have been undoubtedly great; from health and economic outcomes, to the areas of social functioning and daily life that have drastically changed. While the focus on these impacts has been largely related to physical health, researchers have also highlighted the effects on other areas of life such as mental health and emotional wellbeing. While pandemic-related outcomes should continue to be examined, the effects of quarantine measures more specifically must also be examined. With a deeper look at the various aspects of wellbeing, the impact of these changes on social connectivity should begin to be considered. How have these changes in the world altered social network connections to one another? Each person can likely think of an example of how quarantine measures have altered their social networks, but what about those underserved populations that have already been pushed to the fringes of mainstream society? How have quarantine measures affected their connections to social supports? As research begins to explore the greater effects of this pandemic, the people serving at-risk populations (including the author of this article) must also be cognizant of the impact of the loss of connectivity on the communities with which they work. One such underserved demographic that faces a number of risk factors are homeless populations.^{1,2} While the focus has been on containing the spread of the disease among this and other populations, it must also be asked if the social needs of homeless individuals are adequately being addressed, given the importance of social network connections on their wellbeing. As is the case with so many aspects of this pandemic and quarantine, this article will ask more questions than it will answer. However, its purpose is not to answer scientific questions, but to encourage the public and mental health professionals to consider the importance of social network connectivity among homeless individuals given this very uncertain time.

Impact

In the short period of the COVID-19 pandemic and quarantine, new lines of research have begun to examine its impacts. One specific area of inquiry has focused on the psychosocial impact of quarantine measures. Quarantine measures generally include a number of disease control strategies such as home curfew, restrictions on group assemblies, cancellation of public events, and travel restrictions.³ And while these measures often vary by region, they are generally intended to separate individuals to slow the spread of disease. Studies have found that individuals living in quarantine conditions largely experience feelings of anxiety, fear, loneliness, panic, depression, obsessive behaviors, hoarding, anger, exhaustion, poor concentration, irritability, and insomnia among an array of additional symptoms.³⁻⁶ And while the intent of quarantine measures are to reduce the spread of disease, preserving health overall, the effects of the isolation caused by quarantine must also be examined. But amidst all the increased risks associated with quarantine, why focus on this specific issue of social connectedness? Studies have found that during times of adverse events, the need for social support is greatest, and inability to access this support when it is needed most can threaten the sense of connectedness, impacting mental health.⁷⁻²⁶ Thus, it appears that this issue of support and connectedness may have far-reaching consequences for health, requiring additional attention.

For many populations, social network connectedness and social supports serve as important gatekeepers to health and wellbeing,⁸⁻¹⁰ with social networks impacting a variety of risk and protective factors. Social networks have been shown to be particularly important in at-risk populations where engagement with members of one's social network, such as social supports, can influence an individuals' engagement in a variety of behaviors such as engagement in drug and sex risk behaviors.¹¹⁻¹⁴ Thus, in

a world where social networks have been greatly impacted by an event such as a pandemic, social network ties may potentially mitigate risk. However, when measures, such as quarantine, interrupt those connections, vulnerable populations might be expected to incur even higher rates of risk.

For a particularly high-risk population such as homeless populations, social networks can be expected to be an extremely important factor in an individual's life. The research supports this assumption in a variety of ways, with social networks impacting the lives of homeless individuals with regard to their mental health, substance use, length of time spent homeless, experiences of interpersonal violence, and HIV risk behaviors among others.^{15-20,28} Studies have repeatedly found social networks to impact the health, mental health, and risk experiences among homeless individuals.^{20,28} For example, among homeless populations, social networks have been shown to impact condom use and mental health of youth adults, as well as the physical health of adult men.²⁸ As a result, it goes to argue that the social isolation caused by a pandemic's quarantine measures may greatly impact this populations' social networks, thusly effecting their health, safety, and wellbeing.

Where To Go From Here?

Given what is known about the role of social networks in the lives of homeless individuals, how might the pandemic and resulting quarantine measures impact these individuals in the future? As medical professionals, public health workers, social workers, and researchers, how might these impacts be addressed to help those at-risk? Thus far, the majority of the research on homelessness and risks presented by the current pandemic have focused on the susceptibility of this population to the disease, or the ability of local government to adequately protect them.²¹⁻²³ Fewer studies have examined the impact of the social isolation of quarantine on this population more generally, but research has established that social isolation not only increases the likelihood of becoming homeless, but for individuals already facing mental health issues, the social isolation from the quarantine measures may worsen their condition. Homelessness already puts individuals at an increased risk for poor health and poor mental health outcomes; the pandemic is likely to increase these risks.²⁴⁻²⁶ Some additional risks presented by the pandemic and resulting quarantine measures are the result of service-providing organizations closing or limiting services provided or hours of operation, where reduction of services put people at potential risk for increased unsafe substance use and intimate partner violence.²⁷

What remains to be determined, and yet is vitally important for health and wellbeing, is the impact of the pandemic and quarantine measures on the social networks of homeless individuals and how these impacts affect behavioral health outcomes. Additionally, there are a number of factors that will affect these outcomes that have yet to be discussed. While it is known that

the social networks of homeless individuals are associated with health outcomes, it is not known how the pandemic and resulting quarantine measures will impact smaller segments of the homeless population: adults compared to youth, racial/ethnic subgroups, and variations in age, gender and sexual orientation just to name a few. Quarantine measures may affect these groups differently, or may impact their health outcomes differently. Additionally, as previously discussed, quarantine measures may interrupt services that homeless individuals usually receive. And while this disruption may directly impact service receipt such as health care, STI testing, and food/shelter, among others, this disruption may also interrupt very important social network ties. Studies have indicated that particularly among homeless youth and young adults, connections to service providers such as social workers or drop-in/shelter staff impact an individuals' engagement in risk behaviors.²⁸⁻²⁹ These relationships have likely been altered in some way as a result of the pandemic, and exactly how these relationships have been altered or how these alterations have changed is currently unknown. Similarly, researchers often look at the number or proportion of social network ties that represent positive or negative socializing agents.³⁰ In other words, what percentage or proportion of an individual's social network engage in prosocial or anti-social behaviors that may influence their own risk or protective behaviors. This number of positive or negative socializing agents must also be examined in light of the pandemic. The actions and behaviors of individuals' connections (friends, family, staff, etc.) may influence the engagement of risk behaviors of the individual, and should be examined as a result.

While many questions remain unanswered, the current pandemic also presents a number of implications and potential for future interventions with at-risk communities. Understanding the general impact of the pandemic and quarantine measures on homeless populations is essential for keeping the population healthy, but health, medical and social work professionals should also continue to improve their understanding of the importance, and the impact, of social networks and connectivity on homeless and other vulnerable populations. Understanding how the social network disruption caused by quarantine measures influence this and other populations will help us to tailor interventions during and after quarantine to provide the social and emotional supports needed for physical and mental health. Additionally, it is a reminder that the impact of social isolation may have lasting effects on this population, as dealing with the aftermath of these disruptions may take time and intervention for resolution. It can also inform future crises by calling attention to the need for additional supports to be put in place, as well as establishing more diverse social support networks should networks experience disruption. If nothing more, shedding light on the importance of connectivity among homeless populations during times of crisis may help both clinicians and researchers alike in assisting clients as holistic persons, focusing on the inclusion of social and emotional needs in treatment and intervention.

Author's Affiliation:

Department of Social Work, Myron B. Thompson School of Social Work,
University of Hawai'i at Mānoa, Honolulu, HI

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Diabetes Prevention Programs and a Pharmacist's Perspective

Brooke Higa BA; Aryn Meguro PharmD; and Bryce Fukunaga PharmD

HJH&SW contributing editor of the Daniel K. Inouye College of Pharmacy (DKICP) Scripts column is Jarred Prudencio, PharmD, BCACP, BC-ADM. Dr. Prudencio is currently Assistant Professor of Pharmacy Practice and Chief of Experiential Education, with expertise in healthcare education and outpatient family medicine.

Background

Type 2 diabetes is a chronic condition characterized by elevated blood glucose levels that if not controlled, can lead to significant complications such as heart attack and stroke.¹ Prediabetes is a stage in which the blood glucose is elevated but not at the severity of type 2 diabetes.¹ Both type 2 diabetes and prediabetes increase the risk of heart attack and stroke.¹ However, unlike diabetes, which is rarely reversed even at early stages, prediabetes is reversible.¹ The Diabetes Prevention Program (DPP) was first initiated in 1996, when the first clinical trial was conducted.² This trial compared metformin against lifestyle intervention of 5%-7% of weight loss with 150 minutes of physical activity per week in patients with prediabetes, and found that the risk of developing type 2 diabetes was lowered by 31% in the metformin group and 58% in the lifestyle group.² This study helped with the implementation of the National DPP in 2010, which mimics the lifestyle interventions shown to decrease the risk of developing diabetes.¹ According to the Centers for Disease Control and Prevention (CDC), the National DPP partners with public and private organizations to help patients with prediabetes implement evidence-based lifestyle modifications to delay or prevent their chances of developing type 2 diabetes.¹

DPPs allow patients with prediabetes to have access to affordable, high-quality, and evidence-based interventions which can help improve their overall health. Programs may choose to apply to gain CDC recognition which allows for reimbursement opportunities. In order to gain full recognition status, a DPP must meet CDC standards to ensure the quality of content delivered.³ A few of the standards include using a CDC-approved curriculum, having the capacity and commitment to deliver the program over a year, and the ability to submit data on participants' progress.³ Each DPP offers a total of 22 sessions, each 1 hour long.¹ The year is split in 2 components with the first 6 months having sessions every 1-2 weeks and the last 6 months having sessions monthly.¹ The goal of the first 6 months is to lose 5% of body weight and get 150 minutes per week of physical activity.¹ The goal of the last 6 months is to learn to continue lifestyle changes to either maintain the 5% weight loss or to

lose even more weight.¹ The DPP sessions focus on teaching participants how to change their lifestyle by switching to a healthier diet, adding in moderate-intensity physical activity, learning coping skills, developing a sense of responsibility for everyday lifestyle choices, and also by providing a sense of community and social support.¹

Those who run the programs need to be certified and trained as lifestyle coaches, and programs submit data to the CDC on body weight and physical activity minutes every 6 months to show how the program is impacting participants.¹ Lifestyle coaches do not need a background in health care which provides an opportunity for anyone to run a DPP. This potentially allows DPPs to be readily available throughout the United States. Having DPPs readily available for patients could be a significant way of preventing diabetes considering more than 88 million Americans, or 1 in 3, have prediabetes.¹ In comparison, there are 30 million Americans with diabetes and 1 in 4 health care dollars are spent on those with diabetes.¹ These numbers highlight the importance of addressing the prediabetes population.¹ Focusing on the 88 million with prediabetes through DPPs could not only benefit the health care system, but could help individuals prevent chronic disease complications. These patients could then set examples to others on living healthy lifestyles.

Diabetes Prevention Programs in the United States

In the United States, as of 2015, the average reported prevalence of prediabetes per state is 6.8% with Vermont having the lowest prevalence of 4.8% and Hawai'i having the highest of 14%.⁴ Most recent data from 2018 indicates that the prevalence of prediabetes in Hawai'i has marginally increased to 14.5%.⁵ As of July 2020, the United States has a total of 1639 reported DPPs.⁶ The average number of reported DPPs in each state is 32 with Vermont having the lowest number at 2 DPPs and California having the highest number at 128 DPPs.⁶ Hawai'i has 17 reported DPPs which is about half of the national average.⁶ While there was a good growth of programs over the 10 years since the programs started, to accomplish a goal of targeting

the 88 million patients with prediabetes by having DPPs readily available, the US needs to greatly increase the number of DPPs. Having lifestyle coach training open to anyone provides a significant number of opportunities for DPPs to open up and this should be capitalized on especially by health care professions.

Pharmacist's Role

One of the healthcare professionals that is widely accessible to patients are pharmacists. Pharmacists have a unique position in the healthcare field because they are so easily accessed by patients in multiple settings from retail stores, to outpatient and inpatient facilities. Pharmacists are the most accessible healthcare professional and are in the top 5 most trusted professionals.^{7,8} They build relationships with patients through consistent patient interaction. Because of the relationships that are built between pharmacists and patients, patients may be more receptive to what a pharmacist has to offer. Pharmacists are clinically trained and have knowledge on the body and chronic conditions which can provide an advantage when it comes to educating patients on their health. Pharmacists counsel patients regularly and could easily educate patients on the risks of prediabetes and diabetes. Utilizing technicians and students could also be beneficial, as patients may feel more comfortable interacting with them and students and technicians can also build their clinical knowledge and patient counseling skills.

The idea of having pharmacists lead DPPs isn't just coming from a pharmacist's perspective. The CDC has a document titled "Rx for the National Diabetes Prevention Program. Action Guide for Community Pharmacists."⁷ This document explains the availability of pharmacists and advantages of having a pharmacist-led DPP. The CDC has 3 tiers of DPP workforce categories.⁷ Tier 1 is promoting awareness of prediabetes and patients at risk, tier 2 is screening, testing, and referring patients, and tier 3 is offering a DPP.⁷ Out of the 3 tiers, the CDC lists pharmacists in all 3, which puts them in the perfect position to not only promote DPPs and get patients enrolled in programs, but more importantly, to lead DPPs.⁷ Pharmacies could promote awareness of prediabetes by displaying promotional and educational materials.⁷ Pharmacists could screen and/or test patients for prediabetes and refer them to DPPs in the area or even to their own DPPs.⁷ Screening their own patient population can eliminate the entire process of external patient recruitment.⁷ Each program can apply for full CDC recognition which will qualify programs for reimbursement on a pay-for-performance model.⁷ Reimbursement provides benefits to pharmacies and helps to keep pharmacist-led DPPs sustainable.⁷ Because pharmacists are in an ideal position to increase the number of DPPs, they can play a key role in decreasing the 88 million people with prediabetes and ultimately help to decrease the 30 million people with diabetes.⁷

Pharmacist-Led Diabetes Prevention Program Experience

Pharmacy-led DPPs are already available in the US. There are about 52 and one of the pharmacist-led programs in Hawai'i is on the island of Kaua'i.⁶ This DPP is led by Dr. Aryn Meguro and Dr. Bryce Fukunaga who are both pharmacists and Assistant Professors at the Daniel K. Inouye College of Pharmacy. Both became certified lifestyle coaches in July 2018 and started their first DPP on Kaua'i in July 2019 in partnership with Wilcox Medical Center and the Hawai'i State Department of Health. Prior to the start of their program, they recruited participants at the Diabetes Awareness Expo at the Wilcox Medical Center where they provided education on prediabetes and advertised their upcoming DPP. The Department of Health also played a role in advertising the upcoming DPP. They were initially recruited 15 participants. Participants mentioned they appreciated having the actual lifestyle coaches doing the recruiting themselves. This personal aspect made them more willing to sign up for the program. By the end of the year, there were 6 participants who regularly attended the sessions. Those who were able to lose 5% or more of their body weight attributed their success to either tracking calories or by being mindful about portion sizes while keeping up with their weekly activities. One unique aspect of this DPP was that since Dr. Meguro and Dr. Fukunaga both continuously have pharmacy students on experiential rotations, they allowed students to participate in all the sessions. The participants saw this as a benefit, as having more people contributing to discussions led to more solutions on ways to live healthier lifestyles. Student involvement not only benefited the participants, but it also impacted students in a positive way. Students became more comfortable and confident in interacting with patients and one student enjoyed his experience so much that he became certified as a lifestyle coach within weeks of attending his first DPP session.

Dr. Meguro and Dr. Fukunaga just completed the last session of their DPP in July 2020 and are in the process of submitting their data to the CDC. The last session included some time to reflect back on the year. One participant said, "We're at an age where we need to get more serious about health and this program is helping. The support is good and the information is good." Another participant said, "You two made the difference. You made it easy to understand everything and we were comfortable to ask you questions." When asked what they thought of having pharmacists as their lifestyle coaches, the class responded saying "It was good that you are professionals and have knowledge because someone without this kind of knowledge may not have been able to explain health topics in different ways for us to understand." The participants were also encouraged to become lifestyle coaches themselves to continue helping others and a health background is not needed to become certified.

Future Plans

Dr. Meguro and Dr. Fukunaga plan to start another DPP to directly help reduce the risk of developing diabetes. They also plan to indirectly reduce the risk of diabetes by becoming master trainers so that they can certify lifestyle coaches to run their own DPPs. This will allow them to help increase the number of DPPs available and because of their access to pharmacy students, they hope to incorporate lifestyle coach certification into the pharmacy curriculum at the Daniel K. Inouye College of Pharmacy. Adding this certification into the curriculum will encourage these future pharmacists to run and maintain their own DPPs, further expanding available DPPs. Their vision is to solidify a culture based on preventative care where future pharmacists will see DPPs as part of their normal workflow. This preventative mindset through DPPs will not only help prevent diabetes, but the lifestyle and behavioral changes learned from DPPs could also help in preventing other chronic conditions such as hypertension and hyperlipidemia.⁹ The roles of a pharmacist are continuously evolving and incorporating DPPs is a positive step towards improving patients' health and wellbeing.

Authors' Affiliation:

The Daniel K. Inouye College of Pharmacy at the University of Hawai'i at Hilo, Hilo, HI

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Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the 'okina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (<http://www.wehewehe.org/>) or with the University of Hawai'i Hawaiian Language Online (<http://www.hawaii.edu/site/info/diacritics.php>).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawai'i are referred to as Hawai'i residents.

Hawaiian words that are not proper nouns (such as *keiki* and *kūpuna*) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

Examples of Hawaiian words that may appear in the HJH&SW:

'āina
ali'i
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