UBCMJ
UNIVERSITY OF BRITISH COLUMBIA MEDICAL JOURNAL
Volume 10 Issue 1 Fall 2018

PUBLIC HEALTH

FEATURE Harm reduction innovation during an overdose emergency

NEWS AND LETTER
Cholera in Yemen: Public health consequences of conflict

COMMENTARY
Addressing eating disorders and substance use

THE UNIVERSITY OF BRITISH COLUMBIA

The University of British Columbia Medical Journal (UBCMJ) is a peer-reviewed, student-driven academic journal with the goal of engaging students in medical dialogue and contributing meaningful discourse to the scientific community.

On the cover

Public health casts a wide net over human health and quality of life, and understanding the conditions and behaviours that affect health is no easy task. Navigating this multifactorial and labyrinthine world can often seem like walking through an Escher landscape! However, public health has enormous potential to improve the lives of many and all healthcare professionals and students should be aware of current topics in this field. Therefore, in this issue we recognize the importance of, and encourage discussion on, many public health topics, such as substance use and the opioid crisis, homelessness, food insecurity, vaccinations, reproductive health, air quality, and more. Let's explore them together.

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VOLUME 10 ISSUE 1 | August 2018

One crisis after another: The policies that shape our health

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Citation: UBCMJ. 2018: 10.1 (3)

The health of Canada's population cannot be managed by the health care system alone. While continuous strides are made to understand the physiological mechanisms of diseases to inform treatment options, we must understand the socioeconomic, environmental, and behavioural factors that play a pivotal role in disease epidemiology, burden, and outcomes. The reality is that roughly 25% of the population's health status can be attributed to the health care system, while physical, environment, and social determinants of health contribute up to 60%, and baseline biological factors and genetics account for the remaining 15%.[1]

The World Health Organization defines public health as "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society."[2] It is these "organized efforts of society" that are paramount to tackling some of the most serious health challenges we face today.[3]

In recent years, B.C. has become a leader in implementing evidence–based policies to address public health emergencies. One notable example is B.C.'s efforts in preventing the spread of HIV and achieving effective control of the AIDS epidemic. The B.C. Center for Excellence in HIV/AIDS (BC–CfE) was established in the early 1990s to serve all regions of the province to combat the AIDS epidemic, which was claiming a life almost every day. Since then, clinicians and researchers at the BC–CfE have developed policies and resources including rapid testing programs, improved access to treatment, and a treatment–as–prevention (TasP) strategy.[4] This led to a dramatic decline in new HIV infections from over 800 per year in 1990s to below 250 per year in 2015.[5-7] The success of B.C.'s public health interventions that effectively prevented HIV transmission required active engagement by government, health authorities, research scientists, community members, and health care providers.

In 2016, B.C. declared another public health emergency due to an overwhelming number of deaths associated with illicit drug use.[8] Specifically, an additive/substitute of heroin called fentanyl was the primary agent accounting for the increase in illicit drug deaths from 5.9 per 100,000 in 2012 to 19.3 per 100,000 in 2017 in B.C.[9] In many aspects, strategies used to control the AIDS epidemic have been translated to tackling this illicit drug emergency.[10] The Province of BC established the BC Centre on Substance Use (BCCSU) in 2017 as a provincially networked organization with a mandate to develop, help implement, and evaluate evidence-based approaches to substance use and addiction. The BCCSU has become a pioneer in North America in producing research and developing guidelines that influence policy change regarding substance use disorder and the overdose crisis. The BCCSU's ongoing efforts have demonstrated that innovative harm reduction strategies such as needle exchange, supervised consumption sites, overdose prevention sites, and take–home naloxone programs are effective in lowering the risk of overdose in people who use illicit drugs (PWUDs). While criminalization of PWUDs has been shown to be ineffective.[10,11] Similar to those who live with HIV, the health outcomes of this marginalized population are impacted by unstable housing, violence, unsafe sex work, and multiple barriers to accessing resources.[10] Despite numerous key actions by B.C. to curb the increasing number of drug–related deaths, this number continues to rise relentlessly.[12] The increasing prevalence of fentanyl and its analogues is a result of their cheap costs and ease of transportation that represent a global change in drug supplies.[9] This poses unique challenges in preventing overdoses, and new public health interventions must adapt to this dynamic epidemic.

In this UBC Medical Journal issue, we start off with a feature article from Drs. Mark Lysyshyn and Jane Buxton, who provide insight into important innovations in harm reduction strategies in response to the fentanyl overdose emergency. Drs. Sian Tsuei and Xochitl Pastran discuss in their feature piece the need to emphasize public health in medical education. In the third feature article, Drs. David McVea and James Lu highlight the health effects of wildfires and protection strategies, in the wake of the worst–recorded wildfire season during the summer of 2017. Throughout this issue, we have included articles that examine different public health challenges and policies, and we hope to showcase the complexity in addressing these challenges.

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Harm reduction innovation during an overdose emergency

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Citation: UBCMJ. 2018: 10.1 (4)

Harm reduction aims to reduce the negative consequences of drug use in people unable or unwilling to stop.[1] Home to North America's first and only legal supervised injection site for over a decade, British Columbia (B.C.) has been considered a leader in the field.[2] But faced with increasing overdose deaths and a public health emergency due to an illicit drug supply contaminated with fentanyl, B.C. has had to innovate in response to the crisis.[3,4]

When the public health emergency was declared in April 2016, legal supervised injection services were only being provided at two sites in Vancouver. Now, two years later, legal supervised injection services are being provided at three sites in Vancouver, two sites in Surrey, one site in Victoria, and by Interior Health via innovative mobile services in Kamloops and Kelowna.[5] Although the vast majority of clients continue to consume drugs by injection, following Fraser Health's application to expand the modes of consumption that could be supervised, most services now offer supervised injection, oral, and intranasal consumption.[4,6]

Even so, the process for establishing supervised consumption sites has not kept pace with community need. Following the lead of activists that set up "pop–up" supervised injection sites, the Government of B.C. issued an order allowing health authorities to establish Canada's first overdose prevention sites in December 2016.[7] These are low–barrier services where clients can be monitored while using pre–obtained illicit drugs. They are typically operated in partnership with community agencies and without authorization from the federal government. As of March 31, 2018, 25 overdose prevention sites in B.C. had received 826,064 visits and reversed 5,386 overdoses with no deaths.[8] The flexible model has led to innovative practices such as peer supervision and supervision of inhalation via an outdoor tent.[9] It has also allowed Island Health to offer supervised consumption services in smaller communities such as Port Alberni and other agencies to target vulnerable populations such as women and people living in high–risk housing complexes.[10-12] Overdose prevention sites have since been established in other provinces and the federal government has created a process to authorize them.[13,14]

Faced with a contaminated drug supply, Vancouver Coastal Health implemented the first legal drug–checking service in Canada. A one–year pilot at Insite, the first supervised injection site in North America, showed that drug–checking using test strips designed to test urine for fentanyl could prevent overdose by encouraging clients to reduce their dose.[15] Since then, fentanyl drug–checking has been expanded across the province with calls for further expansion.[16] More advanced drug–checking using an infrared spectrometer is also being evaluated by the B.C. Centre on Substance Use with health authority partners.[17] Additionally, information about drugs is being shared with the drug–using community through a novel anonymous text–based, two–way messaging service called the RADAR network.[18]

The B.C. Centre for Disease Control established a provincial Take Home Naloxone program in 2012.[19] The program, which provides training and kits containing naloxone, an antidote to opioid overdose, has been scaled up, distributing over 56,000 kits in 2017, with at least 14,000 kits used to reverse overdoses that year.[20,21] The kits have also been used by community organizations to create innovative programs such as Portland Hotel Society's "Spikes on Bikes" mobile overdose prevention and response service.[22]

Building the capacity of peers and reducing stigma has been a focus in B.C.[23] Best practices for peer engagement and use of respectful language have been developed and peers in Vancouver can now obtain a "street degree" in overdose prevention at the Molson Learning Lab.[24,25] However, many lack the scientific background to publish in peer–reviewed journals, leaving the scientific impact of many interventions undocumented.

Despite these innovations and others in the field of addiction treatment such as injectable opioid agonist therapies, preventable overdose deaths continue at an unacceptable rate. Now is the time for medical students and researchers to fight against stigma and turn their attention to studying the complex phenomena of drug use, overdose, and addiction if we are going to turn the tide on this devastating crisis.

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Wildfire smoke: Health effects and protective strategies

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Citation: UBCMJ. 2018: 10.1 (5-6)

The wildfire season of 2017 was one of the worst on record in British Columbia, with over 1.2 million hectares of land burned.[1] Intense media coverage focused attention across the province on the impacts of these fires, including property loss, evacuations, and air quality. With British Columbia (B.C.) expected to have a warmer and drier climate in the future due to global climate change, these impacts will become more severe and more frequent as wildfires increase. In this article, we review the impact that wildfire smoke and its constituents have on public health, and suggest strategies for physicians to protect those under their care from these harms.

Smoke from forest and wildfires is a mixture of fine particles and gases such as volatile organic compounds, nitrogen oxides, and carbon monoxide.[2] It is clear that these constituents are harmful to human health. Hospital admissions and deaths increase during and shortly after widespread wildfire smoke exposure, due primarily to exacerbations of respiratory illnesses such as asthma, chronic obstructive pulmonary disease (COPD), and bronchitis.[3] These effects result from irritation of the respiratory tract, which in turn causes inflammation with shortness of breath and wheezing. Children, the elderly, and those with chronic illnesses are especially vulnerable.[4]

The effects of suspended particles of solids and liquids, called particulate matter, have received particular attention as a human health hazard. Particulate matter (PM) has different health impacts depending on its size. Particles over 10 micrometers in size typically do not penetrate into the lungs, but can irritate the nose, eyes, or throat. Particles under 10 micrometers (called PM_{10}) enter the lungs, are deposited in the bronchi, and contribute to lung inflammation and respiratory symptoms. Particles under 2.5 micrometers in size (called $PM_{2.5}$) penetrate more deeply into the alveoli, where they prompt further inflammation. In B.C. specifically, physician visits for respiratory conditions, as well as medication dispensations for asthma,[5] increase following forest fires releasing high $PM_{2.5}$ levels.[6,7]

Due to its small size, $PM_{2.5}$ can translocate into the bloodstream. Here, these particles can cause systemic inflammatory responses, endothelial dysfunction, and release of free radicals, as well as impair function of the autonomic nervous system.[8] As a result, cardiovascular disease, including acute coronary syndromes and strokes, are increased during and after exposure to wildfire smoke.[4,9] In children, exposure to $PM_{2.5}$ can exacerbate asthma and impair lung development, and has also been associated with neurodevelopment disorders via similar system effects.[10,11]

Given these health effects, how should physicians respond to wildfires? First, they should be aware of the air quality in their community and how it may be impacted by nearby fires. An important measure is the Air Quality Health Index, which combines measures of air pollutants into a single, easy–to–interpret measure of risk.[12] Many communities will also have $PM_{2.5}$ level measurements available separately. Most of the air quality regulatory agencies use 24–hour and annual average $PM_{2.5}$ levels to set air quality objectives. For example, in B.C., the $PM_{2.5}$ quality objectives are 25μg/m^3 averaged over 24 hours and 8μm 3 averaged over one year. However, research currently cannot identify an exposure level to $PM_{2.5}$ below which there are no negative effects. Physicians should also be aware of those patients in their care who are most at risk: those with existing chronic cardiovascular disease and the elderly.[13] Physicians should keep in mind that the effects of smoke may be magnified during times of unusual heat.[14]

Solid evidence on what interventions should be recommended to those at risk of wildfire smoke is lacking. There are good a priori reasons to believe that remaining indoors and reducing activity reduces the effects of smoke. $PM_{2.5}$ levels are lower indoors than out, and can be up to 80% lower.[15] During physical exercise, air intake may increase 10-20 fold and enter more deeply into the lungs, worsening the effects of PM.[16] Reducing outdoor activities and increasing time indoors seems to protect asthmatic children against some effects of fire smoke,[17] but evidence for the general population is lacking.[15] Remaining indoors and reducing activity has the additional benefit of keeping individuals cooler and out of summer heat, which can exacerbate the negative effects of wildfire smoke.[14] During heat waves, however, vulnerable individuals should be reminded not to try to avoid smoke by keeping all windows closed. This can exacerbate the health risks of high heat.

Evidence on the use of masks to protect against wildfire smoke is mixed. Appropriate masks (N95) do reduce exposure to harmful $PM_{2.5}$, but overall effects are mixed due to the need for education on correct mask usage and proper mask fit.[18,19] Studies have reported that mask use gives no benefit,[17] but also that mask use can confer decreased odds of respiratory symptoms.[20] Surgical or procedural masks offer no protection and should not be encouraged.[18]

There is good evidence that using portable high efficiency particulate air (HEPA) filtration units in homes is effective at reducing exposure to PM associated with adverse health effects. HEPA filters reduce PM 2.5 by up to 55-85% within homes[21-23] and roughly halved the odds ratio of worsening chronic respiratory illnesses due to smoke.[17] They also decreased markers of cardiovascular stress in those exposed to fire smoke.[23] Ideally, homes should include HEPA filters as well as air conditioning to protect against the dual effects of smoke and heat. There has been no study that directly evaluated the use of community shelters (shopping centres, community centres) to protect against smoke, but PM levels are generally lower than in homes without air filters.[24] There is also no direct evidence that enhancing filtration within institutions such as schools or hospitals reduces negative health impacts of smoke.[2]

Overall, it is reasonable for physicians to rely on the health messages that accompany the Air Quality Health Index, which guide individuals at risk to reduce their time outdoors and reduce exercise as air quality deteriorates. Particularly when high levels of smoke occur during a heat wave, physicians should consider recommending patients at risk visit indoor air–conditioned public spaces such as malls or libraries. When necessary, local Medical Health Officers may make further recommendations, and physicians should be prepared to discuss these with their patients at risk. Physicians may also want recognize the current Air Quality Health Index, as well as temperature, as part of a COPD action plan or other related health planning for their patients with chronic disease. At a systemic level, physicians should be aware of the impact of air quality on the health of their patients and consider how community actions, such as those that decrease other sources of air pollution, may reduce the burden of pollutants.

Physicians should also be aware of other important sources of particulate matter in addition to wildfires. In urban areas, particulate matter is associated with vehicle traffic and includes not only the emissions from combustion but also products of mechanical wear including tire and brake pad degradation.[25] In rural areas, wood–fired stoves and fireplaces are a significant source of particulate matter.[26] The likelihood of exposure to these different types of particulate matter varies across British Columbia, but good evidence of how they

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may affect health differently is lacking.

Many resources are available to physicians regarding air quality and wildfire smoke. Metro Vancouver (which manages air quality in the Vancouver region) and the B.C. Ministry of Environment and Climate Change (which manages air quality in the remainder of B.C.) have real–time readings of air quality available online. Air quality advisories and/or Smoky Skies Bulletins, issued by the Ministry of Environment and Climate Change in conjunction with local health authorities, contain details of the expected severity and duration of smoke events. The B.C. Lung Association has many resources online including reports, webinars, and videos, and the BC Centre for Disease Control has produced a set of detailed evidence summaries of the health impacts of wildfire smoke and effectiveness of interventions.

With a warmer, drier climate, wildfires will be larger and more frequent. British Columbia's physicians can be key advocates for their patients and communities by being aware of this increasing risk, how it impacts their patients, and how to best reduce it.

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Is there a relationship between female ballet injuries and maturation? A review

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Citation: UBCMJ. 2018: 10.1 (7-9)

Abstract

Ballet dancers are a historically underrepresented cohort in the field of sports medicine. Although increasingly more research is being conducted on the dancing population, as of recent, many questions remain. Young, elite, female dancers have high rates of injury with longstanding adverse consequences though further research is required to better understand the etiology of injuries in this demographic. What is apparent is that the injury location is often the lower extremity and back, whereas the injury type is often stress fracture and overuse injury. Delays in menarche and menstrual irregularities are often present in female dancers which may impact skeletal development during the critical time of bone accrual and subsequently increase the risk of dancers acquiring injuries such as stress fractures. Issues of energy availability and training demands during adolescence may also influence injury patterns and require consideration. Determining the contributions of these various factors to the types of ballet injuries during adolescence is an important direction of future investigations. Furthermore, developing appropriate screening measures and effective treatment strategies is of value for maturing female ballet dancers.

Introduction

Evidence in the discipline of dance medicine is limited compared to sport science investigations of other athletic endeavours; however, the production of literature regarding ballet dancers is gradually expanding. The need for continued study of ballet–resultant injuries is warranted considering the high injury rates being documented in elite adolescent ballet dancers.[1-3] There remains a gap in the literature currently as to how a delay in the onset of menarche or menstrual dysfunction are related to a dancer's injury occurrence in the pre–pubescent and pubescent years, especially across different injury types acquired in ballet.[4] This review aims to present the impact of energy and hormonal imbalances, puberty, and skeletal maturation on the types and rates of injury within adolescent ballet dancers.

Injuries in adolescent ballerinas

As most ballet injury–based research has been conducted retrospectively in adult professional dance populations, there is less evidence as it relates to injuries sustained in the pre–adolescent and adolescent years.[4-6] Importantly, the impacts of injuries acquired during the early training years persist, often reappearing during one's professional career or leading to dropout prior to a professional career, and subsequently affect other forms of physical activity participation.[5,7] Musculoskeletal injury is a substantial risk for ballet dancers, whose athletic pursuits require training in extreme positions of joints.[1] Common injuries cited include those of the lower extremities and overuse injuries, particularly through the spine.[2,3] Overuse injuries consistently account for the majority of injuries, whereas fractures have been found to be responsible for the longest recovery time.[2,4] Although in–depth examinations of the different injury types presenting during ballet training are needed, it is difficult to do so without accounting for the multivariate underpinnings of ballet injuries. For example, time lost from practice cannot be relied on to classify injury prevalence or severity because most dancers will continue to train through an injury.[2]

Energy, availability, menstrual irregularity, and ballet training

Dancers tend to have a lower body mass index, shorter height, lower weight, and smaller breast circumference than non–dancers.[5] For example, both small stature and low height was found in 18% of adolescent dancers compared to 9% of controls in a study of adolescent dancers.[5] The relevance of an extremely lean body in classical ballet is its association to a delay in the onset of menarche and subsequently strong predictive nature for acute injury.[6–9] The delay of maturation and growth of female dancers may partially be due to selection and self–selection of those who genetically mature later, are lighter weight, and are shorter[10–12] rather than as an outcome of dancing itself.

In relation to leanness, inadequate eating patterns can arise from a combination of factors such as high intensity training or pressures to reach weights for performance or aesthetic enhancement that are unrealistic.[13] It is now believed that the relative energy deficiency between energy intake through diet and the body's various forms of energy expenditure, appears to be the driving cause of the phenomenon in athletes commonly known as "Female Athlete Triad," and now being referred to as "Relative Energy Deficiency in Sport."[14] Energy balance is cited as 45 kcal/kg of fat–free body mass,[15] and female dancers are recommended to intake 45-50 kcal/kg when heavily training.[16] Intake below the threshold of energy availability at 30 kcal/kg of fat–free body mass runs a risk of hormonal suppression[17] and the result of energy deficiency subsequently includes negative physiological impacts on systems such as menstrual functioning and bone health.[14] The older theory of 17% body fat being required for onset of menarche and 22% body fat required for maintaining menstrual cycles in adulthood may not represent truly accurate numbers;[18] however, the trend of adequate fat mass and energy availability being required for the female reproductive system to operate effectively, appears to hold true.

Menstrual disturbances from insufficient energy availability can include oligomenorrhoea, primary amenorrhoea, or secondary amenorrhoea, which are menstrual cycles longer than 36 days, no menstruation by 16 years of age, and a post–menarcheal absence of three consecutive menstrual cycles, respectively.[13,14] Female dancers show a greater prevalence and length of all of these menstrual abnormalities, with rates of stress fractures increasing alongside delayed or halted menstruation.[4,5,7,8,10,19,20] In addition, they exhibit higher incidences of

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delayed onset of menarche, delayed growth and maturation, and sexual immaturity, compared to non–dancers. [5,7,8,10,20] For example, Kadel et al.[21] found 80% of pre–professional dancers to have delayed onset of menarche, 56% of dancers with stress fractures and amenorrhoea, and most notably amenorrhoea corresponding to a 93 times greater chance of developing a fracture. Even so, the contributions of activity, body composition, and genetics to the maturation of young dancers[8] and how they relate to the various injuries seen around the time of puberty are not fully understood.

Puberty, skeletal development, and injury

Injury prevalence in dancers corresponds with increasing age of the dancer and amount of dance exposure, which in pre–professional training increases concurrently with the beginning of the adolescent growth spurt.[10] Bone mass acquisition, modeling, and remodeling are highly influenced by the female reproductive system throughout puberty,[22,23] a period of time in which there is an asynchrony between the growth rate of one's stature and the rate at which the accumulation of bone mass occurs.[10] The hypothalamic–pituitary–gonadal system is interrelated to both puberty and skeletal maturation in a variety of ways.[24] The complex interactions of hormones such as sex hormones, growth hormone, and insulin–like growth factor I (IGF–I), that increase at the onset of menarche, also regulate osteoblastic lineage cells, thereby stimulating radial and longitudinal bone growth in addition to the rapid acquisition of skeletal mineralization.[22,23,25] For example, plasma levels of IGF–I rise during puberty and stimulate osteoblasts to differentiate and proliferate thus enhancing osteoblastic activity to form the extracellular matrix and increase the size of a bone.[26] Estrogen appears to play a protective role for conserving bone mass and inhibiting bone loss by extending the lifespan of the cells through increased osteoclast death and decreased osteoblast and osteocyte death.[22,26]

Bone mass acquisition peaks in females at menarche,[22] with one third of peak bone mineral density gained within the four years surrounding menarche's onset.[23] During the time of skeletal development, bone is relatively fragile for one's body size and has less resistance to mechanical stress, explaining why the highest incidence of fractures are recorded during the adolescent period.[3,22,24] Bone mineral density is known to be highly influenced by genetics,[27] with differences in bone mass measurements found between those with earlier and later age of menarche potentially already present before pubertal maturation or introduction to professional dance training.[11,12,24] However, with hormonal and menstrual pattern abnormalities and energy deficiency comes the negative effects on bone mineralization including osteoporosis and stress fractures.[10,13,28] This may be amplified when intensive or elite ballet training is initiated prior to puberty, since hypothalamic–pituitary function may be altered and cause a delay in menarche.[13] Delayed menarche has further been shown to correspond with lower bone mineral density in locations such as the spine, as well as with the high incidence of stress fractures, scoliosis, and other injuries seen in young ballet dancers.[4,10,21,24,26,31] For example, dancers with stress fractures have experienced a higher age of menarcheal onset at 15.2 years as compared to 13.5 years in dancers without stress fractures,[29] and 83% of dancers with scoliosis have had delayed onset of menarche, with 44% of dancers with scoliosis experiencing secondary amenorrhea.[19]

There are opposing views in regards to whether dancing has a harmful or protective effect on bone health, given that the findings on dancers' bone mineral density are unclear.[20] Research suggests that bone–forming cells may be stimulated by activities of dancing including jumping and weight–bearing, which require high levels of muscular strength.[20] Professional female ballerinas have reported higher bone mineral density at impact sites when compared to controls;[20] however, such findings are not consistent since low bone mineral density at non–impact sites, the lumbar spine, and throughout the whole body, have been found across available studies of dancers' bone mineral density. [27] The intensity, volume, and frequency thresholds of dancing to produce enough gain in bone mass to classify it as an osteogenic activity remain unknown and the negative effects of issues such as amenorrhea and low energy availability on the skeletal system are likely not fully offset by the weight–bearing nature of dance training.[27]

Identification of dancers at–risk

With high injury rates being seen in the training years, continued investigation into injury prevention strategies are needed along with the identification of major risk factors. Risk factors found for professional dancers cannot necessarily be assumed to be accurate for younger dancers[4,6] given the structural and physiological changes occurring during puberty and adolescence. Therefore, it would be of benefit to determine feasible screening and monitoring procedures for at–risk dancers during this time of skeletal immaturity, when the risk of overuse injuries is high.[10] With the onset of menarche being a prominent sexual developmental milestone,[24] using timing of onset of menarche as a marker for tracking maturation may be a possibility in such strategies. Addressing the complex interactions of training parameters, nutrition, pubertal status, and genetic predispositions on the musculoskeletal development of elite female ballet dancers in pre–adolescent and adolescent years appears to be a promising direction for further investigations.[7,11,30] In addition, it is of benefit to better determine puberty's effects on non–skeletal injuries in the adolescent elite dancing population. Health care professionals, dance teachers, and parents should all be cognisant of the time surrounding puberty when physical changes are occurring, as anatomical limitations may be present for female dancers and excessive volumes of intensive training and stretching may need to be adjusted.[31]

Conclusion

There is growing attention for the field of dance medicine that recognizes the athleticism and complexities involved with ballet and its training. Understanding the injuries of adolescent elite ballet dancers requires attention, as overuse injuries, stress fractures, and lower extremity injuries are prominent. The timing around puberty appears to be of particular interest for injury, due to its importance in skeletal development. Since dancers may exhibit issues with menstrual functioning and energy availability, the impacts of such factors on various injury types also require consideration. Due to the nature of ballet training and its desired aesthetics, a delay in sexual maturation and its subsequent effects on the skeleton are likely to make dancers vulnerable to injury during the skeleton's period of growth. Further research is encouraged to better understand these interactions and develop effective screening and injury prevention strategies.

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Investigating gender–specific determinants of help–seeking behaviours in older adults with hearing loss who participated in a community group auditory rehabilitation and exercise program

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Citation: UBCMJ. 2018: 10.1 (10-13)

Abstract

Objective: Hearing loss (HL), which affects 78% of Canadians aged 60–79, can negatively impact socialization, health, and cognition. Many people take years to seek help, and most go undiagnosed or untreated. Walk, Talk 'n' Listen (WTL) was a community based group auditory rehabilitation program for older adults with HL assessing the benefit of adding group exercise and health education to group auditory rehabilitation. Unlike in most group exercise programs, the majority of participants were men. This prompted our exploration of the motivators and barriers to help–seeking in older adults with HL in both men and women.

Methods: Semi–structured guided interviews were conducted with 14 participants of WTL. Qualitative content analysis identified key themes within each cluster of ideas discussed.

Results: Participants discovered their HL through difficulties functioning or by external advisement (via family members or hearing tests) and were motivated to seek help for the same reasons. Men were specifically motivated by their partners. Denial was the main reason for delay, followed by pride/stigma. Participants joined the WTL to be proactive in their health, for physical activity, because they felt it was relevant for them, and, for men, because of support from others. Barriers were either physical (geography and disabilities) or social (denial, resistance to change, or misconceptions about WTL).

Conclusion: Older adults are delayed in recognizing and understanding the extent of their HL, and thus delayed in seeking help. This could be mitigated by improved screening of HL in older adults or by targeting family members to promote help seeking, especially men's communication partners.

Introduction

Hearing loss (HL) is common in older adults, with up to 78% of Canadians aged 60–79 affected.[1] The negative impacts of HL include declines in health, physical activity, and social involvement,[2] as well as depression, anxiety, and loneliness,[3] all of which are already a challenge for older adult populations. Unfortunately, few of those with HL ever seek help for their hearing. For those who do, it can take ten years to recognize one's HL and another ten or more years before finally seeking help.[4]

Auditory rehabilitation includes using hearing aids (HAs), coping mechanisms for specific environments, cognitive training to increase comprehension, and information and instruction on available technology as a means to mitigate the limitations imposed by HL and improve overall function.[5,6] HAs are the main form of rehabilitation and can reduce mortality in older adults with HL.[5] However, only approximately one in three of those who could benefit from a HA actually use one.[7,8] Further, those who do obtain a HA often discontinue use after acquisition.[9] This could be due to stigma surrounding HA use,[6,10,11] problems with effectiveness,[12] technical difficulties,[2] or thinking that one's HL was not severe enough to warrant a HA.[13] In older adults who began using HAs, additional auditory rehabilitation has been shown to improve hearing abilities over time.[14]

Walk, Talk 'n' Listen (WTL) was a community group auditory rehabilitation (GAR) program for older adults with HL in the form of a randomized control trial (RCT) comparing the health benefits of adding group exercise and health education/socialization to bi–weekly GAR classes that included education about hearing, hearing technologies, enhancing communication skills, and psychosocial support.[15] In most community based physical activity programs, the majority of participants are women; usually two thirds or more of participants are women.[16,17] However, 58% of WTL participants were men.[15] Although HL is more prevalent in men than women,[1] this alone might not explain the demographic composition of WTL. This prompted our research question: what motivates older adults to seek help for HL, and does this differ between genders?

There is minimal literature on the gender differences in motivators to help–seeking for HL, specifically in the context of auditory rehabilitation. The majority of published research includes only the acquisition of HAs as a measure of help–seeking behaviour and does not examine other methods of auditory rehabilitation.

In this study, we examined the motivators and barriers that older adults face when seeking help for HL by interviewing participants of a community GAR and exercise program to understand their perceptions of HL and help–seeking, and to note any difference in responses between genders. By understanding what influences older adults to seek help for HL, we can better tailor similar programs to increase participation and improve hearing and other health–related outcomes, and therefore reduce morbidity and mortality in older adults with HL.

Methods

Recruitment

We employed a homogenous sampling technique of previous WTL participants. Ambulatory adults aged 65+ with self–declared HL were recruited to participate in the WTL through advertisements in audiologists' and otolaryngologists' offices, seniors' venues, the YMCA, local newspapers and newsletters, or by recommendation of their audiologist. After completing the program, 39 participants were emailed inviting them to discuss the WTL and their HL. Interviews were scheduled for those who wished to participate. Ethical approval was granted by the University of British Columbia Behavioral Ethics Board (H15-02319).

Data Collection and Analysis

One–on–one interviews were conducted following a script of guided questions and targeted probes related to HL, help–seeking behaviours, and experiences with the WTL.[see Appendix 1] The interviews were audio–recorded and transcribed verbatim. Qualitative content theme analysis was performed using the Miles and Huberman method.[18] Transcripts were reviewed independently by three researchers to identify clusters relating to the interview questions and key themes in each cluster. Final clusters and themes were decided by consensus among the three researchers. Results were compared between men and women to determine trends among genders. Results pertaining to help–seeking behaviours and participation in a community GAR/exercise program are presented here.

Results

Fourteen participants were available to meet for an interview: eight men and six women. All were in the intervention group, except two women and one man from the control group. Demographic information can be found in Appendix 2. The clusters identified were: 1) hearing loss; 2) help–seeking; and 3) the WTL program.

Hearing Loss

Participants first recognized their HL due to its functional impact or by external advisement. HL began to impact their ability to function in work (n=2) or social settings (n=6). They were unable to hear what others were saying or missing things in conversation. Some noted frequently requesting that people repeat themselves, especially in crowds or public places. Others began to recognize their HL when

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family and friends informed them that they were missing things (n=7). The participants' relations expressed complaints about not being heard, having to repeat themselves, or that the TV was too loud. For the women, these complaints were from family and friends, while three of four men mentioned their partner specifically. Another common theme that emerged was discovering their HL after failing a hearing test (n=5). Some participants did not notice their HL or see it as a problem, so the discovery was a surprise.

"That's when I said oh do I have a HL? 'Cause you know lots of times you don't even think you really [do], at the beginning stages you're not really aware of it."(3m)

Help-Seeking

Interviewees spoke about their decision to seek help for their HL, including what motivated and delayed them. They also discussed different strategies they had attempted to mitigate the impact of HL.

Help–Seeking Motivators

Participants reported a variety of factors that prompted seeking help for their HL (Figure 1), falling into the same categories as HL recognition: functional difficulty and external encouragement.

Functional Difficulty

Eight people said the main motivator to seek help was difficulty in situational functioning, with equal representation between genders. Some participants were having trouble at work, in meetings, or in lectures.

"So I thought if I'm going to be able to keep my job I better do something about it."(6w)

Others were most motivated to seek help by their inability to hear conversations, impacting their ability to socialize.

"I wanted to hear what people were talking about more than anything else." (8m)

"Well just because I had a hard time if I was in with… a group."(12m)

External Encouragement

For some participants, the discovery of one's HL by failing a hearing test was reason enough to seek help. For others, however, a big source of motivation was family members (two women) or a partner (three men); their frustrations due to HL were causing stress in their relationships.

"The constant aggravation of my wife getting after me about not being able to hear things and doing something about it." (5m)

Help–Seeking Delays

Participants reported various reasons for why they or others might be delayed from seeking help, which included denial, pride, or technical concerns (Figure 2).

Denial

Denial was the most prominent theme (n=8). Many respondents were unwilling to admit the extent of their HL or downplayed its impact. Some men described how their HL was not bad enough to warrant seeking help (n=6). They felt they were still coping and did not yet need any assistance, so they had not yet obtained HAs.

"I won't say denial would be the word, but ya know I'm still coping with my hearing the way it is right now. I do see that uh I'm missing stuff, uh my wife is mentioning that uh the TV is too loud, especially at times, and things like that and then you also miss out on little things, like hearing the rain in the gutters and the birds in the, outside ya know the house and things like that, but so I haven't quite gotten the point where I'm going to get a hearing aid but I think about it pretty quick." (3m)

"I didn't feel, as far as the hearing concerns, well I'll miss some things, but it's not that important anyways." (8m)

"There was probably some procrastination in those days because I didn't think it was all that bad." (10m)

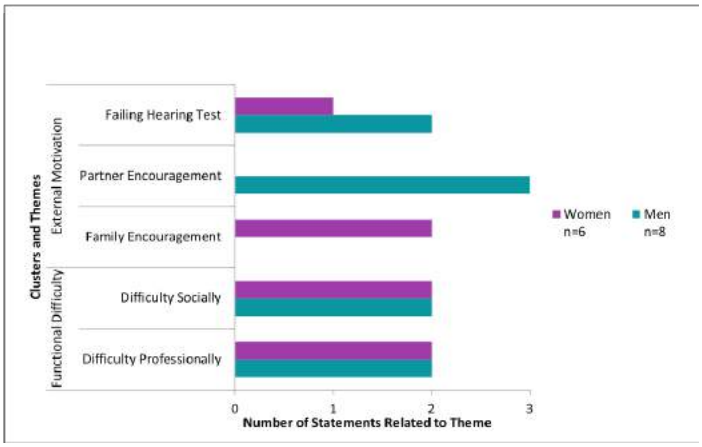

Figure 1 | Motivation to seek help for hearing loss

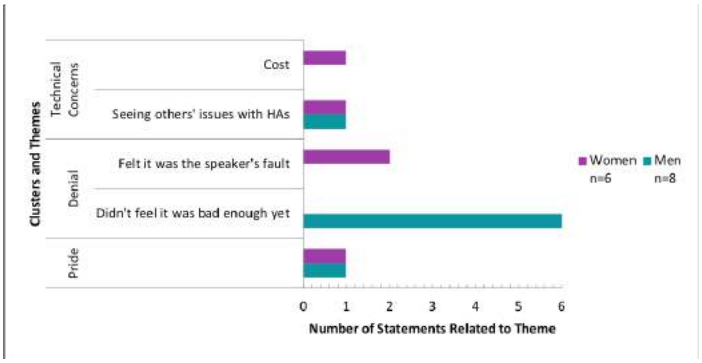

Figure 2 | Delays in the decision to seek help for hearing loss

Two women denied their HL was to blame because they felt the speaker was not speaking up properly.

"I don't think I ever noticed, it was always somebody else's problem, they weren't speaking up or they were mumbling or, I just never put it together that it would be me." (9w)

"I thought probably it takes two to, uhm that the speaker is in fault, he should make himself understood and properly talking." (2w)

Some participants denied that their HL required intervention because they doubted it would benefit them.

"I always had to question, ya know "Do I really need hearing aids? Would hearing aids help?" (12m)

Resistance to change was mentioned as a factor that played into denial. One man's description of why he thought some people never seek help for their hearing is as follows:

"I think people, depending on their personality, um have a tendency to resign themselves to the fact that they can't hear, and nothing is going to change the fact…so they don't recognize that … there are things that you can do that may assist you to better hear at the level that you're hearing … people depending on their age, they're not into changing things." (4m)

However, none of the participants reported resistance to change as a delay for themselves, rather as a reason that others might not seek help.

Pride

Other participants noted pride as preventing them from seeking help; they felt that HAs were for old people and that they were not ready to accept that in themselves (n=2). They also mentioned the stigma of wearing HAs as a deterrent.

"Pride, not wanting to have something sticking in my ear. Not, ya know, thinking that HL is related to old age and not admitting the fact that I was getting older." (5m)

Technical Concerns

Lastly, respondents noted technical concerns that delayed them from seeking help. Some participants were deterred by preconceptions about HAs from seeing others having difficulty or hearing that they were ineffective or unhelpful. For one, cost was a barrier.

Most participants described delays related to acquisition of HAs and had not tried anything else for HL (n=11). Lack of awareness appeared as a barrier to accessing other forms of auditory rehabilitation, as many participants were unaware of other help available and had never heard of auditory rehabilitation.

"What else do you do? Besides a hearing aid?" (13w)

"Actually I never realized that there would be groups with HL because I've had it for so long, uhm, it just was part of me, like I didn't consider it a disability of any kind, it was just me and my family. All of my brothers have hearing aids. And it was just us so I didn't realize it was a disability." (11w).

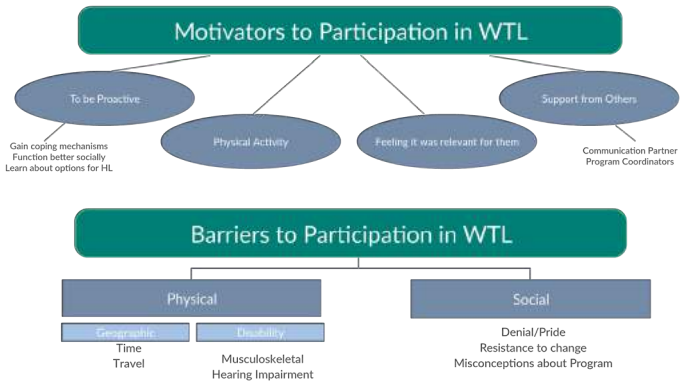

Figure 3 | Motivators and barriers to participation in the WTL program

The Walk, Talk 'n' Listen Program

Motivators to Participate

There were four main themes motivating participants to join WTL: to be proactive, for physical activity, feeling it was relevant for them, and through support from others (Figure 3). The first three themes had equal gender representation; however, support from others as an influence to participate was mentioned only by the men interviewed.

The majority of participants were motivated to attend as a way to be proactive about their HL and were willing to try anything that might benefit their situation (n=10). in lectures.

"In terms of my health… ya know I don't like to sit back, I like to be my own advocate" (4m)

Specifically, some were hoping to gain advice for coping in group situations (n=3), while others wanted to know if there were alternative options they were not aware of (n=5).

"Well again, I thought that maybe I might learn something, uhm when the audiologist I had...had never ever given me any kind of advice except what kind of hearing aids to buy, so I thought 'Hm, I might learn something'." (9w)

"It's been now what about, yeah almost ten years now that I look back on having the dysfunctional hearing so I was hoping you know that things had progressed and I would learn something new about it" (11w)

"What was of interest was the fact that there were strategies that might help you to better engage, uh in terms of uhm human dynamics" (4m)

Another motivator to join was the opportunity for physical activity. The program offered regular exercise that would increase their physical activity and improve their fitness, and this was perceived as a strong benefit to the program (n=5). However, for three of the five reporting this, exercise was a secondary factor in the decision to participate.

"I was also really interested in the exercise program. I was looking forward to something more challenging." (11w)

"It will also maybe uh encourage me to be a bit more active, uh physically–wise, which doesn't hurt." (3m)

One theme that emerged was unique to men: they mentioned that their participation was motivated by support from family members or partners, or as an opportunity to support their partners (n=3). Whether they joined WTL because of support from their partner who suggested it, or for something that they could do together to support each other, it was clear that supporting loved ones was a positive motivator to join. Participants also mentioned that speaking with the program coordinators, who were very positive and supportive, gave further motivation to participate.

Another reason participants joined WTL was that they felt the program was applicable to them (n=3). After reading the advertisement, they felt that they fit the target group for which the program was designed.

"Well because I am a senior, I am experiencing HL, and that was what it was all about basically, so I thought well let's give it a shot and see if it has something that I can benefit from." (5m)

"The part of the ad that talked about withdrawing from conversations, I recognized that, and that worried me." (13w)

Barriers to Participation

Upon exploration of barriers to participation in the WTL, concepts emerged in themes of either physical or social barriers. Genders were equally represented in each theme.

Physical barriers

Physical barriers included geographic factors such as time and travel. Although one participant suggested that time would not be much of an issue for seniors, seven participants thought that both the length of the program and the time to travel to and from the program was difficult to manage. One participant initially thought time would not be an issue but felt the toll part way through. Location was also mentioned as a possible barrier to participation (n=9). Some older adults no longer drive, while others might not feel comfortable travelling through heavy traffic or on highways out of town.

Difficulties regarding physical participation in the program were mentioned. For example, HL itself was suggested as a barrier (n=2 women); those with more severe HL might not be able to hear well enough to get anything from the program, especially in the setting of group discussions or fitness classes with loud background noise.

"I drove one lady home once, and she really couldn't hear a lot that was going on so she quit." (9w)

With verbal prompting, nine participants agreed that physical activity might be an issue for some. They felt that if the physical activity was too advanced for an individual's ability, then they might be deterred from participating. Another noted that one has to value physical activity as a worthwhile use of their time in order for them to participate.

Social Factors

Social factors were frequently suggested as barriers for others to participate in the WTL (n=12). Participants mentioned that denial or pride might deter someone from participating (n=7). They suggested that some might believe HL is for "old people" and would not feel comfortable identifying themselves as part of that group. Some might not be ready to accept that their HL is at the point where they could benefit from seeking help.

"I would guess, it falls back on pride. And because you think you can still hear things, and it's as long as can be, you know, you think that. And you say to yourself 'Ah I don't need to go there, for any kind of help'" (8m)

"I think everybody uhm deals with HL differently, and some people are embarrassed by it. I think that would be a big thing, is to step forward and sort of identify yourself with a bunch of people. One thing I did find is I found most of the people there were much older than me and I think if I had known that in advance that might have slowed me down on signing up, I might have, sort of had this pride thing 'Well I don't need to hang around with a bunch of old people'". (10m)

Some of those interviewed felt that older adults would not participate in the program because they are either resistant to change or do not think it would help much (n=4). Participants suggested that some people might have given up and are unwilling to try anything new. Although the two sentiments—resistance to change and thinking it will not help much—seem to be separate ideas, the interviewees described them together, as if they were part of the same concept.

"Just because they're kind of, they might be resigned… they might feel, this is just how it is, and I can't see how anything is going to help me, because as you get older you tend to do that kind of thing a bit more, ya know you're not looking for something new or ya know, you get used to it." (6w)

Another suggestion was that, if people did not understand what the program was about, they might be deterred from participating (n=3). For example, they might not see the value in it or not think they were eligible and not sign up.

Participants were asked if they thought the group component of the WTL program might deter participation. Three people said this could be possible if someone prefers socializing one–on–one over a group environment; however, none noted this for themselves or suggested it as a barrier for others (other than hearing difficulties associated with group settings).

Discussion

Older adults primarily discovered their HL through functional difficulty and external advisement. The motivators to seek help fell into similar categories: improving functional ability and through external encouragement. This suggests that HL becomes apparent only once it limits one's interactions with others, and recognizing these functional deficits motivates help–seeking. This mirrors Southall's findings, which described the decision to seek help depending on the balance of negative factors, such as ability limitation, and positive factors, such as encouragement from family.[6]

Each gender had similar representation in the categories of improving social

and professional ability; however, when being encouraged to seek help by loved ones, men were specifically encouraged by their communication partner (i.e., their wife). Similarly, research examining strategies for dealing with social isolation found that women felt responsible to make arrangements for their husbands to be more socially active.[19] This implies that focusing efforts on promoting rehabilitation to women might be more effective at increasing overall participation. Further work is needed to examine this finding.

In agreement with the literature, the most common barrier to help–seeking for HL was denial. A new finding was that men and women differed in how they described denial. Men did not believe their HL was bad enough to warrant HAs, while women felt their difficulty hearing was due to traits of the speaker. One population–based study from Japan found that men had a tendency to underestimate their HL more than women,[20] similar to the men's reports here. However, this is the first time any gender differences in denial of HL have been reported. Further research into this phenomenon is warranted to investigate if this applies to different populations and, if so, how each gender's experience of denial could affect their help–seeking behaviors.

Of note, some results suggest that denial might be more complex and could be more closely related to not realizing the extent of one's HL. Specifically, since many participants were either surprised to have failed a hearing test or knew they were missing things only when others told them, a lack of insight could be another delay. HL is gradual, and the effects may be subtle at first, so without external advisement via hearing tests or communication partners, some could take much longer to recognize their HL and thus longer before seeking help. Recent qualitative research found that, because participants could mitigate some of their symptoms or mistakenly attribute them to external factors, they did not recognize their own HL.[21] Laplante–Levesque et al. reported similar descriptions of how one perceives their HL as were found here, including thinking it was not yet bad enough, noticing in certain situations only, or being notified of their HL by family.[2] This could explain why 77% of Canadian adults with HL go undiagnosed.[1] Our findings, in conjunction with the literature, give compelling evidence to indicate that denial and the inability to perceive one's hearing deficits could be a common theme in many populations, and therefore future work is needed to determine the complex relationship between denial and insight into one's HL, as well as how to manage this as a key barrier to seeking help.

To address these delays in help–seeking, one endeavour worth exploring is the promotion of hearing tests in primary care. These screens could be as simple as an annual Hearing Handicap Inventory for the Elderly: ten–item screening questionnaire (HHIE–S)[22] or a single question such as "Do you feel you have hearing loss?"[23] Currently, HealthLink BC recommends discussing with your family doctor if you have any concerns regarding HL, thus putting the onus on the individual.[24] Since many individuals do not notice it early on, their HL goes undiagnosed for far longer than it might if screened adequately. By implementing routine screening in the adult population, people could become aware of their HL before it negatively impacts their functioning or relationships, and this could also mitigate denial as a barrier to help–seeking. Further, routine hearing screening could help reduce stigma by making HL and its significant prevalence more recognized within the population. Previous research suggested that routine screening by GPs could help promote self–realization of HL and hearing rehabilitation and decrease stigma by increasing visibility.[21]

The biggest motivator to participate in WTL was to be proactive in one's health, with almost every person interviewed stating this as his or her main draw. This seems to be a new, distinct motivator; being proactive in one's health is not noted in the literature to be a major draw to HL help–seeking (as determined by HA acquisition).[6,25] Participants in WTL spoke of wanting to take ownership of their health and hearing as a whole, which was described separately from the opportunity for physical activity alone. Most participants had not heard of auditory rehabilitation options beyond HAs, suggesting the need for further promotion of GAR to address lack of awareness as a barrier. It seems that combining auditory rehabilitation with physical activity, as was done in WTL,[15] could further increase help–seeking for HL in older adults. Another draw to WTL was feeling that the program was tailored specifically for them. By understanding these motivators, we can better promote the WTL and similar programs as opportunities for older adults with HL to become engaged in health promoting opportunities geared to their specific physical and social needs. Since men are further motivated by support from others, advertisements could be directed to the partners and families of people with HL as well.

Addressing the physical barriers to participation could help make the WTL and similar programs more appealing to prospective participants. Since many participants acknowledged time and travel as a participation barrier, it may be helpful to consider these factors when choosing locations and schedules for the program, such as offering multiple locations, flexible schedules, or online options. It is also important to give consideration to those with severe HL or physical limitations, such as minimizing background noise or offering modified activities.

Mitigation of social barriers to participation in a community GAR and exercise program might be a more complex task. Again, we strongly endorse the promotion of routine screening for HL to reduce denial and stigma. As with HL help–seeking in general, we feel this alone could be the most effective method to improve awareness and help–seeking behaviours in this population, thus improving the overall health, happiness, and quality of life in older adults with HL.

Limitations

There are potential sources of bias in our sample population. Our population is limited to people who participated in WTL and are therefore already open to a community program and health improvement. Our results might not reflect the attitudes of those who would not choose to participate, so we could miss key information about barriers that others face. Further, given the retrospective nature of the study, it is possible that one's experience with WTL might alter their response. Lastly, participants identified as man or woman, and those with partners were in heterosexual relationships. There was no option for non–binary gender roles. This must be kept in mind when making generalizations about gender differences and the role of one's partner in the decision to seek help.

Three of our 14 study participants were in the RCT control group, so they did not participate in the exercise portion of the program. However, since the decision to participate was made before randomization, this should not affect our examination of motivators and barriers to help–seeking.

Given the face–to–face interview style employed here, we might have encountered social desirability bias. When exploring possible participation barriers, interviewees might have been hesitant to disagree with the interviewer's suggestions, thus agreeing that the suggested barriers were possibilities. We attempted to minimize this bias by presenting the results stratified by suggestions offered on their own versus responses to probing questions. Regardless, all barriers mentioned are discussed as possibilities that can be further examined if necessary.

Acknowledgements

We thank Jodi Siever for providing demographic information on participants. We also thank Carolyn Roque for her help in the technical and administrative execution of the project. Lastly, many thanks go to the UBC Faculty of Medicine Summer Student Research Program and the Colin and Lois Prichard Foundation for their funding support that allowed implementation of this project.

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Pregnancy intention and reproductive care in women living with HIV

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Citation: UBCMJ. 2018: 10.1 (14-15)

Abstract

It is common for women living with HIV to become pregnant following their diagnosis. Rates of unplanned pregnancy are considerably higher in this population compared to the national rate. This commentary discusses possible contributors and implications of this phenomenon with a focus on the population health of women living with HIV. The goal of this commentary is to highlight the need for improved women–centered reproductive programming within comprehensive HIV care. Ultimately, this could help improve rates of unintentional pregnancy on the population level and overall reproductive care for women living with HIV.

Introduction

There are approximately 17,000 women living with HIV in Canada, indicating that women represent close to a quarter of the persons living with HIV nationally.[1] Importantly, the highest rate of new HIV diagnoses among women is in those aged 30-39 years,[2] a decade which coincides with the delayed shift of women's reproductive years.[3] Heterosexual contact is one of the leading modes of transmission of newly acquired HIV cases.[4] These are important trends to consider when examining the impact of living with HIV on a woman's reproductive choices.

Data from the Canadian HIV Women's Sexual Health and Reproductive Cohort Study (CHIWOS) on "Pregnancy incidence and intention after HIV diagnoses among women living with HIV in Canada" reported that close to one quarter of women living with HIV will go on to become pregnant following their diagnosis.[4] This is unsurprising based on the decreased morbidity and increased life expectancy of patients with HIV receiving antiretroviral therapy (ART).[5] Publically funded health care in Canada allowing universal accessibility to ART is a key contributing factor to such. Novel ART regimens are also better tolerated, and engagement in ART lessens the impact of untreated HIV on fertility.[6] Although it is not entirely clear how HIV affects and ART improves fertility, it has been demonstrated that fertility improves in women living with HIV following approximately 12 months of ART, as compared to women who are not on antiretroviral regimens.[7] It would be logical to theorize that the multi–system implications of HIV could contribute to this finding. This could be through secondary sequelae of the disease, such as hypothalamic–pituitary–ovary axis deregulation suppressing ovulation in women with wasting or cachexia,[8] consequences of invasive cervical cancer requiring excision procedures which could affect cervical competence and anatomy,[9] or tubal dysfunction from disseminated pelvic inflammatory disease creating physical barriers to fertilization.[10]

While many women living with HIV go on to have successful desired pregnancies, recognition of the high rates of unintended pregnancies in this population is important to minimize potential downstream adverse outcomes by reinforcing the need for early engagement of these women in care; it is also important to acknowledge the causes that might be contributing to this finding. The CHIWOS study reports that an estimated 27.4% of sexually active women living HIV had not used an effective method of contraception in the preceding six months.[4] Further, a study by Kaida et al. from 2016 reveals that, of the enrolled women living with HIV in Canada who reported using contraception, nearly half relied only on the male condom.[6] These data highlight the crucial need for enhanced education regarding contraceptive effectiveness and use, along with increased focus on providing universal and practical contraceptive access. This point is particularly crucial for women living with HIV, as contraceptive education must be tailored to this population to whom barrier contraception use is strongly promoted for prevention of viral transmission, yet might not be adequate as the sole means of contraception. Furthermore, seroconcordant couples might opt to not use any form of contraception if they perceive no concern of viral transmission to the partner.

Interestingly, the CHIWOS study describes that 61% of all pregnancies in their study group of women living with HIV were reported as unintended.[4] It is important to note that these results are significantly higher than the overall rates of unplanned pregnancy in women of reproductive age in Canada, which is estimated at 27%.[11] While these numbers draw attention to the prevalence of unintended pregnancy in women living with HIV in our country, it is imperative to consider both the individual and societal implications of such realities, along with the potential causes contributing to these data. Although it is generally understood that women who become unintentionally pregnant are at risk of suffering a psychological burden, the consequences of such news can have accentuated psychological and social implications for women living with HIV, such as concern over viral transmission to the fetus.[12] Unintended pregnancy can also lead to potential adverse outcomes, such as unsafe or uninformed termination practices, decreased engagement in care due to fear of stigmatization, fewer pregnancy–safe choices in the prenatal period, or delay in identification and subsequent treatment of obstetrical complications.[13] While these implications can relate to all women with unintended pregnancies, if pregnant women living with HIV choose not to obtain prenatal or obstetrical care, an important opportunity to engage these women in their healthcare is being missed. Pregnancy visits can not only represent an important time to offer prenatal counseling and implement harm reduction strategies, but can also increase overall engagement in medical and HIV care while strengthening therapeutic relationships.

This commentary has touched on the importance of recognizing the high rates of unintended pregnancies in women living with HIV. While a number of potential contributing factors and implications have been suggested, there remains a vital need for improved comprehensive reproductive care in this population. A main limitation of this commentary is that it cannot isolate HIV–positive status as the only contributing factor to the reproductive trends of women living with HIV, as there are undoubtedly other social and societal implications to these findings. Nevertheless, the challenge is clear: to move towards a more comprehensive and accessible reproductive care model for women living with HIV on a population level.

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The challenges of benzodiazepine tapering and discontinuation and an underutilized interdisciplinary approach

Edward Fang[1], Ho Seung Jason Kim[1], Jacky Tang[1], Charles Choi[1]
Citation: UBCMJ. 2018: 10.1 (16-18)

Abstract

Benzodiazepines can carry significant health risks with long–term use and are especially detrimental to vulnerable populations including seniors and patients with substance use disorders. Unfortunately, it is extremely challenging to deprescribe and discontinue benzodiazepines despite their known public health risk. Due to limited commercially available dosage forms, benzodiazepine dose reductions recommended by current guidelines may not be possible or practical. This may precipitate benzodiazepine withdrawal symptoms such as anxiety, sleep disturbances, and seizures. We propose a collaborative approach with pharmacists, including using compounded suspensions of benzodiazepines, to supplement the existing benzodiazepine deprescribing regimens in clinical practice.

Introduction

Benzodiazepines (BDZs) are approved by Health Canada for short–term management of conditions such as seizures, anxiety, and insomnia.[1,2] However, BDZs are frequently and inappropriately continued long–term due to the development of drug dependence and the overlooked use of non–pharmacological treatments.[3,4] BDZs continue to be widely prescribed long–term despite known detrimental effects on patients and public health. Inappropriate BDZ use costs Canada an estimated $3076 CAD per person per year in hospitalization, emergency department, and outpatient visits.[12]

Deprescribing benzodiazepines is incredibly complicated and challenging.[3,4] This article attempts to raise awareness on how an interdisciplinary collaboration with community pharmacists can help supplement the existing BDZ deprescribing strategies and reduce long–term BDZ usage.

Risk associated with BDZ use

Current literature and guidelines support a strong recommendation to stop long–term use of BDZs.[13-15] Long–term use of BDZs are associated with serious adverse events such as impaired psychomotor and cognitive functioning, dependency, respiratory depression, and mortality.[1-4,6,8,16] Two populations heavily affected by long–term BDZ use are patients with substance use disorder and elderly patients.[2,3,6,7,13,14,17]

On 14 April 2016, the provincial health officer of British Columbia declared a public health emergency due to the rising rates of drug overdoses and deaths. While opioids have been heavily publicized as the culprit for drug overdoses, one third of B.C.'s overdose deaths involve BDZs.[6,7,18] When BDZs are used in conjunction with opioids, they can lead to fatalities as a result of the combined effects on respiratory depression.[4,15,19-22] Methadone maintenance outcomes, such as overdose risk, are negatively affected by concurrent benzodiazepine use.[7,23]

On the other hand, about one in ten Canadian seniors regularly take BDZs for various conditions and are susceptible to many BDZ adverse effects such as psychomotor impairment, cognitive impairment, dementia, delirium, falls, and fractures.[1,2,6,8,10] Compared to young adults, seniors are more sensitive to the depressive effects of the BDZs, partly explained by diminishing metabolic function of the body on the drugs.[4,10] In addition, this particular subpopulation is often taking multiple medications for various medical conditions associated with age thereby increasing the risk of adverse drug interactions.[6]

Challenges with BDZ discontinuation

BDZ withdrawal syndrome includes symptoms such as sleep disturbances, anxiety attacks, palpitations, pain, psychotic reactions, and seizures.[4,15,19-21,24-28] The withdrawal syndrome often mimics the condition that initially led to BDZ prescription, which leads to patients and healthcare providers incorrectly assuming that long-term BDZ treatment is warranted.[3,29] Even in patients that are amicable to BDZ tapering, they perceive withdrawing from BDZ as a difficult, complicated, and highly unpredictable process, with reports suggesting BDZs are harder to discontinue than opioids because of BDZ withdrawal syndrome.[4,28]

Current benzodiazepine gradual dose reduction methods

Method 1: Gradual reduction of current BDZ

Gradual dose reduction is recommended over abrupt discontinuation because it decreases withdrawal symptoms and prevents seizure development.[3,4,27,30] Two Canadian sources of BDZ deprescribing algorithms, the Ontario Pharmacy Education Network (OPEN) and the University of British Columbia's MedStopper, both recommend slowly reducing BDZ doses by 12.5%, 25%, or 50% depending on commercially available dosage forms.[24,31] Regardless of pharmacist experience and quality of equipment, cutting these tablets into ½, ¼, and 1/8 equal sizes is incredibly impractical and inaccurate; even the minute dose differences between the cut tablets can trigger BDZ withdrawal symptoms in sensitive patients.[4,15,19-21,24-26]

Method 2: Implementation of drug–free days

Alternative strategies to reduce the average daily dose, from the OPEN deprescribing algorithm, include using "drug–free days during latter part of tapering" but ultimately this method has the same issue as missing doses.[20,24] Intentionally extending the dosing interval may trigger between–dose withdrawal symptoms.[24,32,33] Skipping doses results in fluctuating drug plasma concentrations and may risk withdrawal symptoms in the patient once the plasma concentration drops below the therapeutic level.[20,21,25]

Method 3: Cross–taper

The most frequently recommended method is to cross–taper to diazepam

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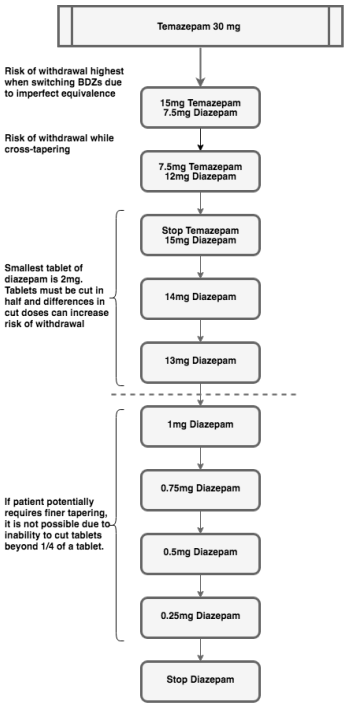

Figure 1: The risks and complexity associated with the Ashton method of BDZ tapering with tablets

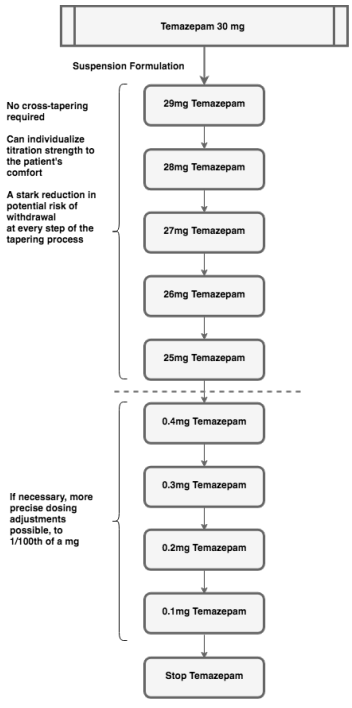

Figure 2: Reduced potential risks and less complexity associated with tapering with a suspension formulation

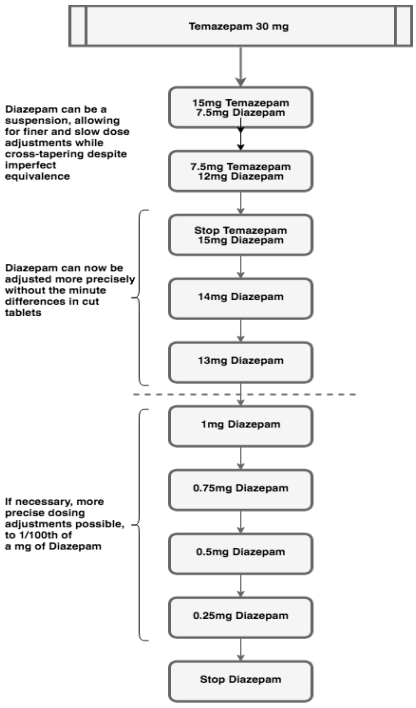

Figure 3: The Ashton Method using a Diazepam suspension

(Valium), a BDZ with a longer half–life.[4,29,30] However, switching one BDZ for another is challenging as BDZ equivalence is poorly described in the literature compared to opioid equipotent dosing.[4,14,34,35] In fact, most benzodiazepine equivalence estimates are based on expert opinions, unreferenced tables in published documents, and clinical experiences.[4,34] Cross–tapering also adds a layer of complexity with confusing calculations for both healthcare providers and patients creating the risk of precipitating withdrawal if conversions are done incorrectly.[10,24,28,36] There is little published evidence stating that switching to a diazepam taper is more effective than other BDZs, can improve outcomes, or reduce incidence of withdrawal symptoms.[10,24,28,36]

Community pharmacists' role in BDZ tapering and discontinuation

Physicians are also often hesitant to deprescribe in general, citing barriers such as lacking the skills and knowledge to deprescribe in a safe and effective manner, fear of withdrawal reactions, and lack of time and support.[37] Physician–pharmacist collaborative settings in primary care can address these barriers and have been shown to decrease inappropriate BDZ use.[38] In addition, community pharmacists are a frequent point of contact for patients and can provide direct patient education to help reduce inappropriate BDZ use, as well as inform the prescriber of any changes or actions required.[39]

In addition to their medication expertise, community pharmacists can compound medications to create dosage forms and strengths that are not commercially available. This underutilized method of using compounded BDZ suspensions can be a very effective strategy in supplementing traditional tapering regimens, allowing for decrements as low as 5% which are useful for patients who are sensitive to dose changes and/or whom are at the end of the tapering regimen and require finer adjustments.[4,16,31,32,40-44]

The Ashton method is shown in Figure 1, with an initial dose of temazepam (Restoril) 30 mg. The Ashton method would involve cross–tapering temazepam to diazepam as per the recommended slow withdrawal schedule.[4] There are several illustrated points in Figure 1 where there is a risk of withdrawal, such as the cross–taper itself, the incongruent doses of diazepam while being tapered, and the final steps of the taper. In Figure 2, we illustrate that using a BDZ suspension does not require cross–tapering, can individualize the titration, and is more precise at smaller doses compared to cut tablets. We chose temazepam as an example, despite its relatively short half–life and consequent higher chance of withdrawal, to emphasize the limitations in the Ashton method. Temazepam cannot be cut in halves or quarters for smaller dose adjustments as temazepam is only commercially available as capsules.

There is also the possibility of combining both methods by switching to diazepam suspension. Note the combined regimen has the advantage of diazepam's longer half–life and lower risk of withdrawal, with the ability to adjust doses more precisely (Figure 3). A temazepam suspension also can potentially be utilized during cross–tapering. This minimizes the risk of withdrawal during cross–tapering and provides flexibility for the patient and physician.

Compounded formulations can carry an increased medication cost for the patient. British Columbia's provincial drug program (PharmaCare) provides some compounded BDZ prescription coverage for BDZ tapering under its exceptional Special Authority criteria for when there is an identified medical need and there are no commercial options available.[45] Community pharmacists can assist with eligibility and coverage issues, reducing barriers to accessing BDZ suspensions for patients and physicians. Specific steps to acquiring special authority for BDZ suspensions are listed in Table 1.

1) Submit written compound request with full explanation: - Indicate that the BDZ compound will be used for tapering - Previous medications and therapies attempted and their outcomes - Starting dose and tapering schedule	**Prescriber Form:** https://www2.gov.bc.ca/assets/gov/health/forms/5479fil.pdf **Pharmacist Form:** https://www2.gov.bc.ca/assets/gov/health/forms/5425fil.pdf
2) Compounding pharmacist submits a completed compound cost sheet and a copy of the prescription	
3) BC Pharmacare will adjudicate on a case-by-base basis, and may provide full, partial, or no coverage	

Table 1 | Steps to obtaining special authority for compounded BDZ from British Columbia Pharmacare

Discussion

BDZs have been a long–established issue and are considered a growing threat to public health.[8,9] Pharmacists are a valuable resource for both patients and prescribers, and meaningful collaboration can be an important factor in improving patient outcomes. Despite highlighting possible benefits of using suspension BDZ over oral formulation, there are limitations such as lack of long–term data on outcomes. The difficulty in discontinuing BDZs and frequency of withdrawals are mostly anecdotal. There is no published evidence stating the superiority of using suspensions over tablets nor does it reduce incidence or severity of withdrawal symptoms. Coverage for BDZ suspensions requires approval and may not be granted for all patients. There is also no optimal speed or duration of gradual dose reduction; however, having the option to adjust doses by 5% is highly beneficial and flexible, and the slower taper may result in greater comfort for patients with less withdrawal incidence.[3,4,28] There is no consensus on a best practice standard for deprescribing BDZs and much more research is needed.[3,10] However, having more options and more allied healthcare practitioners involved in the patient's care can greatly improve the chances of stopping the use of unnecessary BDZs.[3,10]

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Addressing eating disorders and substance use: A call for inclusive clinical support for street–engaged youth and adults with eating disorders

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Citation: UBCMJ. 2018: 10.1 (19-20)

Abstract

Evidence points towards an interrelationship between eating disorders and substance use. However, individuals with concurrent substance abuse and eating disorders often experience significant barriers restricting access to treatment programs. One such barrier is that treatment programs often refuse or lack the expertise to treat individuals who suffer from both substance use disorders and eating disorders. Instead, the disorders are treated in an isolated manner that does not adequately address the nuances of concurrent disorders. As such, healthcare providers must adopt an approach that integrates and holistically addresses multiple factors, including homelessness and substance use, to benefit patients.

Eating disorders (EDs) do not occur in isolation, as they are nested in the contexts of the lives of those who experience them. Eating disorders are influenced by the intersection of complex social, political, cultural, and economic factors in life. In particular, substance use may be entangled with experiences of EDs.[1] However, available ED treatments typically exclude patients who abuse or use substances, while addiction programs generally exclude or do not effectively treat patients who suffer from disordered eating.[1,2] As such, patients with both ED and substance use disorders (SUDs) have more severe ED symptomatology and poorer outcomes compared to patients suffering from just disordered eating.[3] Ultimately, as a result of inadequate and inaccessible treatment, patients with both ED and SUD appear to fall through the cracks.[4]

In regards to the prevalence of concurrent SUDs and EDs, up to 50% of patients with ED will abuse alcohol or drugs and 35% of patients with SUD also present with an ED.[3] Participants have reported using substances such as caffeine, tobacco, and stimulants to aid in weight loss.[3] This can develop into a pattern of impulsive behavior, and ultimately, increase the susceptibility for addiction.[3] The experience of the interrelationship between SUDs and EDs are described by participants in Luongo's study—some consciously used substances to postpone hunger, reduce suffering, and to "numb the pain."[1]

For individuals who present with concurrent ED and substance use in Vancouver, there is a clear lack of resources that adequately and inclusively address both issues simultaneously.[1] The disorders are typically treated in an isolated manner that fails to effectively address the complexity and nuances of these concurrent disorders. For example, the non–profit, Looking Glass Foundation, in Vancouver offers a number of free community–based services to support individuals struggling with an ED, none of which accept clients "who are actively struggling with substance abuse."[4] These requirements present significant barriers to accessing treatment for populations that would benefit significantly from care but experience these issues concurrently.

As the disorders are generally perceived as independent of each other, individuals with ED and SUD are often forced to first undergo separate treatment for their SUD prior to accessing ED treatment.[2] Few clinicians have training in both SUD and ED treatment, and may be hesitant to treat the condition for which they are not trained, even if it is presenting concurrently.[5] As such, to access Vancouver Coastal Health's Eating Disorder Program, substance use cannot be the client's primary presenting concern.[6] Likewise, the Discovery Vista House, an intensive residential eating disorder treatment program run in collaboration with St. Paul's Hospital Eating Disorder Program and Vancouver Coastal Health, is typically unable to admit clients who struggle with both an ED and a SUD, "unless the client has already made significant steps" towards sobriety.[7]

This approach is problematic for three reasons:

1. This approach only serves to exacerbate the problems experienced by patients, as patients being treated for only SUD report an increase in severity of ED symptomatology.[2]

2. Denying access to healthcare based on these existing criteria may exclude those who need help most.[4]

3. Exclusion itself could deter those with sub–clinical substance use from accessing care. Thus, by limiting access to ED resources for those experiencing substance use and/or homelessness, overt and subtle messages are sent that exclude those who may need care most.

Therefore, there is a need for an inclusive approach towards treating EDs in the presence of substance use. Otherwise, these individuals will continue to be overlooked. The lack of available integrated treatment programs for patients with ED and SUD lead to severe ramifications such as higher rates of relapse, worsening of the untreated illness, and poor patient outcomes.[2] There is evidence that when comorbid diagnoses are treated concurrently and integrated on–site, treatment retention and patient outcomes improve significantly.[8] A comprehensive approach for patients with concurrent ED and SUD can improve treatment delivery, reduce time in treatment, improve patient outcomes, and lower overall treatment costs.[2]

Care providers should operate under the assumption that patients with substance abuse issues can benefit from integrated ED and substance use support. Research has shown healthcare professionals generally display a highly stigmatized attitude to patients with substance use and are subsequently less involved and less empathetic when treating patients with SUD.[9] It is clear that stigma surrounding substance use should not predispose clinicians to assumptions about the efficacy, or lack thereof, of ED treatment for those with SUD, especially when previous studies have proven the effectiveness of treating concurrent disorders in an integrated fashion.[2] Thus, it is important that clinicians are up–to–date with referral pathways and

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resources available to address EDs, and advocate for an integrated approach to ED and SUD treatment.

Compounding the issue, however, is the lack of research that addresses the economic feasibility of an integrated approach to concurrent ED and SUD treatment. Preliminary research has demonstrated that comprehensive support for patients with concurrent disorders reduces the total costs of treatment, as well as the cost of more intensive care among these patients.[10] However, more research is needed to determine the cost–effectiveness of integrated treatment. Studying the economic feasibility of comprehensive interventions is essential to providing effective support for patients with concurrent ED and SUD.

Eating disorder programs, rather than viewing substance use as an interference to treatment, should view EDs as issues entangled in the complexities of patient's lives, which can include substance use and housing issues. The adoption of a complementary treatment program that integrates and holistically addresses multiple factors, including substance use, would provide great benefits to patients and existing ED treatment programs themselves.

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Public health and bioethics: An interdisciplinary approach

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Citation: UBCMJ. 2018: 10.1 (21-22)

Abstract

Public health is often thought of as a field focused exclusively on creating policies and implementing interventions. While this may appear to be true, this reductionist view of public health ignores the ethical bedrock upon which public health is founded. Bioethics, when considered alongside public health, can bridge this gap and bring the ethical foundation of public health to the forefront. It is important to recognize that ethical discussions have influenced public health throughout history. Acknowledging this history and accepting the need to evaluate the ethics of emerging issues in medicine will help guide public health in the future.

When stripped to its core, public health is a manifestation of altruism in society. It is "concerned with the health of the entire population, rather than the health of the individual."[1] As defined by the World Health Organization, public health is the "art and science of preventing disease, prolonging life, and promoting health through the organized efforts of society."[2] Epidemiologic data and community–based studies provide the quantitative and qualitative backgrounds necessary for an evidence–based approach to public health, but the roots of public health delve deeper. The ethical basis that runs at the heart of public health is often forgotten. This ethical foundation may be best articulated using the language of bioethics. As originally coined by V.R. Potter in 1970, bioethics is the bridge between "present and future, science and values, nature and culture, and man and nature."[3] Bioethics as a discipline arose to answer questions that emerged after the invention of technologies and scientific research that pushed the boundaries of ethical practice. It is also the discipline whose language and frameworks may help articulate the nuanced ethical discussions in the field of public health. Understanding the ethical roots of public health is essential to achieve its goals and to address ethical challenges affecting public health in the future.

The traditional ethical principles of autonomy, beneficence, nonmaleficence, and justice are key principles in bioethics and play an important role in informing public health policy.[4] In 1962, after the invention of dialysis, committees were created to decide who would receive dialysis and who would not. These "God panels" chose to allocate dialysis based on social worth. Subjective measurements were used to classify people as more or less "valuable" to society and thus more or less deserving of life–saving treatment.[5] These views have changed today because of discussions regarding the principle of justice and the ethics of such committees. As a result, there are now more systematic and fair ways of allocating scarce resources as well as ethical frameworks for use in similar cases, such as organ transplantation.[6] The issue of abortion is also influenced by core ethical principles. Therapeutic abortions were illegal in Canada until 1988, when the Supreme Court of Canada deemed this unconstitutional as it violated the right to "life, liberty, and security of the person."[7] These ethical principles, while important in bioethics, also shape public health policy.

The interplay between the rights of the individual and the rights of society is an area of conflict in the field of public health.[1] Some may argue this conflict puts public health, which focuses on populations, against bioethics, which focuses on individual rights. Upon closer inspection, however, the goals of public health appear to be aligned with those of bioethics. Patient confidentiality is protected in Canada.[8] This individual right is balanced by the right of society to break confidentiality, such as in the case of a patient with a communicable disease dangerous to the population. In this case, the individual right to confidentiality is protected unless there is a valid threat to the population. This is also the case in the setting of medical conditions that impair one's driving ability.[9] By default, individuals are free to operate motorized vehicles provided they follow the laws of the road. This privilege is revoked, however, if the individual is diagnosed with a medical condition that makes driving unsafe. This is done to protect both the individual and the population. Thus, public health policy is shaped by both individual and societal considerations.

Sometimes, however, the goals of public health do not achieve what is ethical. This is especially true when looking historically at research ethics. An extreme example of ethical violations occurred during the Nazi human experiments in World War II.[10] Other examples of ethical violations include the Tuskegee syphilis study and the nutrition research performed on children in residential schools.[11,12] This clash between public good and individual rights have caused some to suggest that the frameworks of bioethics are not sufficient to use for public health as they are not broad enough.[13] In light of obvious breaches of ethical behaviour historically, public health ethics are continuously being refined to avoid such atrocities from occurring again. This is where the collaboration between public health and bioethics becomes important.

Acknowledging the ethical bedrock of public health is crucial to address future challenges posed by technology and globalization. Recent advances in biotechnology, such as the development of CRISPR technology, have made it possible to manipulate the human genome in unprecedented ways.[14] It is then reasonable to question whether individuals should be allowed to do so, or if the decision to change the DNA of one's embryo remains within the scope of the individual to decide. Artificial intelligence, virtual reality, and remote medicine are other examples of emerging technology that will affect medicine and, by extension, public health. Globalization, changing the nature of human interaction, also poses a threat to public health. Certain branches of bioethics are already evolving to encompass ethical issues on a broader, more global, scale. As a result, global bioethics is a growing field that strives to create a universal approach to ethics rather than focusing on an individualistic view of ethics grounded in Western philosophical thought.[3] Within that discussion are such themes as climate change, international aid, and global public health. The future of public health requires that the ethics of the above issues

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be addressed, and this can be aided by the field of bioethics.

At its core, public health is an ethical endeavor. It is based on benevolence and moral justice that seeks to preserve the health and well–being of all individuals in society, regardless of socioeconomic status, race, gender, and so on. The goal of bioethics is analogous. Using philosophical and ethical frameworks, bioethics seeks to discover how to best conduct medical practice based on what is in the best interest of individuals and society from an ethical perspective. Thus, public health and bioethics are two sides of the same coin. The interplay between both disciplines is self–evident and necessary to achieve a healthy, prosperous society grounded on sound policies and ethical principles.

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Underneath the opioid crisis: The forgotten patients in pain

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Citation: UBCMJ. 2018: 10.1 (23-24)

Abstract

The opioid crisis has captured significant media attention in British Columbia. There is also an ongoing pain crisis, however, with one in five Canadians living with chronic pain. A fundamental reason for our reliance on opioids is a lack of effective and accessible alternative pain management therapies for patients with chronic non–cancer pain. We need to provide improved, multidisciplinary pain management, and ensure our efforts to curb opioid over–prescribing do not harm patients with pain. This will require us to improve access to non–pharmaceutical therapies, expand physician pain education, and conduct research to develop new therapies.

The opioid crisis is a major public health issue in British Columbia and has deservedly captured significant media attention. What has received less attention, however, are the people struggling with chronic non–cancer pain. Some patients with chronic pain rely on long–term opioid therapy and are now at risk of being denied pain relief due to the regulatory response to the opioid crisis. At its core, this situation is indicative of a lack of alternative pain management options. Alternatives to opioids are poor due to a shortage of therapies with proven efficacy and limited access to available resources. It is important that we do not allow patients with pain to fall between the cracks and instead strive to provide improved, multidisciplinary pain management for all patients.

Chronic pain is often defined as ongoing pain lasting over six months or, alternatively, as any pain that persists beyond the expected time of healing.[1] Over six million Canadians live with chronic pain. This costs the Canadian economy $6 billion per year in direct health care expenditures and an additional $37 billion per year in indirect productivity loss.[2] These shocking figures are comparable with those of cardiovascular disease, cancer, and diabetes.[3]

Why do we prescribe opioids in the first place for patients with chronic non–cancer pain? Recent evidence shows that the benefits of using opioid medications for chronic pain control may be outweighed by the negative consequences.[4] Yet, with the "pharmaceuticalization" of chronic pain management, there are strong pressures on physicians to prescribe opioids. Chronic pain is a complex, multifactorial condition that can be difficult to properly assess and treat during a typical time–constrained family doctor appointment. A well–meaning physician may therefore reach for their prescription pad even with the best of intentions. Unfortunately, physicians have few pharmaceuticals at their disposal for treating pain and patients often expect to be prescribed opioids.

In 2016, The College of Physicians and Surgeons of British Columbia (CPSBC) released Professional Standards & Guidelines to address opioid over–prescribing.[5] This included legal requirements that are enforceable under the Health Professions Act. There are now anecdotal reports in the media of patients instructed by their physician to reduce the dose of their opioid medication consequently causing the patient terrible suffering.[6-8] Some patients even reported turning to street drugs for pain relief. Physicians should be careful not to misinterpret the CPSBC guidelines. The guidelines are not commands and should be applied carefully on a patient–by–patient basis. When tapering opioids is appropriate, the dose should be reduced slowly and under close supervision by a physician in order to minimize withdrawal symptoms. Patients are likely to be fearful, and it is important to appreciate that pain–related fear beliefs can themselves increase pain.[9] We need to ensure patients with pain have well rounded pain management plans in place, particularly when tapering opioid medications.

Our reliance on opioids is indicative of a lack of alternative therapies.[10] In 2017, Doctors of BC released a policy statement to propose the development of a Provincial Chronic Pain Strategy, recognizing the urgent need to provide better access to alternative therapies.[11] Services such as physical therapy, intramuscular stimulation, mindfulness meditation, and cognitive behavioural therapy are known to help people with chronic pain but are less accessible than pharmaceuticals due to financial barriers. Medical cannabis is another alternative to opioids that is growing in popularity and deserves consideration by patients and physicians alike. Research has shown that cannabis has a relatively low risk of dependence and can both modulate pain signalling and improve psychological factors associated with pain.[12] Research has also shown that patients who have a better understanding of their pain have better outcomes.[13] Therefore, we should provide more pain education and empower patients to manage their own pain.

The gold standard of chronic pain management is multidisciplinary care that embraces the biopsychosocial model of pain.[10,14,15] This holistic approach integrates the roles of nutrition, movement, stress management, sleep, and mood in pain management. Unfortunately, access to multidisciplinary pain clinics is very limited in British Columbia. Wait lists for the few available specialized pain clinics currently range from one to three years.[7] This is particularly concerning, as patients with pain often deteriorate while waiting for access to care, and certain types of pain are more readily reversible when treated early.[16] Therefore, we should provide more funding to reduce wait times and improve access to multidisciplinary pain services in local communities.

Improving physician training is another key element of the long–term solution to Canada's pain and opioid crises. A 2009 survey of Canadian medical school curricula found that, on average, only 16 hours were spent on pain education over the entire multiyear duration

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of the program.[17] For comparison, the same study found veterinarians received an average of 87 hours of pain training. Based on these numbers it is not surprising that physicians are often not well equipped to help patients with pain. On a positive note, the Royal College of Physicians and Surgeons of Canada has launched a new two–year Pain Medicine sub–specialty residency program to provide more specialized pain training.[18] The University of British Columbia began accepting residents to the program in 2016. For now, physicians with less knowledge should collaborate with other physicians and healthcare professionals who have more experience in pain medicine. In the future, we should also expand pain education in medical school and residency of primary care physicians. This will ensure high quality care is accessible for all patients.[19]

There is also room for more research to increase our understanding of pain and its management. Fortunately, the University of British Columbia and Pain BC recognized this need and in April 2018 launched the BC Pain Research Network.[20] The network will bring together researchers of diverse backgrounds from across British Columbia with the aim to act as a catalyst for new pain research. The formation of this network is a key step forward for British Columbia. Health care providers, policy makers, and people with pain should all be open to engagement to ensure the research reflects the realties of pain.

Pain is undertreated in Canada, and patients with pain are at risk of being forgotten amidst the opioid crisis. We need to make sure patients with pain who are long–term opioid users are not harmed while well–meaning physicians reduce opioid prescribing. We also need to improve access to established non–pharmaceutical therapies, increase physician pain training, and conduct more research to develop new therapies to treat pain. Providing better and more comprehensive care may even lead to fewer opioid prescriptions and thereby play a role in the solution to the opioid crisis.

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Inconsistencies in HPV vaccination coverage across Canada: A commentary

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Citation: UBCMJ. 2018: 10.1 (25-26)

Abstract

Human papillomavirus (HPV) affects around 75-80% of men and women in Canada and is associated with high morbidity and mortality rates when the infection persists. Despite the preventable nature of HPV–related diseases, they still burden our society due to errors in past public health efforts and their current shortfalls. Specifically, strict limitations and inconsistencies in HPV vaccine coverage have left many young Canadians unprotected. This commentary will highlight the gaps in HPV preventative care across Canada and discuss an impactful student initiative that has paved the road for future advocates to effectively promote HPV prevention within their own communities.

What is HPV?

Human papillomavirus (HPV) has long been thought of as a "woman's disease." This has been debunked by the rising incidence of HPV–related cancers among both men and women.[1] In women, HPV can manifest as cervical, vulvar, and vaginal cancers, while in men, HPV can develop into penile cancer.[2] Both sexes can develop anal and oropharyngeal cancers (OPC), the latter of which is increasing at an alarming rate, particularly among men.[2]

At the inception of public health efforts, like the grade–school vaccination programs in 2007, HPV vaccines were only recommended and covered for females.[3] However, the rise in OPC among men has solicited further investigations into the impact of their omission from these programs and therefore, the impact of men not receiving the vaccine.[4]

Recent studies demonstrate 90% protection against HPV infections for both male and female vaccinated populations.[5,6] This highlights the effectiveness of HPV vaccines and demonstrates how gaps in their provision, particularly for men, may have contributed to public health detriments. The rise in HPV–related diseases among unvaccinated populations, in conjunction with evidence supporting vaccine efficacy, evokes feelings of urgency among all stakeholders, namely public health officials and young adults, to take action towards improving HPV preventative care.

HPV vaccine accessibility

Currently, there are three HPV vaccines approved in Canada (Gardasil®, Gardasil 9®, and Cervarix®) that differ in formulation and strain coverage.[1] These will be discussed generally as "HPV vaccines" for simplification, as all three have proven highly efficacious in preventing HPV–related diseases.[7]

HPV vaccinations are currently recommended for all young men and women.[1,2] In Canada, most provinces and territories provide coverage for students in grades six or seven through school vaccination programs.[8,9] Although these efforts are commendable, limiting coverage by age has left many excluded.[10]

Since parental consent is required, students occasionally miss the vaccinations for reasons such as: lack of parental knowledge, the misconception that HPV vaccines may promote earlier sexual activity, and the fear of long–term effects.[10,11] If these students decide to be vaccinated later on, they may no longer be covered, depending on where they live, their age, and their sexual orientation.[8,9]

For instance, Table 1 compares HPV vaccine coverage provided in Ontario and British Columbia (B.C.). In B.C., a catch–up program is available for females up to age 26, which does not exist in Ontario.[8] Furthermore, compared to heterosexual male populations, both provinces focus on providing coverage primarily for men who have sex with men (MSM) and young women.[8,9] This is due to their higher risk of developing anal and cervical cancers, respectively, thereby leading to MSM– and women–centered public health promotions.[12] As a result, heterosexual men report that they are less willing to receive the vaccine because they are less aware of its efficacy and less worried about HPV–related diseases.[12] However, HPV transmission only requires skin–to–skin contact.[12] Therefore, everyone, regardless of age, sex, and sexual orientation can benefit from receiving the vaccines and should be provided with adequate coverage.

Student initiatives

Current research demonstrates that advocacy without coverage does not effectively increase HPV vaccination rates among young adults.[11,13] A systematic review reported that vaccination rates were approximately 4.92 times greater in publicly funded programs than in pay out–of–pocket situations.[4] At $180 CAD per dose for the three doses of HPV vaccine recommended in individuals above the age of 15, cost remains a barrier to HPV protection.[4,14] This is of particular concern for current post–secondary students who are already financially overwhelmed. Where coverage is not universal, students have advocated for their own through their respective

Table 1 | HPV vaccine coverage differences between British Columbia and Ontario

Province	Coverage
British Columbia[8]	**Everyone in grade 6** **Females ≤ 26:** - born in 1994 or later and did not complete vaccine series **Males 9-26:** -having sex with men -not sexually active but are questioning their sexual orientation **Everyone in grade 7**
Ontario[9]	**Male <26:** -having sex with men -identify as gay or bisexual

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institutions. In Ontario, the University of Ottawa, does not provide coverage for HPV vaccines, whereas only a few kilometers away, Carleton University provides 80% coverage.[15, 16] In B.C., students at Simon Fraser University and the University of British Columbia receive 100% coverage for non–prescribed vaccinations for up to $150 CAD per year, covering almost one of three HPV vaccine doses.[17,18] The inter– and intra–province discrepancies are disheartening for students who stand without sufficient coverage, but health advocacy success stories from institutions like McMaster University provide hope for change.

An interview with the administrative services coordinator (Victoria Scott, February 28, 2018) at McMaster University suggested that it all started with one student advocate. Upon proposal of amendments to the existing student health insurance coverage, a school–wide referendum was called. The majority of students voted for the plan with maximum health benefits, which included 80% coverage for HPV vaccines at only a marginal cost increase. This was ratified in 2014, providing a plethora of additional health benefits for all McMaster students. Similarly, the student body constitution can be an avenue to explore for students looking to improve their health benefits. While it may be an arduous task, the rising incidence of HPV–related diseases is an urgent reminder that the onus is on young adults to advocate for their own health needs. Given the strong evidence for the effectiveness of HPV vaccines, promoting responsibility at the individual level and advocating for greater coverage at a systemic level is highly merited.

Future recommendations

Medical training often emphasizes the recognition of a condition, understanding its etiology, and treating accordingly. Often, this philosophy of medicine undermines the importance of preventative measures to stop diseases before they occur. Considering the highly preventable nature of HPV, the current rise of HPV–related diseases emphasizes the need to improve preventative care. Despite the large variance in coverage that is present on a macro and micro level, collaborative advocacy efforts can help increase awareness and develop coverage plans that are congruent with the true universal care that has always made us so proud to be Canadian.

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Call to action: Addressing the need for patient–reported outcome measures in Canadian healthcare practice

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Citation: UBCMJ. 2018: 10.1 (27-28)

Patient–reported outcome measures (PROMs) are heading an exciting new era in medicine—an era where patient voices are considered alongside those of the healthcare providers in order to help direct patient care, compare provider and hospital performance, and investigate the efficacy of commonplace medical procedures.[1,2] Indeed, the addition of novel patient–reported data to the routinely collected, objective clinical data will support decision–making at multiple levels within the healthcare system, ultimately helping minimize patient disability and maximize quality of life.

PROMs are defined as measurement tools or instruments, such as questionnaires that assess a patient's health status across several domains relevant to their quality of life, including pain, day–to–day function, and social, mental, and physical health.[3,4] Unlike ordinary questionnaires, however, PROMs employ scientifically rigorous psychometric methodology and are thus highly reliable tools for translating subjective aspects of patient health into validated objective data.[5,6] Depending on the information one hopes to gain, different categories of PROMs can be used. For example, if one hopes to aggregate general aspects of health data from a population of interest, generic PROMs should be used. As their name suggests, generic PROMs measure non–specific components of health and wellbeing, irrespective of any underlying health conditions.[7] Condition–specific PROMs, on the other hand, should be used if one hopes to measure outcomes relevant to those living with a particular condition.[7]

Although initially developed for research purposes, PROMs quickly spread into the clinical setting as a quality improvement (QI) tool used to assist physicians with patient management and supply data for benchmarking purposes.[1] Since then, a growing number of studies have demonstrated the benefit of QI–oriented PROM initiatives (QI–PROMs) on symptom management, patient survival, and medical intervention cost–effectiveness,[8–11] though further research is needed to more concretely demonstrate their clinical efficacy in other domains.[12] Regardless of promising reports, Canadians appear to be largely behind the curve when it comes to implementing PROMs—especially when compared to leading countries such as England and the United States.[13] In England, PROMs were introduced in 2009 and continue to be collected on a mandatory basis for elective hip replacement, knee replacement, groin hernia, and varicose vein surgeries,[14] as the primary objective of these procedures is to improve patient quality of life.[5] The continued collection and public reporting of these data across England have helped evaluate current medical practice, inform policy, compare provider performance, and provide patients with meaningful data to aid their decisions of whether or not to undergo treatment based on predicted outcomes.[1,5] Similarly, the Affordable Care Act in the United States publicizes patient–reported data as a way of enhancing provider accountability and informing pay–for–performance programs used to reimburse providers.[13,15]

Although several PROM initiatives exist across Canada, the vast majority are regionally operated and are largely meant to serve independent research projects and patient registries.[5] For example, the Patient Experience with Arthroplasty of the Knee (PEAK) Project was a regional initiative in British Columbia that collected both generic and condition–specific PROM data regarding patient satisfaction with surgical outcomes from a prospective cohort of approximately 500 patients who underwent total knee arthroplasty.[5,16] As a research–oriented project, however, the PEAK study focused primarily on acquiring new knowledge regarding patient experience as opposed to applying this knowledge to patient care. A similar trend is seen with national–level PROMs, where the few ongoing initiatives primarily serve health–surveillance and/or research purposes. However, as demonstrated by current evidence, large–scale PROMs are often preferred to local initiatives for their ability to provide stronger statistical power for national and international comparisons.[5] One notable example of such an initiative is the Canadian Community Health Survey (CCHS), an annual Canada–wide, cross–sectional survey that collects information on health status, healthcare utilization, and other health determinants of the Canadian population.[17] One strength of the CCHS lies in the flexibility it provides for individual provinces and territories to supplement core questionnaire content with optional modules,[17] thus allowing both regional and national interests to be addressed without compromise. Importantly, the CCHS provides a well–established infrastructure that can be leveraged in the future to greatly reduce the time and resource demands needed to implement and operate any national PROM development. However, regardless of the framework it provides, the CCHS, like most other PROM initiatives in Canada, is of limited direct benefit to patients and providers. Upcoming PROM initiatives should therefore use past projects only as guidelines, as future projects will necessarily require a QI–focus if they hope to bring about change at the clinical level. It is also imperative that stakeholders of all levels, from policy–makers to administrators to clinicians, agree on a common approach in order to ensure that future developments adequately meet the needs of all those involved. Furthermore, stakeholders must ensure that both the selection of PROM instruments (e.g., generic versus condition–specific) and PROM administration mechanisms (e.g., sampling design, method of administration, timing of data collection) align with the purposes of the project.[5]

By collecting and quantifying a patient's perspective, PROMs will undoubtedly help close the gap that exists between healthcare providers and patients. Indeed, considering patient–reported data alongside routinely collected clinical data allows for a more holistic approach to patient care. Ultimately, such an approach will bring us closer to one of the fundamental goals of medicine—to relieve patient pain and suffering. Who could be better at providing this information than the patients themselves?

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Cholera in Yemen: Public health consequences of conflict

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Citation: UBCMJ. 2018: 10.1 (29-30)

Yemen is fighting a war on two fronts: a geopolitical conflict and a public health crisis, the worst cholera outbreak in history.[1] These two battles, however, represent two sides of the same coin. Cholera is an opportunistic infection that thrives in regions that lack proper sanitation.[2,3]

Vibrio cholerae colonizes the small intestine and secretes cholera toxin.[4] This toxin induces intraluminal chloride ion secretion and decreases the entry of sodium into enterocytes, leading to an electrolyte imbalance. Following a 12 to 72 hour incubation period, symptoms of diarrhea and vomiting appear, advancing to fluid losses of up to one liter per hour.[4-6] If left untreated, cholera can lead to dehydration, metabolic acidosis, and death.

As of April 2018, in Yemen, an estimated 19 million people lack access to safe water.[7,8] A World Health Organization (WHO) report dated 8 April 2018 details a cumulative total of 1,088,030 suspected cholera cases and 2,272 associated deaths.[9] To comprehend this avoidable death toll, we must appreciate both the state of Yemeni public health and the pathogenesis of cholera.

Fundamentally, the cholera outbreak in Yemen exists due to contaminated drinking water. This situation comes as a result of a sectarian conflict between the Saudi–led coalition and Houthi rebel forces now in its fourth year. While Yemen is one of the poorest countries in the Middle East, the destruction of sanitation facilities by Saudi–led coalition airstrikes, coupled with striking public sanitation workers, expedited the transmission of cholera.[10] Furthermore, in violation of international law, the Saudi–led coalition imposed a blockade on Yemeni seaports and the airport in Sana'a controlled by rival Houthi forces. Following international pressure, the coalition eased some restrictions in late 2017 and announced humanitarian aid packages for Yemen; however, a significant backlog of humanitarian supplies persists, exacerbating the country's crisis.[11] Since Yemen is fully dependent on the import of foreign medicines, these restrictions on commercial commodities have drained the nation of medical supplies and fuel. These fuel shortages experienced by domestic water companies lead to escalating costs of water trucking, an essential mode of clean water distribution.[1,7]

Approximately 2.2 million internally displaced persons reside in displacement camps with poor sanitation and waste management conditions.[3,12] Damage to infrastructure and hostility on the ground have resulted in only 45% of health care facilities in Yemen remaining in operation, with limited foreign engagement.[13] Specifically, four separate health facilities run by Medecins Sans Frontieres (MSF) have been hit by airstrikes, with the bombing of Abs hospital on August 15, 2016 killing 19 people including an MSF staff member.[14] Consequently, efforts to control the spread of cholera, including the distribution of 1 million doses of cholera vaccine—half the global stockpile—by the WHO and the Global Task Force on Cholera Control (GTFCC) partners, have been unsuccessful.[2,15]

One therapy in particular, oral rehydration solution, consisting of sodium, glucose, and safe drinking water, has proven effective in treating 80% of cholera cases.[16] Sodium–glucose linked transporter channels are spared by cholera and can be harnessed to co–transport glucose and sodium into enterocytes to equilibrate ion imbalances.[17] The establishment of dehydration centres in Yemen has had a moderate effect on reducing fatality to a low overall case–fatality rate of 0.25%.[16,18] The prevention and treatment of cholera is simple yet internal change and foreign intervention in Yemen are complicated by the conditions of war.

The WHO is currently working to implement a multi–sectoral intervention to manage the cholera outbreak and restore food, fuel, and medicines to Yemen.[8,15] In a zero sum game, these measures, including the systematic use of the oral cholera vaccine (OCV) for high–risk persons, have proven insufficient to effectively resolve the epidemic, with nearly 5000 cholera cases reported per day.[15,18] Concurrently, the WHO and partners continue to urge the Saudi–led coalition to find a political solution to the conflict and end all blockades on Yemen.[1,19] Although ongoing humanitarian intervention is paramount to preserve human dignity and life, only a political solution to this fighting will allow the Yemini people to rebuild their broken country and prevent a new flashpoint for migration worldwide.

The WHO has foreshadowed future cholera outbreaks due to the explosive and unpredictable pathogenesis of the disease; nonetheless, the organization remains steadfast in their goal to eliminate cholera by 2030 through the Global Roadmap initiative that focuses on 47 countries that remain affected by cholera. The Yemeni outbreak has highlighted the need for targeted investments in infrastructure to improve water, sanitation, and hygiene, termed the WASH program, coupled with the use of OCV in the interim to control the transmission of disease in "hot spot" regions.[15] The operation consists of three axes: 1) early detection and rapid response through community–level surveillance; 2) a multi–sectoral approach to prevention in endemic countries through measures including the WASH campaign; and 3) improvement of coordination mechanisms for resource mobilization at the local and global levels.[15] These efforts represent a positive shift towards more proactive care, and may prove effective in the prevention of future large–scale outbreaks of cholera.

The cholera epidemic in Yemen highlights an Achilles heel of modern medicine: the dangerous influence of war on the spread of disease. In the face of advances in public health, the pernicious nature of war, with associated economic and infrastructure loss, incapacitates the provision of health services. It is the duty of the international community to hold adversarial groups accountable and develop diplomatic channels to facilitate the establishment of safe conditions for health workers in both conflict and post–conflict zones.

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Public health and the fentanyl crisis in B.C.: An interview with Dr. Jane Buxton

Sympascho Young[1]
Citation: UBCMJ. 2018: 10.1 (31-32)

Introduction

A public health emergency was declared in B.C. on April 14, 2016 in response to the rise in opioid overdoses and deaths.[1] More than a year later, the opioid epidemic is still surging and has spread from the epicenter of the Downtown Eastside to touch every part of the province of B.C. Dr. Jane Buxton is the Harm Reductions medical lead at the B.C. Centre for Disease Control (BCCDC) and a professor at the UBC Faculty of Medicine and School of Population and Public Health. Dr. Buxton founded the provincial Take Home Naloxone (BCTHN) program in 2012. Under her leadership, the program has grown into one of the largest programs at BCCDC, expanding to 1389 locations throughout B.C. and distributing over 98,000 kits as of May 2018.[2] In our interview, Dr. Buxton tells us about her career in public health, her thoughts on the current fentanyl crisis, and the next steps in combatting it.

How did you get involved in public health? What do you like about this specialty?

Before coming to Canada in 1998, I had practiced as a family physician in the U.K. for seven years. Though I enjoyed family practice, I wanted to take a step back and see how we could improve the health of the population rather than just the individual patient. Therefore, I chose to do my mandatory year of residency in public health. I feel like I have been able to make a difference on a larger scale than had I stayed a family doctor. In particular, I enjoy the variety of work in public health: dealing with infectious diseases, epidemics, and collaborating with a variety of stakeholders within governmental programs.

What advice would you give to students interested in this field?

My advice is to explore all the different areas of public health: advocacy, social determinants of health, prevention, and health promotion (to name a few). Talk to people in the field, conduct a research project, and do an elective. Appreciate the diversity of it; you can work in an academic environment, a local environment (such as a health authority), provincially (such as the BCCDC), nationally, or even internationally (with the World Health Organization) and abroad.

What has your experience been like in terms of starting the BCTHN program from scratch and then facing this surge in attention and demand brought on by the fentanyl crisis?

I feel very fortunate that we started BCTHN early in 2012, because it allowed us to have an established program and training materials developed before the crisis hit. When death tolls skyrocketed in 2016, we were forced to react and expand rapidly. We had to respond to a 17–fold increase in demand of naloxone kits within a year.[2] This was good, because that means the public knew naloxone could save lives and was buying into the program; however, it was a struggle at times to actually get as much naloxone out into the community as was needed.

Facing this public health emergency has definitely been a challenge. The public wants naloxone, because it is something concrete that they can do. However, there are many other interventions that we need to be looking at to prevent overdoses. Although the BCTHN can be seen as an after–the–fact, band–aid solution in some ways, it is a fabulous tool for engaging people. Peers have come forward and started talking about their drug use because someone handed them a naloxone kit. It has really started the conversation and been empowering for peers.

Why do you believe the fentanyl crisis has become so significant in B.C.?

I think there are two main reasons: prohibition of the drug and its toxicity. We saw that when oxycodone (OxyContin) was removed from the market in 2012, people were pushed to illegal substances. Oxycodone is a medication that is frequently crushed, snorted, and injected by people who use opioids illicitly (PWUOs).[3]

Prohibition is simply not effective and when a certain drug is made unavailable, PWUOs will seek alternatives. The high potency of fentanyl compared to other opioids means that a small package can contain enough fentanyl to make thousands and thousands of tablets when cut with other substances. Previously, small packages could not be opened or assessed by the Canada Border Services Agency, and this made it difficult to discover and seize illicit fentanyl. Powerful analogues such as carfentanil (one hundred times more potent than fentanyl) are even easier to smuggle undetected.[4] Because of the illegal market and the prohibition, there is no quality control on dosage and this has led to unintentional fatal overdoses.

What do you believe are the next steps to solving this crisis?

First, we have to improve our messaging to PWUOs about policy changes. I am concerned that peers are reluctant to call for help if they are using drugs together and someone overdoses. However, we have the Good Samaritan Drug Overdose Act, a federal act, which means that anyone calling for 911 for themselves or someone else, or anyone else at the scene when emergency help arrives, will not be charged for simple drug possession.[5] We have to get the message out that if you are going to use, make sure you are with someone who can call for help. Second, we have to improve access to safe injectable opioid agonists, such as methadone or suboxone. There has to be an alternative to heroin and fentanyl so that people are not going to the illegal market. Heroin–assisted treatment trials such as the Study to Assess Longer–term Opioid Medication Effectiveness (SALOME) and The North American Opiate Medication Initiative (NAOMI) have shown that injectable hydromorphone and diacetylmorphine are safe when taken in a clinical setting.[6,7] Finally, we have to reduce the stigma around people using drugs. Unfortunately, stigma can prevent PWUOs from accessing therapy, and can affect the attitudes of healthcare workers and the quality of care delivered. By making naloxone kits and training commonplace in B.C., we are hoping BCTHN can not only

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reduce the amount of fatal overdoses, but also reduce the shame and stigma surrounding drugs.

Conclusion

At the time of this interview, despite the declaration of a public health emergency in April 2016 and rapid scale up of the BCTHN, death tolls have only grown. In 2017, there were 1436 illicit drug overdose deaths, which represents a 44% increase compared to 2016.[8] Dr. Buxton's BCTHN program has been a critical intervention that has saved thousands of lives, but solving this crisis requires major upstream change: reducing stigma, improving access to regulated opioids, educating PWUOs about policy changes, and prescribing opioids responsibly. As doctors and health advocates, we will all have a role to play in solving this unique public health crisis.

Disclosure

Sympascho Young works with Dr. Jane Buxton and the BCTHN program in a research capacity.

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