CANADIAN JOURNAL of UNDER GRADUATE RESEARCH

Off-Leash

"Because dogs are one of the most widely distributed terrestrial carnivores, filling the knowledge gap on their effect on the composition and distribution of wildlife species, especially other carnivores, habituating in urban areas should be a key consideration for future studies to inform natural resource managers seeking to mitigate such effects." (p.6)

SEPTEMBER 2022 VOL 7(2) **www.cjur.ca**

Educational Reconciliation

"Canada must reconcile the broken relationship between Indigenous groups, the Earth, and our current institutions. The integration of traditional ways of knowing promotes the resurgence of Indigenous ways of being in education." (p.12)

Psychoeducational intervention

"…psychoeducational intervention was an effective way to improve attitudes towards the early release of prisoners and that those with a higher level of education were not more affected by psychoeducational intervention than those with a lower level of education" (p.36)

CANADIAN JOURNAL *of* UNDERGRADUATE RESEARCH

A student-led publication that aims to highlight research by undergraduate students of all disciplines

Second Issue of the Seventh Volume
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This issue is published on the traditional, ancestral, and unceded territory of the Coast Salish Nations, including xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh).

Letter from the editor-in-chief

Dear readers,

I am honoured to present Volume 7 Issue 2 of the Canadian Journal of Undergraduate Research (CJUR) brought to you by a talented team of interdisciplinary undergraduate students.

We have been highly impressed with the quality and diversity of publications received this year from hardworking undergraduate students studying and performing research across the country. In this issue, we are proud to share eight publications spanning fields including public health policy, medical ethics, neuroscience, and urban policy. Each submission has undergone two stages of double-blind peer review performed by graduate students, post-graduates, and professors, as well as copyediting and typesetting by our talented team of editors.

Volume 7 Issue 2 is the first publication completed by our new editorial board, all of whom I am incredibly proud. The articles before you are due to the efforts of this hard-working team, and the tireless support of our external editors and senior advisors. It has been an honour to work with such an enthusiastic group and to begin several new initiatives which I look forward to seeing come to fruition this academic year.

Finally, I would like to thank every reviewer who continues to support CJUR through their facilitation of the peer-review process. At the time of this publication we have 20 active submissions undergoing review, and a total of 70 wonderful pieces of student research published. This would not be possible without a dedicated team of interdisciplinary reviewers volunteering their time and knowledge to the journal.

Yours sincerely,

Imogen Porter

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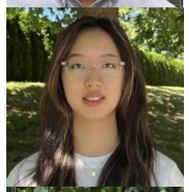

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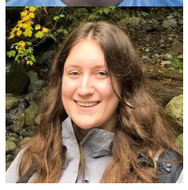

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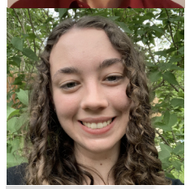

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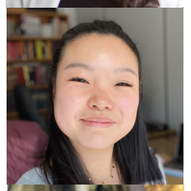

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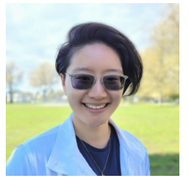

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September 2022
Volume 7, Issue 2

Uncontrolled dog activity and problem areas in urban parks

Kaitlyn Squires [1]

[1] Mount Royal University, Miistakis Institute

Abstract Domestic dogs are a significant, but poorly recognised, threat to native wildlife inhabiting natural environments within urban areas. Human presence is the main driver of dog abundance and habitat use. The objective of this study is to i) determine the level of uncontrolled dog activity (off-leash, without human accompaniment) in on-leash designated areas within the City of Calgary, ii) identify off-leash problem areas, and iii) provide recommendations to parks management on how to reduce the impacts of domestic dogs on wildlife in city parks. There was a lot of documented off-leash dog activity in all of the natural areas with camera traps, and the majority of this activity occurred in on-leash areas. A large portion of uncontrolled dog activity occurred within 250 m of off-leash designated areas (the majority occurring within 50 m), suggesting that a lack of public awareness of where off-leash areas end and on-leash areas begin may be contributing to the high off-leash rates. The results also suggest that dog owners behave similarly with respect to dog leashing, regardless of leash rules. In order to decrease the number of off-leash dogs in on-leash designated areas and the subsequent effects that dogs have on wildlife in Calgary, an increased vigilance by the city and increased public awareness of the effects that domestic dogs have on wildlife, e.g., signage in problem areas, is recommended.

INTRODUCTION

Wildlife is greatly impacted by human activities, including recreation and urbanization. One threat in particular that humans have on wildlife is with their loyal companions, domestic dogs (*Canis familiaris*). Domestic dogs are a significant, but poorly recognised, threat to native wildlife inhabiting natural environments, particularly within urban areas. Dogs are prominent agents of wildlife disturbance (Weston et al., 2014; Weston & Stankowich, 2014). The impacts of such disturbance include harassment, injury, or death; temporal and spatial displacement; and modification of behavior (Sime, 1999). Temporal and spatial displacement has been observed in various studies for many wildlife species, including small mammals, coyotes, bobcats, and deer, all of which reduced activity in urban parks during peak human visitation hours and avoided areas where dogs were present (George & Crooks, 2006; Lenth et al., 2008; Miller et al., 2001; Twardeck et al., 2017). Domestic dogs can cause direct or indirect mortality of wildlife through means such as predation, pursuit, and transmission of disease (Dorresteijn et al., 2015; Sime, 1999; Twardek et al., 2017; Weston et al., 2014). Even when on-leash, dogs can disturb wildlife sufficiently enough to reduce species diversity and abundance (George & Crooks, 2006; Lacerda et al., 2009; Sime, 1999). This disturbance not only negatively affects wildlife in the short-term, but in the long-term as well; this includes, for example, reproductive success and immune system suppression (Twardek et al., 2017).

The environmental impact of domestic dogs largely depends on the extent to which they are allowed outdoors (Twardek et al., 2017). Two key factors that influence the impact levels of dogs are i) if dogs are allowed to roam free (influenced by their owners), and ii) area covered when roaming (influenced by individual dogs) (Weston et al., 2014). Human presence is the main driver of dog abundance and the most important predictor variable in shaping dog habitat use (Lacerda et al., 2009; Lenth et al., 2008; Paschoal et al., 2018). As dogs increasingly roam into natural areas, the likelier they will encounter native carnivores and interact with them as predators, prey, and/or competitors (Vanak & Gompper, 2009). The presence of domestic dogs may be considered a human-derived edge effect in urban parks, protected areas, and along trails (Paschoal et al., 2018; Soto & Palomares, 2015). This indicates that in areas which allow off-leash dogs, there is a certain percentage of habitat that is unsuitable for certain species, even if it may be perfectly suitable otherwise. While the susceptibility that wildlife has to disturbances caused by domestic dogs is species-specific and influenced by individual habitat use (Forrest & St. Clair, 2006), the edge effect can still considerably diminish a habitat's ability to support wildlife populations.

The objective of this study is to i) determine the level of off-leash dog activity in on-leash designated areas within the City of Calgary, ii) to identify off-leash problem areas, and iii) to provide recommendations to parks management on how to reduce the impacts of domestic dogs on wildlife in city parks.

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METHODS

Study area

This study took place in Calgary, Alberta (51.0447° N, 114.0719° W). The City of Calgary has 71 parks, in total covering over 10,000 hectares of natural area (City of Calgary, n.d.-b). Most parks are open to visitors from 5:00 a.m. – 11:00 p.m. and allow a variety of recreational activities, including walking, running, and cycling, to take place within their boundaries (City of Calgary, n.d.-b).

Many parks in the city allow domestic dogs to accompany their humans. There are only a few areas that prohibit dogs completely for both human and wildlife safety. These include playgrounds; wading or swimming areas; rivers, lakes, or ponds; and the Inglewood Bird Sanctuary, Inglewood Wildlands, and Weaselhead Natural Environment Park trails for the protection of sensitive wildlife habitats (City of Calgary, n.d.-b). In accordance with Calgary's Responsible Pet Ownership Bylaw 23M2006 and Parks and Pathways Bylaw 11M2019, dogs are required to be on-leash at all times, unless in a designated off-leash area (City of Calgary, n.d.-b). There are 150 public off-leash areas in Calgary, which make-up approximately 17% of all the natural areas in the city (City of Calgary, n.d.-a) (Figure 1). Furthermore, the by-laws require owners to ensure their pet is not running at large, entering areas in which they are prohibited, and is restrained by a leash within 2 meters of an off-leash area (City of Calgary, 2018).

Camera trapping

97 wildlife cameras (Spypoint and Reconyx) were placed at 106 locations across 19 parks and natural areas in the city between May 9, 2017, and May 31, 2020, as part of the Calgary Captured Urban Wildlife Monitoring Program (Figure 2). The selected locations were primarily on game trails or human foot paths. Camera placement occurred in a 1 x 1 km grid system throughout the parks and were approximately 1 m from the ground (Dorresteijn et al., 2015; Schlacher et al., 2015). Study areas contained different numbers of sites, which were roughly proportional to their physical area, and not all cameras were operational for the full duration of the study period. The camera traps recorded time and date for each detection and took 3 images when triggered.

Analysis and classification

The wildlife images collected were classified to a species through the online WildTrax platform, by Miistakis Institute staff and in-house volunteers. An event was defined as any image that contained a living being (human or wildlife). Human and wildlife events were considered independent if consecutive images of the same species were taken more than 30 minutes apart. If a dog was detected in an image, a staff member would record whether it was on-leash, off-leash, or if the leashing was unknown. To protect privacy, all human images recorded were processed manually, and were deleted after classification.

The data set was cleaned, which involved filtering out records from unreliable cameras or those with very short sampling period, false trigger events, and records for very small animals not designed to be captured by cameras (birds, insects, etc.). Records of humans with dogs occurring after June 1, 2018 were unavailable due to a camera software change (on-leash events were not recorded properly after this date). The resulting data for humans with dogs ranged from May 9, 2017 to May 31, 2018 (379 total camera trap days) and included 16 parks within Calgary; while the data of domestic dogs alone ranged from May 9, 2017 to May 31, 2020 (1,119 total camera trap days) and included 19 parks within the city. Because human with dog events were not being recorded properly, the leashing status of those dogs was unknown; thus, for this analysis, dogs were classified as either controlled or uncontrolled. The assumption of uncontrolled was made if the dog was captured in the camera traps without a human nearby and was off-leash, while controlled was assumed if the dog was captured in an image accompanied by a human nearby, regardless if on- or off-leash (Cortés et al., 2021).

Dog activity rates were determined through the calculation of the number of dog events per camera trap day in each grid cell. Dog control rates were calculated as a proportion of total dog events per 100 camera trap days and by camera location. The frequency of uncontrolled dogs from off-leash designated areas was calculated as uncontrolled dog activity per 100 camera trap nights for each camera versus the distance from such areas using ArcMap GIS. Problem areas were identified using ArcMap GIS by assessing the rates of off-leash dogs in on-leash designated areas and their distance from designated off-leash area boundaries..

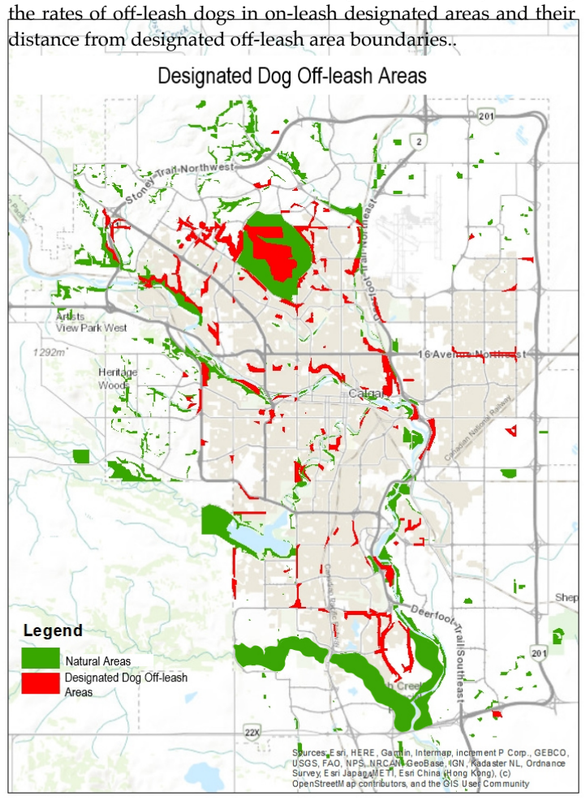

Figure 1 Designated off-leash areas in Calgary.

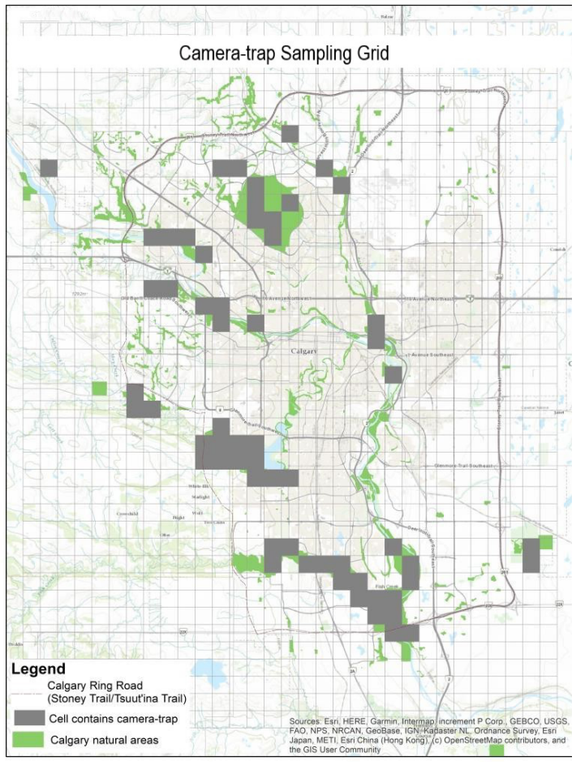

Figure 2 Camera-trap sampling grid (1 km²) used to establish camera locations in Calgary natural areas.

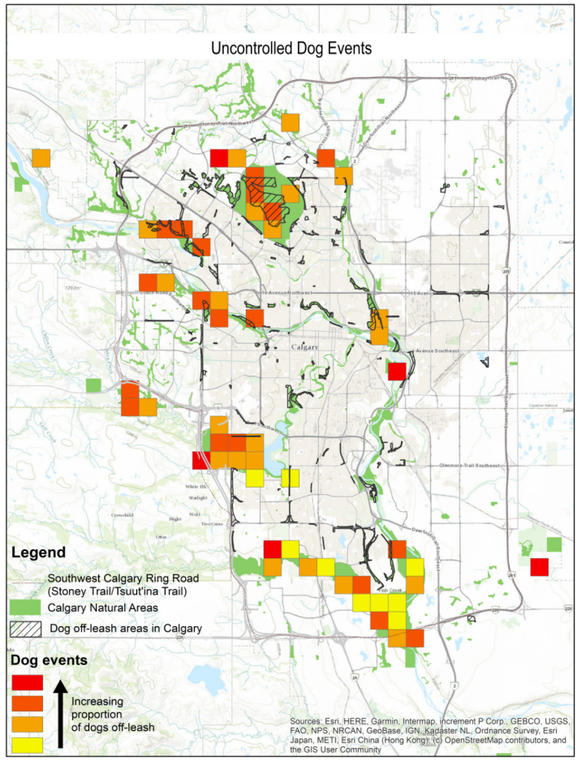

Figure 3 Designated off-leash areas in Calgary.

Park	Total dog events	Uncontrolled events	%	Controlled events	%
Bowmont	61.36	48.44	78.93%	12.93	21.07%
Confluence	54.71	28.33	51.78%	26.39	48.22%
Edgemont	3.93	3.66	93.28%	0.26	6.72%
Edworthy	494.88	298.84	60.39%	196.04	39.61%
Fish Creek PP	835.68	376.32	45.03%	459.37	54.97%
Griffith Woods	12.02	9.38	78.05%	2.64	21.95%
Haskayne	2.58	1.79	69.31%	0.79	30.69%
HID241	27.82	7.24	26.02%	20.58	73.98%
Inglewood	0.18	0.18	100.00%	0.00	0.00%
North Glenmore	176.20	96.51	54.78%	79.68	45.22%
Nose Hill	471.74	281.77	59.73%	189.97	40.27%
Paskapoo	11.77	4.38	37.21%	7.39	62.79%
Ralph Klein	0.09	0.09	100.00%	0.00	0.00%
SE Corridor	89.90	89.90	100.00%	0.00	0.00%
South Glenmore	243.76	120.02	49.24%	123.75	50.76%
Tom Campbell	184.06	48.97	26.61%	135.09	73.39%
Twelve Mile Coulee	6.17	6.17	100.00%	0.00	0.00%
Weaselhead	157.01	73.64	46.90%	83.38	53.10%
Winston Heights	6.08	6.08	100.00%	0.00	0.00%
Total	**2,670.70**	**1,415.82**		**1,254.88**	

Table 1 Total rate of dog events for both controlled and uncontrolled dogs, calculated as the number of dog events per 100 camera trap nights in each park.

RESULTS

There were 21,876 total events involving dogs, of which 16,804 were uncontrolled (without human, off-leash; 76.81%). Uncontrolled dogs were recorded on 91 of the 97 camera traps (Figure 3). Uncontrolled dogs were recorded in on-leash areas in all of the parks (89.03% of the total uncontrolled events), with the exception of Tom Campbell and Winston Heights, as well as 2 camera-traps in Nose Hill, as in these parks the camera-traps were set in areas which permitted dogs to be off-leash (Tables 1 and 2).

Off-leash problem areas

There were 7,057 uncontrolled domestic dog events that took place within 250 m from the boundary of a designated off-leash area (42% of total uncontrolled dog events) (Table 3). These events were captured on 17 cameras; the other 74 cameras were not included due to their location being i) greater than 250 m from the off-leash areas or ii) in parks without off-leash areas. The majority of uncontrolled dogs in these events occurred within 50 m from the off-leash area boundary (Figure 4).

Temporal activity

The vast majority (99.87%) of dog events took place within park open hours (5:00 am – 11:00 pm). Only 28 events occurred outside of park hours, most of which were uncontrolled dogs (67.86%); the rest of those events were controlled dogs. Of the events that took place during operating hours, the majority took place in the afternoon (11:00 am – 4:59 pm) (see Figure 5). Seasonally, the majority of domestic dog events took place in the spring (36.45%), with winter being the second-most common occurrence (26.59%) (see Figure 6).

Park	Uncontrolled		Controlled	
	On-leash area	Off-leash area	On-leash area	Off-leash area
Bowmont	48.44	0.00	12.93	0.00
Confluence	28.33	0.00	26.39	0.00
Edgemont	3.66	0.00	0.26	0.00
Edworthy	298.84	0.00	196.04	0.00
Fish Creek PP	376.32	0.00	459.37	0.00
Griffith Woods	9.38	0.00	2.64	0.00
Haskayne	1.79	0.00	0.79	0.00
HID241	7.24	0.00	20.58	0.00
Inglewood	0.18	0.00	0.00	0.00
North Glenmore	96.51	0.00	79.68	0.00
Nose Hill	169.97	111.80	189.97	62.80
Paskapoo	4.38	0.00	7.39	0.00
Ralph Klein	0.09	0.00	0.00	0.00
SE Corridor	89.90	0.00	0.00	0.00
South Glenmore	120.02	0.00	123.75	0.00
Tom Campbell	0.00	48.97	135.09	135.09
Twelve Mile Coulee	6.17	0.00	0.00	0.00
Weaselhead	73.64	0.00	83.38	0.00
Winston Heights	0.00	6.08	0.00	0.00
Total	**1,334.85**	**166.85**	**1,338.26**	**197.89**

Table 2 Uncontrolled and controlled dog rates for on- and off-leash areas, calculated as the number of dog events per 100 camera trap nights in each park.

Distance from off-leash park (m)	Park	Number of uncontrolled dog events
0	Nose Hill-49	71.13
	Nose Hill-50	40.66
	Tom Campbell-24	48.97
	Winston Heights-77	6.08
50	Bowmont-16	9.12
	Bowmont-87	5.00
	Edworthy-56	280.25
	Nose Hill-54	15.73
	Nose Hill-57	14.83
100	Bowmont-19	5.63
	Bowmont-58	26.09
	Fish Creek PP-45	7.77
150	Bowmont-17	0.27
	Edworthy-13	3.75
200	North Glenmore-1	0.36
	North Glenmore-66	94.91
250	Twelve Mile Coulee-88	0.09

Table 3 Rate of uncontrolled dog activity versus the distance from off-leash areas (within 250 m), calculated as the number of dog events per 100 camera trap nights in each park. Note: some camera traps were excluded due to a distance of greater than 250 m from the off-leash area or location in parks without off-leash areas.

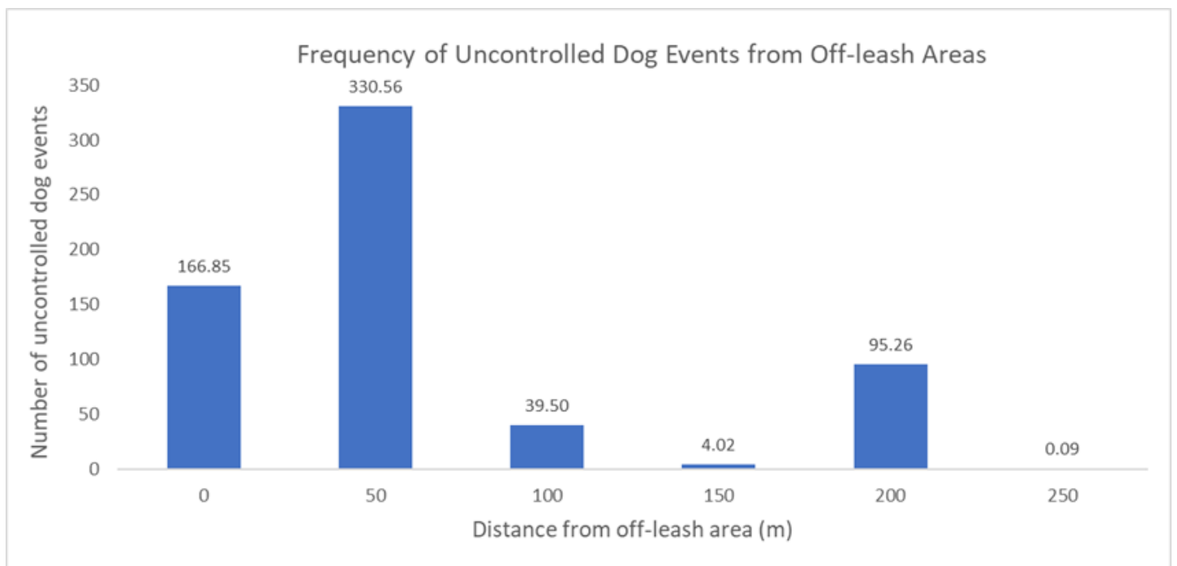

Figure 4 Uncontrolled dog (without human, off-leash) activity per 100 camera trap nights versus the distance from off-leash areas (within 250 m).

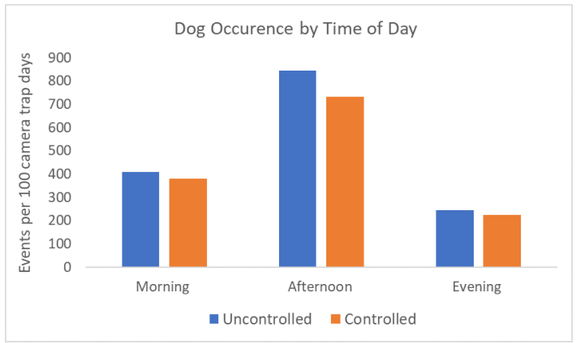

Figure 5 Occurrence of dog events, controlled (with human either on- or off-leash) and uncontrolled (without human, off-leash), by time of day, within park operating hours (5:00 am – 11:00 pm) per 100 camera trap nights. Morning = 5:00 AM – 10:59 AM; Afternoon = 11:00 AM – 4:59 PM; Evening = 5:00 PM – 11:00 PM.

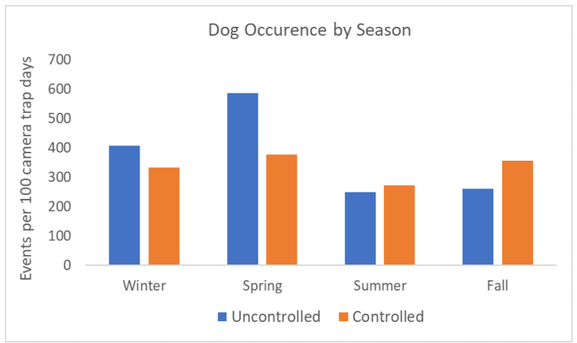

Figure 6 Occurrence of dogs, controlled (with human, either on- or off-leash) and uncontrolled (without human, off-leash), by season per 100 camera trap nights. Winter = January – March; Spring = April – June; Summer = July – September; Fall = October – December.

DISCUSSION

There was variation in the number of total dog events across the city of Calgary, Alberta and within its parks. Throughout Nose Hill Park, dog activity rates were high, while throughout both Glenmore/Weaselhead Park and Fish Creek Provincial Park activity rates vary. Furthermore, the rate of leashing varies more throughout both Glenmore/Weaselhead Park and Fish Creek Provincial Park versus Nose Hill Park. The large portion (42%) of uncontrolled dog events occurring within 250 m of the designated off-leash area, and the trend that the majority of those events are occurring within 50 m, suggests that a lack of public awareness of where off-leash areas end and on-leash areas begin may be contributing to the high rates of off-leash dogs. The results also suggest that dog owners behave similarly with respect to dog leashing regardless of leash rules and that there is a lack of owner compliance with city by-laws. This is a similar conclusion to the studies by Cortés et al. (2021), Parsons et al. (2016), Weston et al. (2014), and White (2009), all of which recorded a lack of compliance with leash regulations.

It is the responsibility of the City of Calgary Animal & Bylaw Services to enforce bylaws and educate the public on dog-related rules and issues. Consequences for not obeying the by-laws include ordering a dog to be put on-leash, ordering the removal of a dog from an area, and/or issuing fines for non-compliance (City of Calgary, 2018). An increased vigilance by the City of Calgary and increased public awareness of the effects of domestic dogs on wildlife, through means such as signage in problem areas, could help to decrease the high number of dog owners who are not complying with the leashing regulations. For example, increasing the enforcement of leash laws reduced the frequency of unleashed dogs by 21% across the eastern United States in the study by Parsons et al. (2016). This is especially beneficial in the long term, as on-leash regulations can reduce wildlife disturbances (Martinetto & Cugnasse, 2001).
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CONCLUSIONS

For many wildlife species, keeping dogs on-leash, notably during certain critical periods (e.g., winter, gestation, and lambing), can help to avoid wildlife mortality due to predation and the consequences of pursuits (Martinetto & Cugnasse, 2001). Domestic dogs amplify the negative responses of wildlife to human disturbance, as they extend the radius of human recreational influence on a landscape (Sime, 1999; Weston & Stankowich, 2014). Therefore, areas with significant wildlife populations should be designated as on-leash and require greater regulatory actions to decrease the rates of off-leash dogs.

The impacts of dogs on wildlife have significant management implications, as dog policies (e.g., prohibited or allowed, and off-leash or on-leash) are an important factor in determining the extent of such impacts. When dogs are on-leash, their range of influence is lessened and spontaneous predatory behaviors are less likely to occur. Through increasing leashing regulations in parks and protected areas, wildlife is disturbed less often, thus decreasing time spent being vigilant and increasing time conducting routine activities. Because dogs are one of the most widely distributed terrestrial carnivores, filling the knowledge gap on their effect on the composition and distribution of wildlife species, especially other carnivores, habituating in urban areas should be a key consideration for future studies to inform natural resource managers seeking to mitigate such effects (Gámez & Harris, 2021). It is recommended that the City of Calgary increases i) signage to indicate where off-leash areas end and on-leash areas begin, ii) enforcement in on-leash designated areas, and iii) public awareness of the effects dogs have on wildlife. As well, camera monitoring should be continued in order to better understand the effects of domestic dogs on wildlife in Calgary parks.

Acknowledgements

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Conflicts of interest

This author declares no conflicts of interest

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Educational Reconciliation: Implementing Traditional Land-Based Learning in Canadian Universities

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Abstract Indigenous groups across Turtle Island, the name given to North America by the Lenape, Iroquois and Anishinaabe, are often marginalized in the creation of contemporary theories and policies, creating a knowledge gap between the traditional Indigenous ways of teaching, and knowing in academia. Land-based learning encompasses the ways of knowing of Indigenous groups, and when implemented as part of the ii' taa'poh'to'p, the University of Calgary Indigenous Strategic Plan promotes the decolonization of current pedagogies and the understanding of the importance of land to Indigenous peoples. We aimed to decolonize a university course through land-based learning and bridge the gap between Western and Indigenous knowledge, while remaining respectful of Indigenous protocols and inflicted traumas by settler-colonial goals to extract knowledge from their communities. This study sought to research how land-based learning could be integrated into an Indigenous Studies course on animal-human relationships at the University of Calgary. Through a qualitative study of peer-reviewed sources predominantly written by Indigenous authors, we found common themes on how we could implement land-based learning into the course. Based on our findings, we propose a three-part learning module. Firstly, students should be introduced to the topic of land-based learning before attempting a land-based activity. Secondly, we suggest the incorporation of a land-based activity be led by an Indigenous Knowledge Holder or Elder. Lastly, the learning module should be finalized with a class discussion and self-reflection assignment to provide students with the opportunity to solidify their learning. Canada must reconcile the broken relationship between Indigenous groups, the Earth, and our current institutions. The integration of traditional ways of knowing promotes the resurgence of Indigenous ways of being in education.

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INTRODUCTION

Post-secondary institutions in Canada are currently rooted in settler-colonial pedagogies and epistemologies that emphasize Western dichotomies (Bang et al., 2014; Calderon, 2014; Little Bear, 2000; Marker, 2019). Language taught in classrooms is centred on noun-based, product-oriented, and static paradigms (Little Bear, 2000). Often, we are taught to view the environment through a paternalistic lens, as stewards that hold dominion over the world around us (Bang et al., 2014). These epistemologies have been in place for centuries, ironically, as a society that favours progress, a paradigm shift is more than overdue (Little Bear, 2000; Mashford-Pringle & Stewart, 2019). Indigenous ways of knowing provide ways of learning that are different from dominant pedagogies since they are not materialistic but spiritual, as the land is a conscious being and language is centred in processes and relationships (Bartmes & Shukla, 2020; Calderon, 2014; M. J. Barrett & Brad Wuetherick, 2012).

Although the ways of knowing of different Indigenous groups on Turtle Island (indigenous term by some groups for North America) are unique, land-based learning encompasses the traditional ways of learning across Indigenous peoples (Datta, 2018; Mashford-Pringle & Stewart, 2019; McKim et al., 2019; Snowshoe & Starblanket, 2016; Wildcat et al., 2014). Indian Residential Schools (IRS), the Sixties Scoop, assimilation policies and even current child welfare systems have displaced Indigenous peoples from the land, their source of teaching and spiritual healing to which they tie their identity and culture (Wildcat et al., 2014). The severed spiritual connection with the land was the most significant obstruction to healthy well-being and has led to intergenerational consequences in Indigenous peoples (Fellner, 2018; Mashford-Pringle & Stewart, 2019; Snowshoe & Starblanket, 2016).

The Truth and Reconciliation Commission made 94 Calls to Action to redress the harm of Indian Residential Schools and move towards Canadian reconciliation. Therefore, in the spirit of the 94 Calls to Action, introducing land-based learning into post-secondary institutions could decolonize the ways of learning in university courses (TRC, 2021). Decolonizing our ways of knowing and teaching would serve to bridge the gap between Western and Indigenous knowledge and honor the thousands of children found in unmarked graves across Turtle Island that were forcibly removed from their homes to assimilate to Western pedagogies and epistemologies. Here in Mohkinstis, the traditional Blackfoot name of Calgary, some classes in the University of Calgary's Department of Education (2021) have successfully implemented land-based learning for future educators. Additionally, there have been successful youth-oriented educational programs by the Canadian Education Association (2017) that have implemented land-based teachings. However, there is still a lack of implementation of Indigenous pedagogies in post-secondary settings across Turtle Island (Little Bear, 2000; Mashford-Pringle & Stewart, 2019; Mowatt et al., 2020).

Our research aims to explore how land-based learning could be implemented into an Indigenous studies course on animal-human relationships at the University of Calgary. Firstly, our research aimed to remedy the knowledge gap in the practice of decolonizing classrooms by conducting a qualitative study through a review of land-based learning literature by Indigenous authors. To contextualize our research, a systematic review was necessary to effectively organize the literature by common themes of land-based learning. Secondly, we proposed an outline of the application of land-based learning supported by our literature review. Lastly, our research can contribute to the ii' taa'poh'to'p, the University of Calgary Indigenous Strategic Plan (2017) to promote Indigenous ways of knowing and general comprehension of the importance of land to Indigenous people. Our research does not aim to place Western and Indigenous pedagogies in opposition to each other or in interrelation but rather promotes the resurgence of Indigenous ways of being in Alberta.

LITERATURE REVIEW

Our review determined that the difference in the significance of the land between the Indigenous and Western perspectives, and the meaning of spirituality appointed to the land by Indigenous peoples was more profound than typically understood by Western academics. The importance of the land was found to go beyond the spirituality held by ancestors buried in the land; it extended to the land holding a spirituality as it is perceived a living, breathing being and a teacher in itself (Fellner, 2018; Styres, et al., 2013).

Bartmes and Shukla (2020) explored how to implement land-based pedagogies at the post-secondary level. From their study, they highlighted the obstacles the students faced when trying to understand land-based learning and submerging themselves in the activities. Many students had no prior knowledge in land-based learning and found the non-systematic and non-institutionalized Indigenous ways of knowing difficult to conceptualize. Therefore, our resolve to this obstacle was to first introduce the students to land-based learning in a text-based form as Westernized students are accustomed to learning. From a case study by Hansen (2018), the profound perspective of the land from Cree Elders and concluded that no one other than Indigenous Elders or Knowledge Holders could appropriately convey the importance of the land to students when implementing land-based learning into a course. The Elders concurred that the connection Indigenous peoples have faced with the land due to colonization was deeply severed. Still, the Cree Elders believed that through land-based learning grounded in cultural taught through oral traditions, ceremony and being on the land can decolonize our current teachings, Indigenize education for Indigenous students and promote the well-being of the Opaskwayak Cree Nation (Hansen, 2018). Cassidy and Marsden (2009) attempted to implement Aboriginal ways of knowing at the elementary level by using practices such as talking circles, drum making, sweats and ceremonial dances. Experiential activities that can be used in land-based learning and concluded a field trip led by an Elder or Knowledge Holder would provide the space for a culturally sensitive activity in the land (Cassidy & Marsden, 2009).

While the literature used in this study extensively contextualized land-based learning, the importance of the land from the Indigenous perspective, and examples of implementation of land-based learning in other settings, it is not a perfect replacement for Indigenous voices. It would be beneficial to attain ethical approval to interview Indigenous Elders and Knowledge Holders to expand this study and create a learning module under the guidance of Indigenous voices. With their counsel, a learning module specific to Mohkinstsis could be created, with greater significance to the students. Similarly, with our study as a precedent, more applications could be done to implement land-based learning at other post-secondary institutions.

METHODS

This study adopted a qualitative methodology of thematic analysis of common themes found in academic literature predominantly written by Indigenous authors. Articles were chosen firstly based on their use of keywords such as decolonization, Indigenous learning/pedagogies, Indigenous Ways of Being, land-based learning/pedagogies, Indigenous education/pedagogy, and/or place-based learning/pedagogies. Place-based learning in this context was defined as learning on the land without the acknowledgement of Indigenous knowledges and practices associated with this type of experiential learning (Zandvliet, 2013). Secondly, we searched for sources through Indigenous databases (i.e., University of Saskatchewan Indigenous studies portal research tool) to ensure our findings came from Indigenous authors over non-Indigenous authors, who may be biased by a Western perspective. Since this study did not acquire ethical approval for conducting interviews with Indigenous knowledge holders, teachers, etc., the use of sources predominantly written by Indigenous authors attempted to compensate for the lack of transcript data from Indigenous voices.

The common themes found in our analysis were interpreted for the purpose of finding a culturally appropriate and rational way of implementing land-based learning into a previously text-based pedagogical approach in university classrooms. Our initial findings were presented to the students enrolled in the Indigenous studies course on animal-human relationships at the University of Calgary at the time of the study (Winter 2021 term). This was

accomplished through two 20-minute presentations, which allowed us to present our main findings, pilot sections that would be proposed in how to implement our findings into the course and present an outline of a learning module that disseminated our findings. Feedback from the students and the course instructors was collected through a survey where they were asked to anonymously give their thoughts and concerns on the learning module presented considering their experience with the course content. Comments included what they did and did not like about the module presented, what aspects they would change, and any other comments they thought should be considered in the study. From their assessments, the learning module was adjusted to include our findings from the literature, while also considering the perspectives collected in the survey of individuals with experience in the course as instructors and students.

We applied a methodology similar to that used by Bartmes and Shukla (2020), who interviewed Cree Elders on their perspective of land-based pedagogies used in post-secondary settings, as well as instructors, administrators and students that participated in land-based pedagogies in post-secondary settings such as classes, clubs or events held by the institution. Literature from Indigenous authors coupled with the observations from individuals in the course, brought together the ideas of traditional land-based learning as well as the learning environment at the University of Calgary for which our findings were targeted. We consistently considered how to avoid colonizing land-based learning through our Western lens, cultural appropriation, and unintentionally creating a hybridized pedagogy that was not true to the traditional land-based learning described in the literature.

RESULTS

Qualitative Themes

Indigenous ways of knowing & Western pedagogies. Indigenous ways of knowing can differ for each Indigenous group (Datta, 2018; Mashford-Pringle & Stewart, 2019; McKim et al., 2019; Snowshoe & Starblanket, 2016; Wildcat et al., 2014). Here we focus on common themes that these different groups share based on the literature reviewed. The Western perspective views the land as a resource, a habitat, or similarly like a thing and place (Little Bear, 2000; Mashford & Pringle, 2019). Western epistemologies view the land as where people and animals live, where we get our resources from, such as fossil fuels, water, or wood (Bang et al., 2014). The Indigenous perspective is not materialistic, it is spiritual (Hansen, 2018) as the land is seen as a conscious being with which people must have a reciprocal relationship. From the Indigenous perspective, the land is their source of knowledge and strength (Wildcat et al., 2014), and is home to the plant people, tree people, four-legged, flyers, crawlers, swimmers, rock people. Indigenous ways of knowing views all beings, which includes the land, are sacred and a necessary part of life that is interconnected, and dependent on one another (Allen, 2008; Redvers, 2018). Indigenous communities see the land as spiritual and healing in nature as many Elders teach that the Creator provided the people with the land to both live on and sustain (Hansen, 2018). Indigenous sociologist Duane Champagne (2015) describes the Indigenous people as guests of the Creator who have the sacred task of sharing the land with other powerful beings that they had to show respect to along with the land. The Mi'kmaq First nation people believe all things are part of nature and must be treated with respect (Robinson, 2014). Actions such as digging up plant roots for medicine or killing an animal for food should result in giving thanks for things that are used in personal use (Robinson, 2014). Mi'kmaq oral stories describe that if the remains of an animal were not treated with respect (used to make something or buried) the spirit of the world passed this onto the living animals which would then not permit themselves to be captured and killed (Robinson, 2014).

Land as teacher. Land-based learning is learning from the land while considering our physical, mental, spiritual, and emotional connection to it (Legge & Robinson, 2017). This is a common thread in Indigenous epistemology rooted in the Medicine Wheel (Canadian Education Association, 2017). The Medicine Wheel teachings focus on the interconnectedness of the four aspects of well-being which include the mental, physical, spiritual, and emotional (Fellner, 2018; Karanja, 2019). This method recognizes the land as a conscious being that has teachings to give the learner (Fellner, 2018; Styres, et al., 2013).

Land-based learning is experiential; it is never separated from day-to-day life (Bowra et al., 2020). It flows with hunting, fishing, and other subsistence practices. Examples of this type of learning include smudging and storytelling, remembering childhood connection to the land, recognizing urban-rural dichotomies, and deconstructing Western pedagogies (Styres, et al., 2013). Stories passed down from past generations have long been used to teach in traditional and Western settings (Davis, 2014; Fellner, 2018). Previous research has shown how Indigenous knowledge has provided context and meaningful connections between students and what they are studying (Howard & Kern, 2017). Additionally, environmental conservation efforts and the success of Indigenous individuals in educational institutions could be increased by implementing land-based learning and other Indigenous ways of being in Canada (Canadian Education Association, 2017; Corntassel, 2012; Tuck et al., 2014)

Land-based is not place-based. Decolonizing the classroom means acknowledging the difference between place-based and land-based learning (Bowra et al., 2020). Place-based learning is simply learning in an outside setting without acknowledging the Indigenous knowledge that this practice comes from (Zandvliet, 2013). Land-based learning should centre the practice in Indigenous ways of knowing. This means opening oneselfup to the transformative experience of learning from and on the land.

Proposed Learning Outline

Text-based Introduction to Land-Based Learning. The introduction of land-based learning is centred around the introduction of the land from the Indigenous perspective. A study by Bartmes and Shukla (2020) implemented land-based learning in Manitoba universities and found that students benefited from learning the context of land-based learning as text-based knowledge before their land-based activity. The teachings are introduced with a land acknowledgement relevant to the location of the course. The land acknowledgement is a starting point to discuss with the class how they perceive the land acknowledgement, followed by an explanation of how the Western perspective differs from the Indigenous perspective because of the different significance put on the land by Indigenous groups.

Indigenous Elder & Learning on the Land. The text-based introduction is followed by a land-based activity held by an Indigenous Knowledge Keeper to bridge the gap between learning about the land and land-based learning. The study by Bartmes and Shukla (2020) found that students had a difficult time completely focusing on their land-based activity when they were unclear of how they would be graded. Therefore, the students are assured that they will be marked based on participation only. This activity is held on the weekend to increase the amount of time the students can learn from the activity, as Indigenous Knowledge holders have found that the rushed scheduling of post-secondary classes take away from the nature of land-based learning (Bartmes and Shukla, 2020). In the spirit of reciprocity, ceremonial Elder, Andy Black Water, suggests that anyone can provide a small offering (berries, tobacco, or small pieces of cloth) when engaging with reciprocity on the land. (Sosiak, 2015). At this point, the group can meditate on their relationship with the land and the people under the guidance of the Elder.

It is also important for educators to note that we cannot ask Indigenous peoples for free emotional labor. This means being in a cyclical relationship with Elders and Knowledge Keepers that is continuously renewed and reciprocated even after the activity has ended.

Reflection. Following the land-based activity, we recommend having a class discussion. If the classroom is regularly scheduled in a theatre-style room, we propose that this lesson be moved to a room where seating can be moved to allow for the students to sit facing each other. Discussing in an even level room allows the students to engage in a discussion more deeply on an equal level than in a theatre facing the backs of other students and looking onto the professor only (Zandvliet, 2013). The class discussion serves to open a conversation between the students on their experience with the land-based activity, what they learned, and how their perspective has or has not changed as a result.

DISCUSSION

In exploring how to implement land-based learning into a course at a university that uses Western practices of education, we aim to be culturally sensitive throughout the research process. This is particularly important as researchers without Indigenous descent. The learning module is created to outline how Indigenous ways of knowing (i.e., land-based learning) can be implemented into a course by decolonizing the classroom and integrating Indigenous voices into courses that teaches on Indigenous land. Decolonizing the ways of learning in education goes beyond reconciliation with Indigenous groups but also works to promote the resurgence of Indigenous ways of being in society.

The learning module is the result of our thematic analysis of the literature that explored the meaning of the land to Indigenous groups, the use of land-based learning, practices used in land-based learning, and studies that attempted to use land-based learning in Western settings. We attempt to bridge the knowledge gap on Indigenous ways of knowing by focusing on literature by Indigenous authors that effectively describe Indigenous epistemologies and their origin.

This study gives an outline of how land-based learning could be implemented into other courses at the University of Calgary.

It is our aspiration that this research and learning module could be used to incorporate Indigenous ways of being at all learning levels in Canada. Particularly in the University of Calgary, we think it is appropriate to include Indigenous ways of being when teaching the culture and knowledge to students. Promoting the resurgence of Indigenous ways of being via education in Canada holds value as it goes past simply apologizing (Corntassel, 2012; Pugh et al., 2019; Wildcat et al., 2014). By learning from the Indigenous connection to the land, Western society can learn and promote Indigenous ways of being by removing ourselves from colonial practices we contribute to (Simpson, 2000; Wildcat, 2014). Future implementation of land-based learning should be done with consent and input from local Indigenous communities since there are different Indigenous practices across Turtle Island.

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Conflicts of interest

This author declares no conflicts of interest.

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The Ethics of Germline Gene Editing and Nursing Ethics

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Abstract This paper explores the current ethical issues in the potential use of germline gene therapy. This paper will also discuss the ethical principles of beneficence and non-maleficence in the context of germline therapy. The balance between potential benefits and potential harm in its use will be appraised. Moreover, the principle of autonomy will be further studied. More specifically the issue of consent and the potential dilemma when the modified individual's will and those who chose the modifications do not align will be examined. Furthermore, the ethicality in the potential non-medical use of germline gene therapy will be investigated. Also, the consequences for the non-medical use in the therapy such as potential human rights violations and a breach in the ethical principle of justice will be speculated. Moreover, this paper highlights the use of the Canadian Nurses Association (CNA) Code of Ethics to help guide nurses through the complex ethical problems that they may face in germline gene therapy.

INTRODUCTION

Advances in the health sciences have created the potential to eliminate many genetic diseases that have negatively impacted people and their families. The development of technologies such as CRISPR-Cas 9 and adeno-associated viral vectors have propelled genetic research by making faster, more efficient, and cheaper ways to modify genes with broad applications in medicine and other sectors (Mahmoudian-sani et al., 2018; Wu et al., 2020; Zhu et al., 2020). Gene therapies currently exist in healthcare but are limited, highly regulated, and only affect somatic cells. Somatic gene therapy targets somatic cells; thus, it cannot pass on the genetic changes to future generations. In contrast, germline gene therapy results in changes that are passed on to subsequent generations (Ormond et al., 2017). This difference is one of the main reasons it requires more ethical and moral considerations. Some ethical issues that germline gene editing must consider are the principles of beneficence, non-maleficence, autonomy, and justice (Ayanoğlu et al., 2020; Gyngell et al., 2017). Also, the advancements in biotechnological capabilities to modify genes have created an unintentional possibility to create "Designer Babies". The term "Designer Baby" refers to a child whose genes have been manipulated with technology to impact non-medical traits (Pang & Ho, 2016). This raises additional moral issues such as the potential for use in a eugenics like movement and for creating a society that is less accepting of differences (Friedmann, 2019). The concept of germline gene therapy is an ethically and morally complex subject. Nurses must use the Canadian Nurses Association (CNA) Code of Ethics to help guide their research, education, and clinical practice during ethical problems they may encounter (Canadian Nurses Association [CNA], 2017). This paper will examine the major ethical principles of autonomy, beneficence, non-maleficence, and justice when it comes to germline gene editing. Furthermore, this paper will explore the concerns in the ethicality of non-medical germline gene therapy and will address nursing concerns in the context of the CNA Code of Ethics.

LITERATURE REVIEW

Beneficence and Non-maleficence in Germline Gene Therapy

The intention of altering the germline to fix genetic issues in generations of people is a life-changing and worthy cause. Thus, it is vital to consider this argument of potentially ameliorating the lives of multiple generations when discussing this therapy. However, one of the ethical dilemmas of this therapy is juxtaposing the benefits, such as repairing cancer-causing genes, against the risks such as causing unintended mutation that could result in harm (Katz & Pitts, 2017). It is important to note that potentially changing the germline is not a novel outcome in medicine. For example, current therapies such as radiation have the

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potential to cause unintentional changes in the germline. However, considering what is useful and potentially helpful outweigh the possible consequences of these treatments. Therefore, the risk to benefit ratio favors the use of such biotechnology (Smith, 2003).

When considering the potential risk to benefit ratio in germline therapy through an ethical and safety perspective, many issues go against the principles of beneficence and non-maleficence. Contrary to germline gene therapy's purpose in potentially eliminating diseases in the subsequent offspring, there are considerable risks associated with creating changes in the germline. There are currently high chances of passing down harmful genetic mutations with unknown effects that can have impacts on generations of children (Ormond et al., 2017; Pang & Ho, 2016). Although much progress has been made to reduce unintentional or off-target effects, CRISPR-Cas 9 is still not precise enough to completely prevent such mistakes (Zhang et al., 2015). Off-target effects occur when untargeted areas of genome are changed by accident. These changes can be detrimental to otherwise healthy genes and thus could result in more harm than good. Many researchers have identified the frequency of these off-target effects that can potentially cause deleterious effects as one of the major limiting factors in the use of CRISPR-Cas 9 in humans (Herai, 2019; Liang et al., 2015; Zhang et al., 2015). Because of the lack of research on germline editing in humans, the magnitude of these consequences are also unknown. Thus, germline gene therapy's current usage goes against the ethical principle of beneficence, which is defined as being responsible for doing what is beneficial for the patient (Stephany, 2020). By ignoring and not considering the possible negative impacts on future generations, one cannot fulfill the principle of beneficence nor of non-maleficence.

Moreover, there are unknown risks about the safety and adverse effects such as creating oncogenes that cause cancers in patients and creating unknown off-target effects (Ormond et al., 2017; Pang & Ho, 2016; Singh, 2021). Research by Ayanoğlu et al. (2020) suggests that germline editing is more challenging because of the risks associated with mutation and undesirable side effects are transmitted into the progeny. Furthermore, these side-effects and consequences may not appear until several years later. Non-maleficence is "the duty to prevent harm, whether intentional or unintentional" (Stephany, 2020, p. 46). It is evident that the current use of germline gene editing does not abide by the ethical principle of non-maleficence. This is because the therapy could cause serious harm to future offspring with unknown consequences. Furthermore, ethical concerns on non-maleficence arise in the context of the modified person and family. There is potential for the genetically modified individual's parents to be less accepting of future imperfections and differences in their children due to a sense of perfectionism, which can be psychologically detrimental to the child (Ormond et al., 2017). This therapy is different from other existing therapies as these therapies do not drastically impact the lives of individuals who are not receiving treatment. Germline gene therapies also have the ability to alter societal norms. As a society, we should move towards embracing differences within individuals and identify strengths within those differences. Not doing so could lead to severe consequences. After all, variation is the raw material of evolution and without it, society could become much more susceptible to disease or natural disaster. When examining this in the context of the Ethic of Care that places the person at the center of importance (Stephany, 2020), yielding the principles of non-maleficence and beneficence are not justifiable. Therefore, more research into how to ensure that beneficence and non-maleficence are respected is a prerequisite before further investigating its use.

Autonomy in Germline Gene Therapy

Another issue that people must consider in germline gene therapy is the ethical principle of autonomy. Patient autonomy continues to be essential in guiding research and practice. Autonomy is one of the four major bioethical principles based on the theory of deontology in a form called principlism (Stephany, 2020). Bioethical issues in genome editing may arise in the context of consent. The question of who will give consent and how have to be considered. Consent in the context of somatic cell gene therapy is clear because it only affects the individual. However, there is a sense of obscurity in consent when changes can affect future generations. How they will obtain consent from unborn generations and relay pertinent information, such as risks, is an ethical question that remains unanswered (Knoppers & Kleiderman, 2019; Singh, 2021). One possible avenue of interest is the use of recent biotechnological advancements, such as CRISPRoff (Nuñez et al., 2021). This biotechnology allows researchers to make gene edits reversible. This technology still requires further research; but, if it is proven to be safe and effective in humans, it can potentially help address such issues.

The ethical issue of autonomy also becomes complicated in the context of people's wills and choices. An ethical dilemma exists when the modified individual's will and those who chose the modifications do not align (Macpherson et al., 2019). For example, there can be a disconnect in what the modifier decides what is best and if the modified person agrees with that choice. Choosing what is best for somebody else is called the principle of paternalism. It does not respect the autonomy of the affected person (Stephany, 2020). One can also argue that this violates the human right of being born free and equal (United Nations, 1948). If a decision is made on the behalf of someone without their consent, and it predisposes them to an alternate lifestyle, that contradicts the right to being born equal. An argument can also be made that it should be up to the individuals who are getting modified to decide since it is occurring to their cells. It is important for healthcare professionals to respect the autonomy and decision making of the individual they are treating. Thus, in a debate of germline therapy autonomy, it becomes a question of whose autonomy precedes the other. Therefore, more research into the unborn persons autonomy and rights will need to be addressed.

Ethicality in Non-Medical Germline Gene Therapy

Currently, germline gene therapy is not an acceptable practice within the medical community, nor is it supported by legislation. One of the significant issues that it encounters is the question of treatment versus enhancement. Ethical problems arise when the intent of use is for enhancement instead of for treatment. People may begin to blur the lines between what is necessary and beneficial and what is preferential and unnecessary (Cwik, 2019). For example, there may be germline gene therapy options that treat muscular disorders. However, some people may choose to utilize this therapy for performance or aesthetics even if there are no muscular issues. This creates a problem of people deciding what traits or features are good and bad. Thus, it determines the worth and value of people who have those traits (Singh, 2021).

Historically, when society has acted upon characteristics deemed desirable, it has led to severe consequences such as the eugenics movement. An example would be Nazi Germany that almost successfully eliminated what they thought were undesirable traits in people. Not only is this morally wrong, but it also violates ethical principles and infringes upon human rights. It is important to note that the aforementioned is highly speculative. However, one must consider all the potential possibilities that could create unrealized ethical issues before its use.

Furthermore, the potential use of germline gene therapy for enhancement is concerning because of the ethical principle of justice. According to Stephany (2020), the principle of justice is defined as the idea of fairness and equal treatment. Germline gene editing might increase the problematic inequities already existing in our society. There is the potential for unequal accessibility, creating further division and widening society's injustices (Ayanoğlu, 2020; Singh, 2021). Moreover, medical conditions may become an identifier to a class or culture, resulting in stigmatization and further discrimination (Ormond et al., 2017). A change in what people accept as normal would further emphasize prejudice and intolerance against others that do not have access. This would go against the ethic of care and the ethic of justice (Stephany, 2020). Therefore, nurses must be advocates for the disenfranchised to prevent further division in society. This can be done by being aware of factors such as determinants of health that impact people and supporting policies that are equitable.

Germline Gene Editing and The CNA Code of Ethics

The CNA Code of Ethics is an important document that is "designed to inform everyone about the ethical values and subsequent responsibilities and endeavors of nurses" (CNA, 2017, p. 2). Therefore, nurses must use the CNA Code of Ethics to help guide their research, education, and clinical practice during ethical problems they may encounter. The first value that nurses must consider in the context of germline gene editing is "Providing Safe, Compassionate, Competent and Ethical Care" (CNA, 2017, p. 8). According to the CNA (2017), the ethical responsibility of a nurse under this value is that:

> "Nurses support, use and engage in research and other activities that promote safe, competent, compassionate and ethical care, and they use guidelines for ethical research that are in keeping with nursing values. Nurses involved in research respect the well-being of persons receiving care above all other objectives, including the search for knowledge. They pay attention to the safety of persons receiving care and to informed consent, the risk-benefit balance, the privacy and confidentiality of data and the monitoring of research." (p. 9)

Consequently, the current research in germline gene therapy does not abide by the CNA Code of Ethics in which we have to conduct ourselves. An example of this comes from research done in China. In late 2018, a biophysicist by the name He Jiankui edited the genome of two twin babies prior to their birth to make them less susceptible to HIV despite them not being at high risk of contracting the disease. He neglected protocol and safety procedures and attempted this experiment despite no evidence of potential success. He was severely condemned by the scientific community and was eventually sentenced to three years in prison with a lifetime ban from reproductive technology. The twins were eventually born and have yet to develop any adverse conditions. However, their future health is unknown, and they require continuous monitoring, including genetic testing to detect potentially fatal mutations (Alonso & Savulescu, 2021; Caplan, 2019). It is crucial that nurses not be involved in unethical research and be accountable in reporting instances that violate the law and ethical principles in practice. It is important to note that nursing ethics and social ethics very similar as both emphasize concern for society and for societal change (Fowler, 2016). Therefore, regardless of which lens one decides to approach the issue above, it would have been unethical.

Furthermore, if this therapy were to become a reality, the nurse's ethical obligation would be to ensure that patients receive consent and an explanation of the risk-benefit ratio. This would abide by the ethical conduct of "Promoting and Respecting Informed Decision-Making" (CNA, 2017, p. 11). According to the CNA (2017), it is the responsibility of a nurse to "recognize, respect and promote a person's right to be informed and make decisions" (p. 11). Moreover, nurses must be impartial when providing information to prevent any bias in people's decision-making. Nurses may disagree with the use of germline gene therapy. However, it is essential to understand that the nurse's role is to provide the best evidence to allow their clients to make an informed decision and respect that decision. That is part of not only the CNA Code of Ethics but is also one of the professional standards that nurses abide by in their practice (British Columbia College of Nurses and Midwives, 2021; CNA, 2017). As science makes advances and CRISPR's potential in humans become more concrete, it will become ever more important to practice evidence-based medicine (British Columbia College of Nurses and Midwives, 2021; CNA, 2017).

CONCLUSIONS

The ethicality of germline gene editing will continue to be a highly debated topic in the future. Whether in the context of research or about its use, researchers and ethicists will require considerable introspection, contemplation, and discussion. As more information is uncovered about the human genome and as biotechnology advances, germline gene editing may become a realistic possibility in the future. Germline gene therapy has the potential to alter human genetics in generations of people saving and bettering their lives. However, there are still unknown variables such as the morality, ethicality, and consequences of its use that researchers must address beforehand. Therefore, to contribute, nurses must understand the ethical principles of non-maleficence, beneficence, autonomy, and justice in addition to the ethicality of non-intended uses of germline gene therapy. This ensures that nurses do not inflict further harm and infringe upon the rights of people. Furthermore, nurses must be aware of these factors to best abide by the ethical principles set in the CNA Code of Ethics to advocate for practices that best represent the meaning of being a nurse. Lastly, nurses must use the CNA Code of Ethics to help guide their practice when encountering difficult situations to ensure that their actions abide by nursing values and professional standards.

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Conflicts of Interest

The author declares no conflicts of interest.

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Socially Inappropriate Motherhood: Cross-Cultural Approaches to Sexual Violence-Related Pregnancies (SVRP)

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Abstract Motherhood and childbearing are culturally prestigious, a consequence related to gender roles, life milestones, social function, and population growth. However, external forces such as the community and the state have often overlooked power over the construction of socially acceptable forms of reproduction. Sexual violence-related pregnancies (SVRP) provide unique insight into social constructions of what is deemed as acceptable forms of pregnancy and motherhood, and understandings of the children—sometimes invoked as "monster babies" (Muller, 2016)—that come from these circumstances. This review seeks to examine the relationship between state and community understandings of appropriate motherhood, sexual violence, and gendered perceptions of "good" or socially supported motherhood. SVRP represents an intersection between stigmatization, social support, and criminality in conversations of reproductive health and decision-making, which will be demonstrated using abortion laws as a cross-cultural lens through which to understand the policing of SVRP comparatively between the United States, Australia, Nicaragua, and the Democratic Republic of Congo. Furthermore, the contentious nature of abortion debates and legislation will be utilized as a lens to understand which forms of motherhood and childbearing can be considered state and community sanctioned and which are unsupported. This review will include discussions of difficult topics such as sexualized and gender-based violence, abortion, unwanted pregnancies, and reproductive coercion which may be distressing to readers.

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INTRODUCTION

Gender roles have many different expressions across the world, some moulded by colonization and imperial projects, and others shaped by time and the historicity of culture (Nafziger, 1999; Terman, 2018). However, despite inherent changes in gender's social meaning and expectations over time, motherhood is an element of the life-course that holds extensive meaning and reflects intricate understandings of social integration, adulthood, responsibility, and social roles. While these roles and responsibilities have significant variation on a micro-scale, they are contextually shaped by social and political systems much larger than individual subjects. Not all forms of motherhood are perceived equally, and not all pregnancies are recognized in the positive light that often colours social understandings of childbearing. The pregnancies and forms of motherhood marked by social undesirability vary cross-culturally, but remarkable similarities can be seen even within these differences. This essay investigates motherhood and pregnancy through the following questions: Under what circumstances might motherhood be constructed as socially, legally, or personally inappropriate? Furthermore, in what contexts might pregnancy become stigmatized or discouraged sociopolitically, and what effects does this have on conceptions of motherhood? Incest taboos, one-child policies, or extra-marital conception all serve as excellent examples of society and the state's ability to police certain forms of childbearing, but there is unique insight to be drawn from case studies of sexual violence-related pregnancies (SVRP).

This examination aims to outline the social construction of sanctioned motherhood cross-culturally, using abortion laws, societal stigma, and interpersonal consequences as lenses through which to understand the ways that certain pregnancies and mothers are constructed as less desirable than others. In this way, social and legal bias towards the termination of these pregnancies shapes the construction of SVRP as a negative and socially inappropriate form of childbearing and motherhood. Abortion laws provide crucial insight into ideologies that discourage the continuation of a pregnancy under certain situations and reflect what forms of motherhood are considered socially unacceptable or non-normative. A cross-

cultural literature and policy review relying on case studies is constrained in its capacity for generalization, and must be considered within the frame of the examples given as a theoretical discussion with limitations. However, by examining both global abortion legality in SVRP and multiple previously-documented community perceptions of children conceived through sexual violence, it becomes clear that these pregnancies are heavily stigmatized in many global contexts. Through a comparative examination of global policy and case-studies of the United States, Australia, Nicaragua, and The Democratic Republic of Congo, legislative and cultural relationships with SVRP suggest that they are marked as non-normative, and their termination is differentially privileged over other forms of pregnancy. SVRP are granted comparatively flexible options for termination globally and have low community support in many cultures (Greenhalgh, 2011; Kjelsvik et al., 2018; Muller, 2016; Rouhani et al., 2015; Tarzia et al., 2019; UN, 2020). This indicates that these pregnancies are constructed as problematic and are indirectly or directly encouraged to be terminated by means of special abortion status and community pressures to varying degrees.

BACKGROUND

Gender Ideologies and Global Policy

Despite the third wave of feminism's immense impact on contemporary critiques of gender roles and their relation to violence, the integration of historical conceptions of gender performance in social worldviews persist. Feminist theorist Barbara Welter seminally describes these historical understandings as "the cult of true womanhood"(1966), a phrase that identifies a framework of gender separatism and prescribed feminized characteristics pervasive in the westernized world. This work has since faced critiques (Roberts, 2002) but remains an identifiable pillar in second-wave feminist literature. The cult of true womanhood especially emphasizes women's supposedly inevitable roles as homemakers and mothers, a concept not exclusive to Europe and North America (Welter, 1966). In a global context, caregiving has diverse labour divisions; however, the incorporation of Christian dogma on a global scale inspired a widespread adoption of westernized 'good-womanhood' ideologies, which can be seen from social opinion to public policy across the world. Notably, western religions' pervasiveness constructed a standpoint in which human life begins at conception and terminating a pregnancy transgresses moral standards (BBC, 2014; Ladriere, 2013). Due to the effects of colonialism and globalization, this cultural understanding is far-reaching and serves to reinforce ideas that portray abortion as largely undesirable and immoral. In Carol Gilligan's 1982 book, In A Different Voice, it is noted women may have a socialized tendency to weigh abortion options in terms of care obligations, gender role fulfillment, and personal responsibility rather than simply making decisions based on a "formal logic of fairness" (1982, p.73). In legal systems that have historically been laden with non-secular ideologies (Nafziger, 1999), Gilligan's notation of abortion legislation as a "logic of fairness" is particularly interesting. The author suggests that while abortion is still subject to various policing in much of the world (UN, 2020), there are instances in which withholding this option would be considered unfair or even unethical. In 2020, the United Nations reported that the most common circumstances of permissible abortions globally are cases in which the procedure would be considered lifesaving for the woman, and further noted that 61% of countries would allow abortion in cases of rape or incest (UN, 2020). The recent overturning of the landmark Roe v. Wade case in the United States reaffirms that despite deep cultrual reservations that may exist regarding abortion access, these two circumstances may 'justify' the procedure in even the most pro-life legislatures, with 73% of Americans agreeing termination should be legal in life-saving circumstances, and 69% in cases of rape (Pew Research Center, 2022). The implication of this number correlates with the idea that abortion in situations of sexual assault may qualify as exceptionally ethical or fair (Greenhalgh, 2011). For instance, despite Peru's criminalization of SVRP abortion, prison time for this offence is significantly reduced compared to abortions under other circumstances like socioeconomic strain or mental health (UN, 2020). Furthermore, the UN reports that the "majority" of countries consider abortion in cases of sexual assault permissible within a window of 13-24 weeks gestation (2020, p.26), encompassing the milestone at which a fetus would widely be considered viable outside of the womb (Breborowicz, 2001). Considering the moral implications of late-gestation abortion that underwrite this legal and social discourse, these findings are remarkable in demonstrating that the termination of SVRP is granted an elevated status. For instance, abortion on request often allows a maximum of only 12 weeks gestation (UN, 2020, p.26). Operating off the notion that legislative policy can partially represent the opinion of the state (Erikson, 1976; Wlezien & Soroka, 2016), these numbers affirm, on a global scale, that SVRP are given special status via state-sanctioned access and prolonged time limits for abortion services. In this way, the message of these policies suggests that these pregnancies are socially inappropriate, and they should be allowed more flexibility and access to termination. If the pregnancies are socially unwanted, their termination may be facilitated (to some degree) by the state through increased late-term abortion availability and legislation which formally validates community understandings of SVRP as non-normative and challenging.

RESULTS & DISCUSSION

SVRP Stigma and United States Contextualization

Despite special exceptions in abortion legislation for SVRP, the lack of societal support for these pregnancies and motherhood reflects stigma surrounding SVRP. Prewitt (2010) posits that approximately 25,000 women in the United States become pregnant through sexually violent circumstances annually and that cases in which the woman decides to continue the pregnancy and raise the child are highly stigmatized. She describes a culture of societal judgment and claims from the public that these women resent or dislike their child, that their motherhood serves as re-traumatization, or accusations that their experience of sexual assault has been exaggerated or falsified (Prewitt, 2010). This stigma can lead to personal implications in the mother's life, such as discrediting their court cases and losing certain legal protections like alternative custody arrangements (Prewitt, 2010). It is understood that access to community and social support is a significant factor in women's decision to seek abortion services (Kjelsvik et al., 2018). This correlation suggests that low access to support systems may create circumstances in which continuing a pregnancy can be incredibly difficult and sometimes even impossible. The importance of this connection is the implication that outward rejection of a pregnancy by a woman's support network may be a strong influence on her choice to terminate a pregnancy. Research also suggests that the public sees these birth

circumstances as a complicator to healthy relationships between parents and children, even in adopted families (Goldberg, 2019). Some anecdotal evidence exists which claims that these children may be ostracized by their extended families and thought to carry negative traits related to paternal criminal violence (Muller, 2016). It is widely recorded that westernized discourses of sexual violence rely heavily on rape myths and victim-blaming rhetoric, and that this cultural hostility can isolate victims and discourage them from seeking support from legal and personal resources (Baxi, 2014). In an American context, it seems that SVRP and the children that come from these circumstances are made to be vulnerable, particularly in their instances of familial and community rejection and lack of social support.

Reproductive Coercion and Australian Case-Study

In situations with complicated abortion legality, there can be pressures from community and family members to terminate a SVRP due to negative conceptions and stigma surrounding the pregnancy. For example, Tarzia et al. (2019) affirms that reproductive abuse in cases of sexual assault is a significant concern observed by healthcare practitioners in Australia. Tarzia et al. defines reproductive abuse or coercion as attempts by outside parties to "control a pregnancy outcome (forcing a woman to terminate a wanted pregnancy or to continue an unwanted one)" (2019, p.457). Notably, instances of this form of abuse within the context of sexual assault were common in healthcare staff's recorded responses, suggesting that women seeking abortion services in Australia are doing so under community or family pressure in considerable numbers. In fact, Tarzia et al. estimate that upwards of 24% of women attending general practice clinics have experienced reproductive coercion, a percentage supported by their research; they report a social worker, among others, confirming this estimation: "I would say it's probably about a quarter of the women that we speak to" (2019, p.1400). This research suggested that cultural stigma surrounding intimate partner violence and sexual assault made women vulnerable to coerced abortion regardless of their personal preference for the pregnancy (2019). Xenos and Smith (2001) further suggest that notions of sexual assault in Australia tend to place responsibility on victims, hold "unfavourable attitudes" towards them (2001, p.1113), and perpetuate stereotypes rooted in outdated understandings of women's gender roles – all of which contribute to a culture of silence and stigmatization of victims. Based on these findings, Australia's social understanding of pregnancy and motherhood in contexts of sexual assault is similar to perceptions in the United States, where American ideologies of women's roles as carers are outweighed by negative stigma and hostility towards victims of sexual assault and SVRP. In this way, while abortion legality has significant variation throughout Australia (Tarzia et al., 2019; Zielinski, 2019), it seems that the lack of public support for this form of pregnancy and motherhood may be expressed through coerced abortion. While the Australian state's inconsistent abortion laws may not solely compel the idea that these pregnancies are socially inappropriate, the societal understanding of these pregnancies as unwanted is expressed through reproductive abuse and a culture of silence that discourages victims from raising the child due to enmity.

"Monster Babies" and a Nicaraguan Case-Study

Even in situations where social notions of morality are reflected in strict abortion criminalization, the lack of community and social support for SVRP demonstrates these pregnancies' status as socially inappropriate and undesirable. Examinations of socially unsupported pregnancies in these contexts can turn to family and community support as a measure of the social validity of the pregnancy. Pregnancies which are spurned by these support systems or encouraged to be aborted can be read as manifestations of public opinion on the fetus's personhood and the pregnancy's social standing, regardless of national legislation. Examining a Latin American context, Luffy et al. (2019) emphasize that in Nicaragua, where abortion is completely criminalized (UN, 2020), women who seek abortion services to terminate SVRP face massive social and medical stigma. Mendoza-Cardinal (2016) argues that understandings of abortion in Nicaragua generally understand the procedure as "not simply the removal of a fetus, but a rejection of motherhood" (p.ii), which transgresses dominant ideologies surrounding women's roles and parenting (Mendoza-Cardinal, 2016). Luffy et al. indicate that widespread understandings of sex and gender within marital scopes lead victims of sexual violence to have little support from the public in cases of SVRP (2019). They affirm that complicated cultural and religious understandings of gender roles and marital entitlement obscure understandings of this violence and the choice to raise children from SVRPs (2019). Children conceived through sexual assault are generally awarded a deviant status in Nicaragua, even being titled "monster babies" colloquially in the country (Muller, 2016). Luffy et al.'s case study of a 19-year-old woman who became pregnant after a sexual assault depicts a culture of humiliation and silence surrounding sexual violence, which influenced her decision to seek abortion services (Luffy et al., 2019). This young woman further expressed her concern that revealing her assailant's identity would lead to the disintegration of the social support network she would rely on to raise the child (Luffy et al., 2019). When between 70-80% of sexual violence is committed by someone known to the victim (Cotter & Savage, 2019; RAINN, 2013), disclosing the paternity of a child conceived by sexual assault can considerably complicate the support available to victims in all pregnancy outcomes. Luffy et al. suggest that this woman's testimony may reflect a culture that polices and stigmatizes SVRP and motherhood more than the rape or assailant themselves (2019). So, in a national context that considers abortion a rejection of morals and gender expectations (Mendoza-Carinal, 2016), one could argue that the societal stigma surrounding motherhood of children conceived by sexual assault outweighs both the social and legal discourses surrounding abortion and pregnancy in Nicaragua.

"Bad" Children and a Democratic Republic of Congo Case-Study

Similarly, the Democratic Republic of Congo has been a site of research on the acceptance of SVRP and children conceived by sexual assault. Rouhani et al. found that "even when mothers are accepted by their communities after sexual assault, the acceptance may not extend to their children" (2015). This research further posits that children born under these circumstances face name-calling, social rejection, discrimination, and low community support (Rouhani et al., 2015). The authors suggest that in cases of high public stigma, parenting indexes used to measure a positive mother-child relationship were diminished (2015). Rouhani et al. note that with this pervasive stigma comes higher rates of PTSD and other mental health struggles, as well as effectively serving as a form of secondary trauma in and of itself (2015). In these cases of low community and family support towards the SVRP (and the children born from these

circumstances), mothers were more likely to report that they considered the child a burden, an unwanted responsibility, and internalized narratives that their child as "bad" or "deviant" (Rouhani et al., 2015). While this research aims not to generalize the nature of these complex relationships, it does suggest that abortion and abandoning children from SVRP at birth are common choices in the Democratic Republic of Congo (Rouhani et al., 2015). This can be interpreted alongside the data mentioned above as a reflection of low community acceptance and high stigma, which aid in constructing SVRP as non-normative and socially undesirable. Burkhart et al. explains that legal abortion in the Democratic Republic of Congo exists only under strict measures. But, nonetheless, women who become pregnant after experiencing sexual violence frequently seek informal or naturopathic channels of pregnancy termination, such as herbal abortives, and these methods are sometimes aided or procured by family members (Burkhart et al., 2016). The women surveyed in this research indicated that abortion was often preferable in cases of SVRP but that it was not always an option due to maternal fatality risks and religious ideologies (Burkhart et al., 2016). Interestingly, this research reported healthcare professionals aiding in abortions outside legal guidelines (Burkhart et al., 2016). This informal medical assistance has implications on understanding these pregnancies as socially inappropriate compared to other pregnancies, a notion which a participant affirmed: "to terminate a pregnancy from sexual violence is not a problem because it's from a bandit" (Burkhart et al., 2016). This comment confirms that the personhood of fetuses conceived through sexual assault is differentially constructed; while terminating a fetus conceived under non-violent circumstances would be considered a "problem", SVRP may be constructed as inherently bad and therefore a preferable candidate for abortion. These abortions may be given more ethical leeway due to a cultural understanding that they are unwanted and unsupported by the community.

CONCLUSIONS

The notion that women should fulfill roles of caring and motherhood are elements of gender ideologies that extend globally (Terman, 2018). These ideologies bring forward biased conversations of morality; pregnancy is often considered a significant life milestone and marker of status, and forms of contraception such as birth control, condoms, and abortion, face varying degrees of social stigma due to religious and gendered ideologies. However, despite these persistent philosophies, some forms of pregnancy and motherhood are undeniably rejected by state and social bodies. SVRP are pregnancies fraught with stigma, ranging from victim-blaming and anti-survivor rhetoric to notions that children born under these circumstances are socially tainted or a constant trauma to their mothers. This stigma manifests itself in community and social responses to these pregnancies worldwide, and there is copious evidence that social constructions of these pregnancies as unwanted influence rates of termination and social consequences for victims of sexual violence. These trends in public rejection of SVRP can be seen more broadly in global policy, as more than 60% of countries consider abortion in cases of sexual assault deserving of privileged access to termination in comparison to abortions on request, which are considered less "fair" (Gilligan, 1982; UN, 2020). It can be understood that pregnancies which receive termination coercion or encouragement, or privileged legal flexibility for abortion are pregnancies which are comparatively unwanted by the state and community bodies. In conclusion, while continued understandings of women's ultimate purpose as mothers and child-bearers can be found in many global contexts through religion and gendered stereotypes, safe and equal access to abortion is a fundamental step towards reproductive justice. SVRP can be used as a lens to understand that women's experiences of sexual violence can be exacerbated by legal systems and cultures which continue to disempower their ability to make choices about their bodies and lives.

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Conflicts of Interest

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A Potential Neural Pathway for Explaining Suicidal Behaviour: Does it Exist?

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Abstract Suicide is a major health problem, with a lack of decline in suicide rates over the past few decades suggesting that existing treatment methods are insufficient for dealing with suicidal behaviour. A review of the existing neuroimaging literature on suicidal behaviour suggests that a core, "skeleton" neural pathway exists in most suicidal individuals, who tend to have structural and functional alterations in the anterior cingulate cortex, orbitofrontal cortex, and insular cortex. This altered neural pathway explains the two main cognitive-behavioural characteristics observed in suicidal individuals: impaired decision-making, and emotional dysregulation. Abnormalities in other brain regions may exist in certain suicidal individuals; most notably, the presence of a comorbid mental disorder may be correlated with impairments of specific brain structures depending on the disorder present. Future neuroscientific and psychological research should aim to increase the replicability of neuroimaging studies, determine the extent that a comorbid mental disorder impacts an observed location of neural abnormality, and unify terminology definitions used in the study of suicide to increase validity and compatibility across suicidology research.

INTRODUCTION

Suicide is a major health problem as the 10th leading cause of death in the United States. In 2019 alone, 47,500 deaths occurred by suicide, and 12 million American adults had contemplated suicide (Centers for Disease Control and Prevention [CDC], 2021). Despite the rapidly expanding literature on risk factors contributing to suicidal behaviour and/or thoughts, suicide rates have not declined significantly over the last few decades (Franklin et al., 2017). Additionally, there have been several challenges in the field of suicidology that hinder progress in treating the issue at hand, including a lack of consensus on suicide-related terminology, suicidality measures that are interpreted differently between studies due to the lack of consensus , contrasting perspectives as to whether suicide should be viewed as a state or trait, stigma impacting data collection and analyses, and the low base-rate of suicidal behaviour implying that an extreme sample size in the thousands is required for reliable results (Klonsky et al., 2016).

Given such challenges, a neuroscientific approach to suicide research as opposed to social or personality approaches may be a promising avenue for further research. In particular, neuroimaging techniques seem to circumvent some of the challenges in suicidology. While the subjectivity of defining suicidal behaviour and thoughts may affect the validity and comparability of data, well-established neuroimaging techniques measure objective variables (e.g., brain activity), producing results that are unaffected by social phenomena such as stigmas. Furthermore, neuroimaging studies are not subject to the limitations of self-report measures. Literature reviews of existing neuroimaging studies may provide critical information into the biological factors of suicide and the resulting effects on psychological and social behaviours. This literature review aims to summarise findings regarding potential neural pathways involved in suicide.

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LITERATURE REVIEW

Neural networks in psychological pain

Within the ideation-to-action framework, many theories include negative emotional affect – that is, negative moods or emotions such as anxiety -- in some form or another as a key risk factor for suicidal ideation. Joiner's interpersonal theory posits perceived burdensomeness (the irrational belief that one's death is of greater value than their life) as a main risk factor (Joiner, 2019). O'Connor's integrated motivational-volitional theory includes a sense of defeat and entrapment within the individual as a critical factor (O'Connor, 2011). Most notably, Klonsky's three-step theory explicitly highlights psychological pain as a critical variable in determining intensity of suicidal ideation (Klonsky & May, 2015). While the neural networks of physical pain have been well studied in the general neuroscience literature (Apkarian et al., 2005; Schnitzler & Ploner, 2000), the networks for psychological pain have only been of minor interest (Biro, 2010).

While the definition of psychological pain is not as clear-cut as physical pain, a review of the literature by Meerwijk and Weiss (2011, p. 410) suggests that it be defined as "a lasting, unsustainable, and unpleasant feeling resulting from negative appraisal of an inability or deficiency of the self" that requires considerable time to resolve. When psychological needs such as the need to love or be loved are not met to a sufficient level, intense psychological pain may result (Shneidman, 1998), which has been identified as preceding suicidal ideation and/or behaviour (Troister & Holden, 2010). Psychological pain is clearly relevant in the previously mentioned theories of suicide that highlight negative affect as a key factor. As such, the mechanisms of how such pain manifests within individuals needs to be understood.

Meerwijk et al. (2013) proposed a tentative neural network for psychological pain based on a systematic review of 18 studies that utilised neuroimaging techniques and assessed psychological pain, grief and/or recalled sadness. Across all studies, the medial subcortical area showed significantly greater activation when participants were experiencing any one of the above three affective states, implicating the anterior cingulate cortex (ACC), posterior cingulate cortex (PCC), thalamus and cerebellum. The lateral prefrontal cortex (PFC) and parahippocampal gyrus were also implicated; however, their involvement in psychological pain is not as consistent as that of the medial subcortical area. All the brain areas listed comprise the tentative neural network set forth by the authors. For a visual representation of the system, refer to Figure 2 of Meerwijk et al. (2013). In addition to the tentative network proposed, the authors also found a positive correlation between psychological pain and suicidal ideation, further supporting the role of the former in suicidal thoughts and behaviour.

Neuroanatomical differences in clinical populations

Neuroimaging research investigating suicide aims to provide objective markers for predicting suicidal tendencies. Studies relying on subjective information, such as self-report data from suicidal patients, may present several ethical and practical challenges which could interfere with data collection and analyses. For example, researchers must refer participants with a non-zero risk of suicide to appropriate clinical services (Hom et al., 2017), which may influence the outcome of certain research studies. Furthermore, it has been suggested that the clinical manifestations of suicidal behaviour may vary based on other comorbid psychiatric disorders that are present (Nakagawa et al., 2011). Neuroimaging techniques may be able to identify such differences from a neurobiological perspective with greater power than that of subjective methods.

Zhang et al. (2014) conducted a review of neuroimaging studies examining suicidal behaviour in patients with depression. The review found that, in the studies examined (N = 12), structural and/or functional alterations were exhibited in the orbitofrontal cortex (OFC), ACC, and striatum for depressive patients exhibiting suicidal behaviour. The OFC, thought to be responsible for emotion-based cognitive processes and hedonic valuation of stimuli (Salzman & Fusi, 2010), is crucial for adapting to unexpected outcomes including reversal learning tasks (Bendetti et al., 2011). Suicidal depressive patients exhibited abnormalities in the OFC, which may have resulted in an impairment in affective regulation and contributed to impaired decision-making, increased impulsivity, and susceptibility to subsequent suicidal behaviour. Abnormal activity in the ACC has been reported in depressive suicidal patients, most notably involving reduced dendritic growth in patients who had committed suicide (Hercher et al., 2010). However, as the ACC is involved in a wide variety of functions, a more mechanistic explanation for how ACC is implicated in suicidal behaviour requires further research (Zhang et al., 2014). Finally, a decrease in striatal grey matter volume was associated with suicidal behaviour in depressive patients (Marchand et al., 2012), likely contributing to increased impulsivity (Dombrovski et al., 2012). More specifically, it is hypothesised that abnormalities in the putamen may result in a cognitive shift towards a more short-term, immediately rewarding style of decision-making, thus encouraging impulsive suicidal acts in a state of depression (Luo et al., 2009). In summary, the findings indicate that a frontal-ACC-striatum loop is implicated in depressive suicidal patients and is hypothesized to impair decision-making by increasing patients' impulsivity and impacting affective regulation processes (for a visual representation of the proposed circuit, refer to Figure 2 of Zhang et al., 2014).

Building upon the work of Zhang et al. (2014), Domínguez-Baleón et al. (2018) conducted a systematic review of neuroimaging studies investigating suicidal behaviour in patients diagnosed with a psychiatric disorder. Studies that met the inclusion criteria (N = 33) were sorted into one of five categories: major depressive disorder (MDD; n = 17), bipolar disorder (BIP; n = 6), schizophrenia (SCZ; n = 5), schizoaffective disorders and borderline personality disorder (BPD; n = 3), and other (n = 2). The review corroborated the findings of Zhang et al. (2014) with respect to reductions in grey matter density and cortical thickness in MDD patients' ACC (Wagner et al., 2011, 2012), and decreased cortical volume in the putamen (Dombrovski et al., 2012). However, the review was unable to find additional studies replicating the findings of Monkul et al. (2007) on reduced grey matter volume in the OFC. Additionally, the review identified reduced cortical thickness and reduced grey matter volume in the frontal lobe, temporal lobe, and insular cortex of MDD patients—all hypothesised to contribute to suicidal behaviour through emotional dysregulation (Gosnell et al., 2016; Hwang et al., 2010; Taylor et al., 2015).

Current neuroimaging literature largely focuses on suicidal patients with MDD. Comparatively, studies investigating the relationship between other clinical disorders and suicide are less replicable due to a lack of available studies for review. The review by Domínguez-Baleón et al. (2018) found six studies examining neuroanatomical differences between those with and without suicidal tendencies in the BIP clinical population. BIP suicide attempters had significantly different OFC grey matter volume than BIP non-attempters, but the directionality of the difference has been conflicting, with one study reporting decreased volume (Johnston et al., 2017) and another reporting increased volume

(Duarte et al., 2017). BIP attempters were also reported to have reduced grey matter volume in the hippocampus (Johnston et al., 2017). Other implicated regions have had contradictory evidence, including studies indicating either no differences or a reduction in cerebellar grey matter volume (Baldaçara et al., 2011; Johnston et al., 2017), and bidirectional differences in PFC grey matter volume depending on whether BIP suicide attempters had previously been hospitalised (Lijffijt et al., 2014).

All but one of five studies in the Domínguez-Baleón et al. (2018) review found significant differences in various subcortical regions of the frontal lobe of SCZ patients, including reduced cortical thickness in the right dorsolateral prefrontal cortex (Besteher et al., 2016) and reduced grey matter density in the left OFC compared to non-suicidal patients (Aguilar et al., 2008). Other cortical regions associated with suicidal SCZ attempters included cortical thinning in the temporal lobe (Giakoumatos et al., 2013), ACC, and insular cortex (Bester et al., 2016), among others. Impairment in the insular cortex is thought to contribute to suicidal ideation in SCZ patients by causing an inability to differentiate between internal and external stimuli. It is also a proposed explanation for the hallucinations some SCZ patients experience. The effect of reduced temporal lobe volumes on suicide is corroborated by the observation of an increased prevalence of suicide after epileptic patients have been treated via temporal lobectomy (Bell et al., 2009). With respect to subcortical regions, SCZ attempters were found to have increased right amygdalar volume compared to healthy controls and non-attempters (Spoletini et al., 2011) and reduced thalamic grey matter volume in comparison to non-attempters (Giakoumatos et al., 2013). However, the differences in both subcortical regions have not been consistently replicated across the five studies. Clearly, more studies need to be conducted in this specific clinical population.

Of the three BPD studies included in the Domínguez-Baleón et al. (2018) review, two originated from the same group of authors. Reduced grey matter volume in the left fusiform gyrus, left lingual gyrus, and right middle superior temporal gyrus were found in high-lethality BPD suicide attempters in comparison to low-lethality patients. All of these brain region deficiencies are hypothesised to impair social interactions due to their roles in facial recognition and processing, cognitive appraisal of others' intentions, and reflexive responses to socially-related visual inputs (Soloff et al., 2012, 2014). One of the Soloff et al. (2012) studies found that high-lethality BPD attempters had reduced grey matter volumes in the ACC. More specifically, Brodmann Area 24 was found to be significantly smaller in affected patients (Goodmen et al., 2011). Reduced grey matter volume was also found in the right insula and OFC. It is hypothesised that impairments to the insular cortex may result in patients misjudging the intentions of others and activating responses to perceived rejection, and that similar changes to the OFC may result in disinhibited, impulsive behaviour (Soloff et al., 2012, 2014). Lastly, reduced grey matter volume was found in the left hippocampus of high-lethality BPD attempters in comparison to low-lethality patients. As this area is involved in (episodic) memory encoding and retrieval of information relevant to social settings, as well as identifying sarcasm and processing complex facial features, impairments to the (left) hippocampus is hypothesised to further worsen social functioning and contribute towards suicidal behaviour (Soloff et al., 2012, 2014).

Domínguez-Baleón et al. (2018) found two other neuroimaging studies investigating suicidal patients with a clinical disorder that was not MDD, BIP, SCZ or BPD. One study looked at suicidal panic disorder patients and found no significant differences in grey or white matter volumes in comparison to non-suicidal patients (Kim et al., 2015). Another study examined posttraumatic stress disorder patients that had suicidal thoughts in the past in comparison to healthy controls, finding that the clinical group had significantly increased pituitary volumes, suggesting that these individuals are experiencing hypothalamic-pituitary-adrenal axis dysregulation (Thomas et al., 2004).

Cognitive tasks evaluating decision-making

The idea that neuroanatomical abnormalities contribute to suicidal behaviour has been supported by studies utilising cognitive tasks that evaluate decision-making and/or impulsivity. The Iowa Gambling Task (IGT) simulates decision-making that applies to naturalistic, outside-the-lab contexts. The IGT presents participants with four decks of cards, with two decks generating positive expected values of return (i.e., a "profit") and the other two generating negative expected values of return (i.e., a "loss"). In general, healthy (control) groups are observed to prefer the profitable decks, suggesting that certain cognitive-behavioural processes occur to minimise losses and maximise profits (Bechara et al., 1994). Building upon the pioneering work of Bechara and colleagues, several studies have used the IGT to assess differences in cognition in suicidal populations. Mood disorder patients who have previously attempted suicide performed significantly worse (i.e., chose "loss" decks more often) on the task compared to patients with no suicide history (Jollant et al., 2005). BIP attempters also performed significantly worse compared to other clinical groups (Jollant et al., 2007). The Cambridge Gambling Task (CGT), a similar task to the IGT, has also been used to demonstrate impaired decision-making in suicide attempters in general (Chamberlain et al., 2013; Clark et al., 2011). In both gambling tasks, the concept of loss aversion is key to understanding differences in task performance, since participants' sensitivity to the size and frequency of loss incurred from each deck determines whether they avoid choosing cards from the deck or not (Weller et al., 2010). Loss aversion refers to the humans' desire to avoid losses over making gains of the same magnitude; given an equal chance to win or lose a certain amount of money, participants will refuse to take the gamble (Gächter et al., 2007).

Using this concept, Hadlaczky et al. (2018) utilised a mixed monetary gambling task to measure adolescent participants' tolerance to loss. In this task, various gambles were presented with a 50% chance of winning a fixed amount of money and a 50% chance of losing money, with the loss varying for each gamble. Participants were asked to either accept or reject each gamble (for more specific details, refer to the materials and methods section of Hadlaczky et al., 2018). Loss aversion was found to be significantly lower in suicide attempters compared to non-attempters, and the same relationship was found between attempters and non-attempters at a four-month follow-up after excluding attempters at the beginning of the study. In sum, cognitive studies utilising the IGT, CGT and mixed monetary gambling task have demonstrated that suicidal individuals tend to exhibit signs of impaired decision-making. An impaired sense of loss aversion is hypothesised to arise from increased emotional reactivity and impulsivity due to neuroanatomical abnormalties, which may contribute to suicidal behaviour (Hadlaczky et al. 2018).

Cognitive tasks evaluating emotional regulation

Other cognitive task experiments have supported the hypothesis that maladaptive emotional regulation is correlated with suicidal behaviour. The concept of emotional dysregulation has been operationalised differently in the literature and includes definitions such as (high) emotional reactivity, difficulty returning to emotional baseline, and a greater tendency to use maladaptive emotional regulation strategies — and a lower tendency to use adaptive ones — compared to healthy individuals (Linehan, 1993). The Computerised Paced Auditory Serial Addition Task (PASAT-C; Lejuez et al., 2003) is a stress-based task that emotionally arouses participants and aims to identify problems with goal-directed behaviour under stress. Using PASAT-C, Neacsiu et al. (2018) found that depressed suicide attempters had significantly greater difficulty returning to baseline heart rate after a stressor compared to both healthy and depressed non-attempter controls. This finding indicates that depressed attempters experience greater emotion dysregulation. Additionally, the depressed attempter group self-reported significantly greater difficulty with emotional regulation, more problematic coping, and more experiences of negative affect. In the same study, researchers found that emotion dysregulation, as measured by the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), predicted suicidal ideation in both healthy and clinical populations. However, given the various definitions for emotional regulation and dysregulation, more work is needed to unify and clarify operationalisations for the mentioned terms. Other studies appear to support the findings of Neacsiu and colleagues (2018). Healthy and clinical participants who scored higher on the Suicide Cognitions Scale (SCS; Rudd et al., 2010), indicating more severe suicidal thought patterns, experienced greater negative affect during a variant of the Trier Social Stressor Task (TSST; Smith & Jordan, 2015), which is designed to induce psychological distress in participants (Grove et al., 2020).

Although not the focus of this review, research adjacent to the topics of decision-making and emotional regulation are also notable. Researchers found that suicidal attempters, compared to suicidal ideators and healthy controls, have demonstrated significant impairments in a subset of executive functions (working memory, response inhibition, response selection, and task-switching), known as cognitive control (Ranjbar et al., 2021; Brokke et al., 2020). Task-based measures used to evaluate cognitive control performance include the Stroop Task (Strauss et al., 2006) and its variants, such as the Delis-Kaplan Executive Function System Color-Word Interference Test (D-KEFS CWIT; Delis et al., 2001).

CONCLUSIONS

Neuroimaging studies examining neural correlates with respect to suicidal behaviour have implicated certain brain structures. Some neural abnormalities appear to be common across most suicidal individuals, while other abnormalities appear to occur only within certain clinical groups such as MDD, BIP, SCZ and/or BPD. There is strong evidence to suggest that reduced grey matter volume, dendritic growth, and cortical thickness in the ACC and PFC (specifically the OFC) are key factors in suicidal behaviour. It seems that abnormalities in the ACC and PFC are relatively universal across most suicidal individuals and is thought to result in increased impulsivity and impaired decision-making as well as a greater degree of emotional dysregulation (i.e., greater use of maladaptive emotional regulation strategies). These symptoms are suspected to contribute to a greater degree of "indulgence" in suicidal thoughts and/or behaviours. The insular cortex is also implicated across most clinical disorders considered in this review and is also thought to contribute to suicidal behaviour by altering clinical patients' cognition, including perceiving others' actions and intentions more negatively. Therefore, it is proposed that a foundational "skeleton" pathway may exist wherein the cingulate cortex, prefrontal cortex, and insular cortex are the three key neural structures involved in suicidal thoughts and behaviour. Most suicidal individuals are expected to have abnormalities in these three regions, and more abnormalities may exist in other areas depending on the individual and the presence of clinical disorders. Future neuroimaging research should focus on specific clinical populations in suicide (e.g., SCZ-suicide comorbid patients) so that differential methods of treatment for each population may be identified and recommended for maximal efficacy.

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Conflicts of Interest

The author declares no conflicts of interest.

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Indigenous Sex Workers and Canadian Outreach Programs: A Critical Review of Canadian Outreach Programs and their Accessibility to Indigenous Sex Workers

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Abstract Indigenous sex workers are subject to colonial rule over their lives through Canadian law. Canadian colonial law restricts the agency of Indigenous sex workers resulting in a hazardous working environment. Outreach programs in Canada are vital resources in ensuring that Indigenous sex workers are provided with a safe working environment through occupational safety precautions. Understanding how outreach programs resist or invoke Bill C-36 is crucial to discover whether or not they create a safe environment for Indigenous sex workers. In this article, I critically review the policies of four outreach programs across Canada: Maggie's Toronto, Hope Restored Canada, PACE (Providing Advocacy, Counseling and Education) Society, and Exit Doors Here. Their connection to Canadian law will be reviewed to discover whether or not they work from a decriminalization and a decolonial framework or reinforce Bill C-36. The following questions are asked of the outreach programs: (1) are they positioned as prohibitionists or are they aiming for sex work decriminalization? and (2) do they respect and support the voices of Indigenous sex workers? This article is premised on providing information for individuals who may have an impact on outreach program policies, in terms of how to improve accessibility to Indigenous sex workers.

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INTRODUCTION

Sex work in Canada is a contested site of occupational struggles in legislation, public discourse, and policymaking. Indigenous sex workers in particular experience increased struggles due to the intersection of class, race, and colonization (James, 2018, p. 159). The contemporary regulations around sex work in Canada from Bill C-36 have resulted in undue consequences (Snow et al., 2020, p. 3). For example, the restricted ability of sex workers to work in a safe environment due to lack of client screening time and working within hazardous locations, as well as the silencing of discussions regarding access to rights. Outreach programs across Canada function as contemporary actors which can either reinforce or resist Bill C-36. By 'reinforcing' I refer to outreach program policies that label sex work as illegitimate and/or illegal work. By 'resisting' Bill C-36, outreach program policies must promote sex work as legitimate work while also ensuring sex workers receive both occupational and social rights. As such, outreach programs can create a safe working environment for Indigenous sex workers by exhibiting decriminalization and decolonial approaches to sex work (Hunt, 2013, p. 91). Decolonization and decriminalization work simultaneously; a decolonization approach works to strip Canadian governmental control over Indigenous bodies, while a decriminalization approach works to relabel sex work as work rather than criminal activity.

The four outreach programs I review are Maggie's Toronto, Hope Restored Canada, PACE (Providing Advocacy, Counseling and Education) Society, and Exit Doors Here. I consider how these outreach programs navigate the criminalization of sex work in Canada, and I ask, are they aiming for sex work decriminalization? In addition to analyzing their incorporation of a decriminalization framework, I also consider how these programs integrate a decolonial framework. A decolonial framework includes respecting Indigenous voices, meeting the basic needs of Indigenous communities, and stripping the interference of Canadian state law from sex work (Hunt, 2013, pp. 93-94). Following these considerations, I ask, do they respect and support the voices of Indigenous sex workers? Overall, I hope that this review serves as vital information for individuals who may have an impact on outreach program policies in terms of how outreach programs can be utilized for the benefit of Indigenous sex workers.

PART 1: THE CONTEMPORARY CRIMINALIZATION OF SEX WORK AND ITS CONSEQUENCES

Indigenous sex workers in Canada are heavily impacted by colonial control over their labour through Canadian law. To maintain control over sex work, the Canadian government adopted the "Nordic Model". The Nordic Model refers to sex work as, "inherently harmful and promotes violence against women, such as sexual harassment, rape, and exploitation" (Snow et al., 2020, p. 3). The Nordic Model limits the ability of sex workers to choose to engage in the sex industry. In addition, the Nordic Model blurs the line between sex trafficking and sex work. There is a clear distinction however: sex trafficking is when an individual is forcibly placed into the sex industry without consent (United Nations General Assembly, 2000, Art. 3(a)). In contrast, sex work is when someone has chosen to engage in this form of work. The federal government later passed Bill C-36 based on the ideals within the Nordic Model (Snow et al., 2020, p. 3). Specifically, Bill C-36 has developed a purchasing offence, meaning an individual who has purchased sexual service becomes at risk of detainment. Bill C-36 targets the consumer of sexual services rather than the provider of the sexual service (Government of Canada, 2017, para. 20).

However, Bill C-36 has made select groups such as Indigenous sex workers, who work in street-based settings, vulnerable to this law. Given that all communication with clients in a street-based setting happens predominantly within the public, street-based Indigenous sex workers are made vulnerable from the increased interventions and/or interactions with police officers (Durisin et al., 2018, p. 9). Increased police surveillance on clients results in the decreased ability of sex workers to communicate and/or negotiate terms and services with their clients due to the client's fear of possible detainment. Furthermore, it decreases the ability of sex workers to screen their clients before service, which inherently increases the risk of dangerous interactions (Snow et al., 2020, p. 5-6). Since the intervention of state legal actors, such as the police, creates a hazardous working environment for Indigenous sex workers, outreach programs become important tools in harbouring a safe environment. What follows below is my critical analysis of four outreach programs across Canada. While hundreds of outreach programs do exist, my chosen sample is reflective of some of the most widely known outreach programs in Canada within three provinces: British Columbia, Saskatchewan, and Ontario.

PART 2: OUTREACH PROGRAMS AND NAVIGATING THEIR POSITIONS ON THE DECRIMINALIZATION OF SEX WORK

The first outreach program, Maggie's located in Toronto, Ontario, has multiple goals concerning sex work. Maggie's has a strong belief system that sex workers should have the ability to control their own lives. One of Maggie's primary goals is to create a safe space for sex workers through harm reduction services, including disrupting harmful narratives about sex workers. Another one of Maggie's goals involves social advocacy including anti-poverty, racial injustice, Indigenous sovereignty, and LGBTQ2+ liberation. Lastly, another one of Maggie's goals is the decriminalization of sex work laws in Canada (Maggie's Toronto, 2021, para. 6-7). Maggie's also makes the distinction between sex work and sex trafficking fundamentally clear within their principles (Maggie's Toronto, 2021, para. 7-9). This is an important distinction to make as legal and social narratives that link sex trafficking to sex work silences discussions around ensuring that sex workers are receiving equal access to both occupational and social rights (Hunt, 2016, p. 26).

The second outreach program, Hope Restored Canada, is based in Saskatoon, Saskatchewan. Hope Restored Canada's mission is focused on eradicating sex trafficking and exploitation (Hope Restored Canada, 2016, para. 8). They approach their mission holistically, meaning they provide each person with opportunities for restoration through support groups, mentorship, access to housing, and case planning (Hope Restored Canada, 2016, para. 1). Hope Restored Canada is an exit-based outreach program; as such, Hope Restored Canada promotes exiting the sex industry as an end goal. On Hope Restored Canada's website, they mention, "This legislation [Bill C-36] seeks to protect Canadians through prohibiting sexual services" (Hope Restored Canada, 2016, para. 7). Hope Restored Canada has taken on an approach similar to the Nordic Model. That is, sex work in and of itself is inherently harmful to sex workers (Snow et al., 2020, p. 3).

The third outreach program is PACE Society, located in Vancouver, British Columbia. PACE's mission is to "reduce the harm and isolation associated with sex work through education, support, and advocacy. We work to increase the health, safety, and empowerment of our members by respecting their right to self-determination" (PACE Society, 2016, para. 2). In addition, under their mission statement, PACE mentions, "We hope for long-term commitments to social change within all levels of government and individuals to eradicate systemic issues" (PACE Society, 2019, p. 2). They achieve these goals with such programs as, the Occupational Health and Safety Program; this includes providing sex workers with effective tools for safe practices in the sex industry. Moreover, the Indigenous Sharing Circle is a group within PACE that supports Indigenous sex workers' rights to self-determination through Indigenous peer leadership (PACE Society, 2019, p. 6-7).

The final outreach program is Exit Doors Here, which runs under the Elizabeth Fry Society in Toronto, Ontario (Elizabeth Fry Toronto). Exit Doors Here strives to "ensure all women have the dignity and capacity to make informed choices about their lives and avoid conflict with the law" (Elizabeth Fry Toronto, p. 1). Rather than resist the laws, this program promotes avoiding conflict by not engaging in the sex industry. As such, Exit Doors Here is a preventative program that works to ensure that sex workers are exiting the sex industry. This program is beneficial for sex workers who may have been forced into sex work, or who may want to leave sex work. Exit Doors Here is also funded by the Canadian state itself, as the Canadian government has claimed that this program is a beneficial measure in crime prevention (Government of Canada, 2018). Although crime prevention in this manner may be beneficial for sex workers who choose to leave the sex industry, it can heighten the occupational risks for Indigenous sex workers who wish to remain in the sex industry. Since criminalization often drives Indigenous sex workers to work in "underground" locations which are out of the state's view (Durisin et al., 2018, p. 9).

PART 3: OUTREACH PROGRAMS AND NAVIGATING THEIR POSITION ON THE DECOLONIZATION OF SEX WORK

The first outreach program, Maggie's, is one of the most accessible outreach programs for Indigenous sex workers. Maggie's incorporates the voices of sex workers into their program by having a staff comprised of current or former sex workers (Maggie's Toronto, 2021, para. 1). Additionally, one of Maggie's core missions is to decriminalize sex work, which combats the detainment and heavy police monitoring of Indigenous sex workers (Maggie's Toronto, 2021, para. 17). Moreover, Maggie's has a program specifically created for Indigenous sex workers, including counseling with Elders (Maggie's Toronto). Along with their primary mission of decriminalization, Maggie's is also striving for Indigenous sovereignty; similar to the Elders counselling program, both are examples of what a decolonial approach should include (Maggie's Toronto, 2021, para. 6-7). The second outreach program PACE and its core principles are also worthy to highlight. One of PACE's core principles is anti-colonialism, as well as the promotion of a decriminalization framework (PACE Society, 2019, p. 2). Similar to Maggie's, PACE also has a culturally specific group called "Indigenous Sharing Circle," which includes support from Elders, respecting and learning the use of traditional medicines, and listening to knowledge keepers (PACE Society, 2019, p. 7). This is a further example of a decolonial approach, as it is developed to provide culturally specific support that meets the needs of Indigenous sex workers. Furthermore, PACE has a program that promotes the health and safety of sex workers overall (PACE Society, 2019, p. 6).

The other two outreach programs, Hope Restored Canada and Exit Doors Here, are not currently accessible for Indigenous sex workers. This is because they both work alongside Bill C-36, which creates a barrier for Indigenous sex workers who wish to remain in the sex industry (JJ, 2018, p. 74). Bill C-36 blurs the distinction between sex trafficking and sex work; this blurring promotes that all sex workers, even those who may have willingly engaged in the sex industry, are victims. Due to this lack of distinction, the discourse surrounding occupational safety in sex work is often unfortunately silenced (JJ, 2018, p. 74). As a result, Bill C-36 perpetuates colonial harm and creates a victimization narrative that silences discussions about sex workers' access to safety and rights.

Overall, incorporating a decolonial approach in outreach program design can improve their accessibility to Indigenous sex workers. Accessibility concerning a decolonial approach includes receptiveness of opinions from Indigenous sex workers themselves, developing programs that are culturally specific to Indigenous peoples, and improving geographical reach through the promotion of positive messages. Sex work outreach programs must work towards meeting the basic needs of Indigenous sex workers such as: combatting poverty/homelessness, assisting in drug-related addictions, and combatting intergenerational abuse that arises from colonial history (Hunt, 2013, pp. 93-94). To further promote accessibility to Indigenous sex workers, outreach programs must respect Indigenous agency and self-determination. In other words, outreach programs need to listen to the voices of Indigenous sex workers by hiring Indigenous staff members or accepting input from current and/or former Indigenous sex workers (e.g. Maggie's). As Indigenous sex workers' voices have been silenced by Canadian state law to date, a critical aspect of self-determination for the future is the ability of Indigenous sex workers to have input on their lives. To continue to promote decolonial approaches outreach programs need to support the freedom of Indigenous sex workers' mobility, which can happen by ensuring that Indigenous sex workers can safely commute through rural and urban regions while still having access to services and ceremonial spaces (Hunt, 2013, p. 95-96). A critical component of agency for Indigenous sex workers is the ability to freely move throughout Canada without the fear of Canadian law. This is important because the current policing of Indigenous sex workers' movement by the police and other state agents, limits Indigenous sex workers' mobility.

CONCLUSION

In conclusion, the approaches of outreach programs impact the support that Indigenous sex workers receive in Canada. Outreach programs should implement both a decriminalization and a decolonial framework in their programs to promote a safer working environment for Indigenous sex workers. Maggie's and PACE are outreach programs that should be used as examples of how outreach programs can be more accessible to Indigenous sex workers, given that both outreach programs have strived towards decriminalization and decolonization of sex work. In addition, both outreach programs have incorporated culturally appropriate programs for Indigenous sex workers and have actively resisted Bill C-36. The other outreach programs, Hope Restored and Exit Doors Here, are not accessible because they both reinforce Bill C-36, which strips the agency of Indigenous sex workers via control of their bodies (JJ, 2018, p. 77). Bill C-36 perpetuates harms for Indigenous sex workers, and it should not be incorporated into outreach programs premised on giving support to any sex worker who choose to remain in the sex industry. Future work in this area should be directed towards expanding the sample of outreach programs in Canada, and outreach programs beyond Canada. Indigenous sex workers are not stationary within a single location, and thus should have access to outreach programs on a wider scale.

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Early Prisoner Release due to COVID-19: Effects of Psychoeducation on Canadians' Opinions

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Abstract Due to high rates of infection and contagion of the COVID-19 virus in Canadian prisons, the Parole Board of Canada implemented new guidelines to facilitate the early release of low-risk prisoners to limit the spread of novel coronavirus. This study examines Canadians' opinions regarding the early release of prisoners from correctional institutions due to COVID-19 and seeks to discover if psychoeducational intervention can positively alter these opinions. Additionally, level of education was examined to ascertain whether years of formal education influenced openness to change. Data from 286 Canadians was collected using an online survey and found that overall, opinions towards the early release of prisoners due to COVID-19 were negative. It was also found that psychoeducational intervention was an effective way to improve attitudes towards the early release of prisoners and that those with a higher level of education were not more affected by psychoeducational intervention than those with a lower level of education; however, it was noted that those with a higher level of education expressed less concern overall regarding the increase of released offenders in the community.

INTRODUCTION

During the COVID-19 pandemic, the Parole Board of Canada (PBC) implemented guidelines to allow provincial/territorial and federal prisons to release certain inmates early upon meeting set criteria to limit the spread of COVID-19. Inmates who were deemed at risk of experiencing severe negative effects of COVID-19, met parole requirements, and were nearing the end of their sentence had the potential to be granted early release or a temporary absence (Government of Canada, 2020). At risk inmates were defined by the Canadian Human Rights Commission as those who were older adults, pregnant, those with serious medical conditions, and those with children (Canadian Human Rights Commission, 2020). Additionally, bail was granted to an increased number of low-risk offenders – offenders with a low probability of reoffending – to reduce crowding in holding facilities (Ontario Court of Justice, 2020). These guidelines allowed the PBC to prevent the spread of COVID-19 by protecting those who were most at risk of contracting the virus. As a result of the guidelines, there was a notable decrease in federal and provincial prison populations by approximately 6000 inmates between the months of February and April 2020, as well as an approximate 25% decline in provincial/territorial prison populations (Statistics Canada, 2020).

Research has found that continual close contact amongst prisoners and staff during the COVID-19 pandemic was unavoidable due to the crowded nature of correctional institutions (Vose et al., 2020). Thus, if even one prisoner or staff member were to become infected with the virus, the entirety of the prison population would be at a high risk of infection. One of the only reliable solutions to this issue was to reduce the total population in prisons. This would allow for proper social distancing measures to be put in place along with enhanced sanitization to reduce potential points of infection (Vose et al., 2020).

As a result of the decision to release certain inmates early to reduce the spread of COVID-19, Canadians have voiced their concerns at the increased number of convicted offenders released into the community (Gillis, 2020). We consider this to stem largely from misconceptions spread and perpetuated by popular media about who is being released and why. News media often overrepresent the proportion of violent crimes and crimes committed by people of colour, contradicting official crime statistics which demonstrate that crimes of these types are in the minority (Grosholz & Kubrin, 2007). However, psychoeducational interventions, such as empirically supported informational articles, have been shown to improve negative attitudes towards offenders that were perpetuated by the

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media (Kleban & Jeglic, 2012; N = 410). Furthermore, a study by Rosselli and Jeglic (2017) found that increased knowledge of sex offender recidivism rates, treatment outcomes, and current supervision practices played a significant role in improved attitudes towards sex offenders (N = 559). Psychoeducational intervention is a form of intervention, often used in therapy, which educates individuals on psychological concepts to improve knowledge and attitudes towards treatment programs (Kleban & Jeglic, 2012; Rosselli and Jeglic, 2017).

In relation to attitudes regarding convicted offenders, public opinions towards offenders and offender treatment are typically negative (Corabian & Hogan, 2015; Kerr et al., 2018). A study by Kerr et al. (2018) demonstrated that the Canadian public typically perceives offenders as having little capacity to change and supports offender incapacitation as a primary form of treatment (N = 170). Furthermore, Kerr et al. (2018) found that Canadians typically overestimate recidivism rates and that negative attitudes towards offenders can adversely impact practices surrounding reintegration and rehabilitation of offenders (N = 170). Notably, it has been found that individuals with a higher level of education are more tolerant of offenders (Kozloski, 2010). A positive correlation between higher education and generally more liberal opinions has also been reported (Weakliem, 2002). Furthermore, individuals who are more conservative tend to have more prejudiced attitudes towards ex-offenders and are more likely to endorse negative stereotypes (Rosselli & Jeglic, 2017). More specifically, a study by Rosselli and Jeglic (2017) found that participants who were more conservative were more likely to believe in harmful stereotypes towards sex offenders, such as the belief that sex offenders have a high likelihood of reoffending. Additionally, it was found that conservative individuals were significantly less likely to demonstrate improved attitudes toward sex offenders regardless of their level of knowledge concerning offender recidivism and treatment outcomes (Rosselli & Jeglic, 2017). It could therefore be concluded that individuals with a higher level of education tend to be more liberal and subsequently are more likely to have an improved attitude towards offenders. Furthermore, individuals with a higher level of formal education have been reported to be more tolerant of out-groups such as criminal offenders (Kozloski, 2010).

Currently, there is no literature which examines Canadians' opinions on the early release of prisoners due to COVID-19. As such, no research has been done to study the effects of psychoeducational intervention on these opinions. The purpose of this study is to address these gaps. Additionally, this study seeks to examine the influence of level of formal education on openness to opinion change regarding the early release of prisoners. It is hypothesized that opinions regarding the early release of prisoners due to COVID-19 will be largely negative as has been seen in previous research (Corabian & Hogan, 2015; Kerr et al., 2018). Additionally, it is hypothesized that psychoeducational intervention will be an effective way to positively influence opinions regarding the early release of prisoners due to COVID-19 as found in previous research (Kleban & Jeglic, 2012). Finally, it is hypothesized that those with a higher level of education will be more accepting of the new PBC guidelines and more likely to change their opinion toward the early release of prisoners as a result of psychoeducational intervention (Weakliem, 2002). Data will be collected using an online survey designed for this study.

METHODS

Participants

A total of 289 participants were recruited through the digital learning management system of Red Deer College. Undergraduate students from Red Deer College participated in this study for course credit. Additionally, social media, specifically Instagram, was used to recruit people from outside of the college community to participate. All Canadian citizens aged 18 and older were eligible to participate in the study; however, anyone who had previously been imprisoned before or during the survey period was ineligible to participate. Upon completion of the survey, all participants had the option to enter a draw for a $25 Tim Hortons gift card. Three participants were removed from all analyses as they reported to work in the criminal justice system. These participants were removed to eliminate potential bias. As such, all analyses were run on N = 286 (M age = 26.10, SD = 10.19)

Materials

Question	1	2	3	4	5
1. How knowledgeable would you say you are regarding the controlled release of inmates and charged persons to combat the spread of novel coronavirus?	No Knowledge	Slightly Knowledgeable	Somewhat Knowledgeable	Moderately Knowledgeable	Extremely knowledgeable
2. How supportive are you regarding the practice of the controlled release of inmates and charged persons to combat the spread of novel coronavirus?	Strongly Oppose	Somewhat Oppose	Neither oppose or support	Somewhat Support	Strongly Support
3. How concerned are you regarding the repercussions of the early release of inmates and charged persons during the COVID-19 pandemic?	Not at all concerned	Slightly concerned	Somewhat concerned	Moderately concerned	Extremely concerned
4. How much confidence would you say you have in the Parole Board of Canada in managing the controlled release of inmates and charged persons to combat the spread of novel coronavirus?	Not at all confident	Slightly confident	Somewhat confident	Moderately confident	Extremely confident
5. Knowing what you know now about the controlled release of inmates during the COVID-19 pandemic has your level of support changed at all?	Significantly less supportive	Somewhat less supportive	No change	Somewhat more supportive	Significantly more supportive
6. Do you feel the guidelines put in place by the Parole Board of Canada regarding conditions of early release should be more or less strict?	Significantly more strict	Somewhat more strict	No change is needed	Somewhat less strict	Significantly less strict
7. Knowing what you know now, how concerned are you regarding the repercussions of the early release of inmates and charged persons during the COVID-19 pandemic?	Not at all concerned	Slightly Concerned	Somewhat concerned	Moderately concerned	Extremely concerned

Table 1 Survey Questions and Answer Options.

This study utilized a 13-question online survey which was constructed for this study. The survey contained three demographic questions (age, province, and level of education), one question to ascertain participants' primary sources of information ("What are your primary sources for information regarding the controlled release of inmates during the COVID-19 pandemic?"), one yes-no exclusionary question about previous imprisonment ("Have you previously been or are you currently incarcerated?"), and seven five-point Likert scale questions to evaluate opinions on the early release of prisoners due to COVID-19 (Table 1). Psychoeducational intervention was presented through a paragraph of information regarding the PBC's new guidelines that participants were required to read halfway through the survey. The paragraph outlined the type of prisoners being released and the justifications presented by the PBC to educate participants on the early release of prisoners due to COVID-19. Data was collected with the online application Simple Survey (simplesurvey.com, Quebec, Canada). The full survey is available through the corresponding author.

Procedure

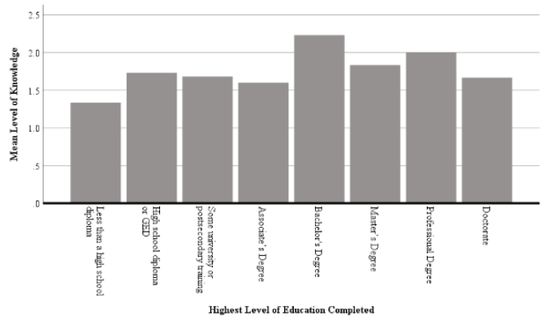
Participants gave informed consent prior to completing the online survey. Participants completed the survey self-paced on their personal devices. On average, survey completion took 5-10 minutes. Participants could choose to submit their name to be entered in a $25 Tim Hortons gift card giveaway, but all data was processed anonymously. Additionally, Red Deer College undergraduate students could enter their names and course information to receive a 1% bonus credit.

Question	Mean	SD
Q1	1.58	0.494
Q2	1.74	0..892
Q3	2.59	1.115
Q4	3.06	1.144
Q5	2.39	1.075
Q6	3.34	0.762
Q7	2.24	0.797
Q8	2.63	1.092

Table 2 Means and Standard Deviations of Survey Questions. Q1 = Were you aware that during the COVID-19 pandemic, eligible individuals charged and awaiting trial, as well as inmates serving in provincial and federal prisons across Canada, were released early to combat the spread of novel coronavirus?; Q2 = How knowledgeable would you say you are regarding the controlled release of inmates and charged persons to combat the spread of novel coronavirus?; Q3 = How supportive are you regarding the practice of the controlled release of inmates and charged persons to combat the spread of novel coronavirus?; Q4 = How concerned are you regarding the repercussions of the early release of inmates and charged persons during the COVID-19 pandemic?; Q5 = How much confidence would you say you have in the Parole Board of Canada in managing the controlled release of inmates and charged persons to combat the spread of novel coronavirus?; Q6 = Knowing what you know now about the controlled release of inmates during the COVID-19 pandemic has your level of support changed at all?; Q7 = Do you feel the guidelines put in place by the Parole Board of Canada regarding conditions of early release should be more or less strict?; Q8 = Knowing what you know now, how concerned are you regarding the repercussions of the early release of inmates and charged persons during the COVID-19 pandemic?

RESULTS

As seen in Table 2, participants reported being unaware that certain prisoners were being released early due to COVID-19 (M = 1.58, SD = .49; lower scores indicate less awareness), and the participants who were aware reported being only slightly knowledgeable about the controlled release of inmate due to COVID-19 (M = 1.74, SD = .89). Participants with a bachelor's degree reported to be the most knowledgeable (M = 2.23, SD = 1.21; higher scores indicate feeling more knowledgeable) while participants with less than a high school diploma reported being



Note. Level of knowledge was recorded on a five-point Likert scale with one being no knowledge and five being extremely knowledgeable.

Figure 1 Knowledge of the Early Release of Prisoners by Education Level. The level of knowledge was recorded on a five-point Likert scale with one being no knowledge and five being extremely knowledgeable

least knowledgeable (M = 1.33, SD .58): see Figure 1. Additionally, participants reported a desire for stricter guidelines to be put in place by the PBC regarding conditions of early release (M = 2.24, SD = .80; lower scores indicate a desire for less strict guidelines), and being only slightly confident in the PBC's management of the early release of prisoners (M = 2.39, SD = 1.08; higher scores indicate more confidence). Participants also slightly opposed the early release of inmates to prevent the spread of COVID-19 (M = 2.59, SD = 1.12; lower scores indicate more opposition).

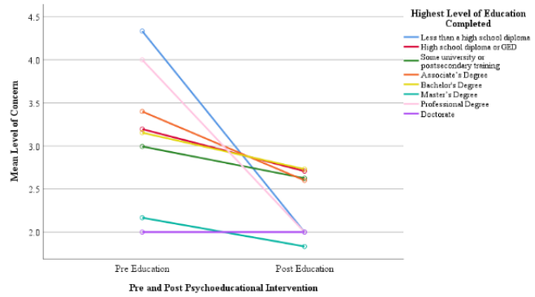
A mixed analysis of variance (ANOVA) was conducted to examine the relationship between level of education and degree of opinion change as well as the relationship between pre- and post-psychoeducational intervention. As Mauchley's test indicated that the assumption of sphericity was violated, a Greenhouse-Geisser correction was applied. Crucially, a significant main effect of psychoeducational intervention was found, suggesting that participants were less concerned about the repercussions of early release of prisoners due to COVID-19 after the psychoeducational intervention (M = 2.63, SD = 1.09) relative to before the intervention (M = 3.06, SD = 1.14), $F(1, 281) = 21.58$, $p < .05$, $\eta^2 = .071$. The main effect of level of education was not significant, $F(7, 281) = 1.20$, $p = .306$; however, further inspection revealed a significant interaction between pre- and post-educational intervention with level of education, suggesting that level of education played a significant role in the degree of opinion change as a result of psychoeducational intervention, $F(7, 281) = 2.20$, $p < .05$, $\eta^2 = .052$. As displayed in Figure 2, those with the highest level of education (doctorate, PhD) reported no change in opinion. However, this level of education also reported the lowest level of concern both before and after the psychoeducational intervention (M = 2.00, SD = 1.00). In contrast, participants with the lowest level of education (less than a high school diploma) expressed the greatest change of opinion, progressing from the highest level of concern to the lowest level of concern (M = 4.33, SD = 1.16 to M = 2.00, SD = 1.73). It should be noted that the level of education data was skewed towards some university or postsecondary training (N = 163; 56.99%). In total, there were only three participants who

reported the completion of a PhD, and one participant who reported the completion of a professional degree.

Another Spearman's correlation was computed to quantify the relationship between level of education and degree of opinion change as a result of psychoeducational intervention; however, this correlation was not significant, $r(287) = .031$, $p = .383$.

DISCUSSION

The purpose of this study was to examine Canadians' opinions regarding the early release of prisoners due to COVID-19 and to explore whether psychoeducational intervention can change these opinions. As expected, psychoeducational intervention was found to be an effective way to improve participants' opinions regarding the early release of prisoners due to COVID-19. This aligns with the findings of Kleban and Jeglic (2012), who found that brief psychoeducational intervention was an effective way to improve attitudes regarding sex offenders. However, there is still a gap in research regarding the influence of psychoeducational intervention on attitudes towards other types of offenders as well as how offence type may impact the effectiveness of psychoeducational intervention.



Note. Level of concern was recorded on a five-point Likert scale ranging from not at all concerned to extremely concerned; higher scores indicate more concern.

Figure 2 Degree of Opinion Change for Varying Levels of Education. The level of concern was recorded on a five-point Likert scale ranging from not at all concerned to extremely concerned; higher scores indicate more concern.

Contrary to what was expected, participants with the lowest level of education (less than a high school diploma) exhibited the greatest positive change of opinion while those with the highest level of education (PhD) exhibited no change of opinion; however, it was noted those with the highest level of education already expressed the lowest level of concern before psychoeducational intervention had occurred (See Figure 2; a pronounced floor effect). This corroborates research that suggests that individuals with a higher level of education are typically more tolerant of outgroups such as criminal offenders (Bobo & Licari, 1989; N = 1,473). Furthermore, because participants with the lowest level of education expressed the strongest negative opinion to begin with, they could demonstrate the highest degree of opinion change. This drastic change demonstrates that participants with the lowest level of education were the most open to changing their opinions in light of new information. However, it should be noted that level of education was disproportionately skewed towards those with some university or postsecondary training. Due to the small number of participants in the higher education levels (PhD and professional degree), there is limited generalizability for how psychoeducation has influenced participants with these levels of education.

Despite this, participants with less than a high school diploma were shown to be least knowledgeable about the early release of prisoners (See Figure 1). Research has indicated that individuals with a lower level of education tend to be less politically involved (Brennan et al., 2015; N = 3,300; Statistics Netherlands, 2017). As such, participants with a lower level of education may not have paid much attention to this topic to begin with, which may explain why this group reported being less knowledgeable. Due to the lack of knowledge expressed by participants with the lowest level of education, the high degree of opinion change exhibited by this group can be attributed to the psychoeducational intervention presented through this study's survey.

Interestingly, those participants who had completed a doctorate reported the highest level of confidence in the PBC's management of the early release of prisoners. This is not in accordance with research which has found that individuals with more years of education expressed reduced confidence in government institutions (Weakliem, 2002). However, as noted, low statistical power may account for these conflicting results.

The finding that participants desired stricter guidelines to be implemented by the PBC is similar to what was found by Kleban and Jeglic (2012). Overall, attitudes towards the early release of prisoners were less negative than expected. Before the psychoeducational intervention, participants reported being only slightly opposed to the early release of prisoners. Research has suggested that the general public has become more tolerant of social outgroups in recent years (Twenge et al., 2015; N = 35,048; Poushter & Kent, 2020; N = 38,426). It can be assumed that, with the growing tolerance of social outgroups, the acceptance of ex-offenders may have also increased, hence the lack of opposition. Nevertheless, overall opinions toward the early release of prisoners were still negative, thereby explaining the desire for stricter guidelines by the PBC. However, little research has been conducted to examine how offence type may influence these changes in public perceptions over time.

Limitations and Future Directions

There were a few notable limitations to this research study. Education level was skewed towards those with some postsecondary education. As such, there was a lack of representativeness in the higher levels of education such as PhDs and professional degrees. It would be valuable to readminister this survey to a more representative sample to improve the generalizability of this study.

t may be valuable to examine whether previous exposure to crime has an impact on people's opinions regarding the early release of prisoners. Additionally, participation was restricted to those who have never been incarcerated to reduce potential biases; however, the opinions of this population may be valuable to explore in future research. Furthermore, it may be advantageous to examine the impact of offense type on the effectiveness of psychoeducational intervention in improving attitudes towards offenders. Finally, due to the skew in data towards those with some post-secondary education, it may be beneficial to examine the efficacy of psychoeducational intervention on those with a lower level of education such as less than a high school diploma. The current study has started to explore the effects of psychoeducational interventions on the opinions of people

regarding the early release of prisoners, a topic that will become increasingly important in the (post-)pandemic era.

CONCLUSIONS

Overall, psychoeducational intervention was found to be an effective way to positively influence attitudes towards the early release of prisoners due to COVID-19. In particular, this study assessed psychoeducational intervention in relation to attitudes towards offenders that were at a low-risk of reoffending and high-risk of experiencing severe negative effects of COVID-19. Contrary to what was expected, those with a higher level of education did not express a greater change of opinion; however, it was noted that the highest level of education (PhD) reported the least level of concern overall both before and after psychoeducational intervention. Instead, the lowest education level (less than a high school diploma) was associated with the greatest change of opinion: these participants expressed the highest level of concern pre-intervention and the lowest level of concern post-intervention. It was believed that this was due to their lack of knowledge regarding the early release of offenders due to COVID-19 prior to this study. Finally, participants' attitudes were not as negative as expected, as only a slight opposition to the early release of prisoners was found. This study has demonstrated that psychoeducation can be an effective method to influence people's opinions about societally relevant and timely topics like early prisoner release during the COVID-19 pandemic. Given the novelty of this pandemic, there is a dearth of research in this field: the current paper is among the first to address these issues.

Conflicts of Interest

The authors declare no conflicts of interest.

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Perceived Stress, Belief in Conspiracy Theories, and Anti-Vaccination Attitudes in a Canadian Sample

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Abstract

Background: The use of COVID-19 vaccinations to prevent serious illness and infection from the SARS-CoV-2 virus has been accepted by approximately two-thirds of the Canadian population, at the time that this article was completed. Although COVID-19 mRNA vaccines are widely accessible in North America, there remains a substantial portion of Canadians who demonstrate vaccine hesitancy. The objective of this study is to examine whether there exists a predictive relationship between one's perceived stress-levels, general support for conspiracy theories, and anti-vaccination attitudes.

Methods: Fifty-one participants from the Vancouver, British Columbia region were recruited through social media. Participants completed a survey, which asked about perceived stress, vaccine hesitancy, and belief in conspiracy theories. Regression models were developed to measure the association between perceived stress and vaccine hesitancy. Simple mediation analysis was conducted to determine if belief in conspiracy theories mediated the relationship between perceived stress and vaccine hesitancy.

Results: Higher levels of conspiratorial thinking were associated with increased vaccine hesitancy ($\beta = -0.465$, $p < .001$, 95% CI [-0.81, -0.21]). Belief in conspiracies was not found to mediate the relationship between perceived stress-levels and vaccination attitudes.

Discussion: The results support a positive correlation between anti-vaccination attitude and the tendency to adopt general conspiracy beliefs. However, no association between vaccination attitudes and perceived stress was found, nor did conspiracy belief mediate the relationship between perceived stress and vaccination attitude. The role scientific uncertainty plays in civilian trust and conspiratorial thinking was explored. Some limitations include the use of a small sample size.

INTRODUCTION

The development and usage of COVID-19 vaccines as a preventative health measure has, overall, been positively received, with two-thirds of Canadians (66.6%) fully vaccinated as of August 2021 (Pettersson et al., 2021). However, a substantial proportion of the population of industrialized countries have avoided vaccination; for example, in a study by Cerda and Garcia (2021) examining at the vaccine attitudes of Chileans, the number one reason cited for avoiding the COVID-19 vaccine, making up 40% of respondents, included concerns about the vaccine's overall safety and side effects. The World Health Organization recognizes vaccine hesitancy as one of the top ten threats to public safety (WHO, 2019), underscoring the importance of identifying factors associated with vaccine uptake.

Many unvaccinated individuals have expressed concerns regarding vaccine safety (Bogart et al., 2021), with some arising from conspiracy theories about the origin of COVID-19 (Hartman et al., 2021) and government conspiracy theories regarding the purpose of the vaccine – e.g., microchip tracking, population control etc. (Ullah et al., 2020). Furthermore, conspiracy theory formation may be utilized as a maladaptive coping strategy (Marchlewska et al., 2021), and has been connected to a variety of psychological factors including increases in perceived stress (Swami et al., 2016); anxiety (Green & Douglas, 2018; Grezesiak-Feldman, 2013); lack of agency/control (Kofta et al., 2020; Whitson & Galinsky, 2008); and increased reasoning biases (Kuhn et al., 2021).

In the current study, we wished to examine how general conspiratorial thinking and perceived stress may impact current vaccination attitudes related to COVID-19, which could inform decision-making regarding how to improve vaccine use as a preventative measure. To the best of our knowledge, no studies to date have examined the relationship between general stress, conspiracy beliefs, and COVID-19 vaccine hesitancy in a Canadian sample (van Mulukom et al., 2020); but have been examined in other parts of the world, including

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the UK. The results of these studies have been mixed. For instance, some studies (Freeman et al., 2020a; Freeman et al., 2020b) have found COVID-19 conspiracy belief adoption to be strongly associated with variables linked to stress, including paranoia (Kuhn et al., 2021), and distrust stemming from perceived threats to "*…societal change, uncertainty, powerlessness, lack of socio-political control, perception of lower social-status, less analytical thinking, and lower levels of education and income*" (Freeman et al., p. 2, 2020a). Freeman et al. (2020a) further found that higher levels of COVID-19 conspiracy thinking were associated with reduced support for government health guidelines, and less willingness to take antibody tests, or to be vaccinated. Additionally, higher endorsements for conspiracy beliefs were found in this study compared to an earlier pre-COVID-19 study conducted by Freeman and Bentall (2017), suggesting that as stress-levels related to the pandemic have increased (Dozois & Mental Health Research Canada, 2021), so has the popularity of conspiracy beliefs.

Alternatively, Georgiou et al. (2020) failed to find a relationship between reported COVID-19 conspiracy beliefs and perceived stress . The authors concluded that COVID-19 conspiracy beliefs were strongly correlated to other types of conspiracy-based thinking (general conspiracy theories), but current perceived stress levels were unrelated to whether conspiracy theories were supported. The objective of the current study is to further examine whether a predictive relationship exists between perceived stress and conspiracy theory formation in a Canadian – in this case, British Columbian – sample. We hypothesized that belief in Generic Conspiracy Beliefs (GCB) would be associated with greater COVID-19 vaccine hesitancy. Additionally, a simple mediation model was used to test whether conspiratorial beliefs would mediate the relationship between perceived stress and vaccine hesitancy, e.g., an increase in perceived stress would result in greater support for conspiracy-theories leading to increased vaccine hesitancy.

METHODS

Participants

In total, 62 participants completed the survey in early August 2021 using the described recruitment methods. Of the 62 participants, 51 (82%) completed the survey. A recruitment message was posted on the primary investigator's Facebook account, and recruitment emails and scripts were sent to students attending classes at Capilano University over the 2021 summer semester. All participants resided in the Vancouver, British Columbia region at the time of data collection. No questions about demographic characteristics were collected to guarantee participant anonymity and help reduce social desirability response sets. This study was approved by the Capilano University Research and Ethics Board (REB).

Measures

When designing the survey, several pre-existing, testing instruments were adopted and will be further discussed below (included in the appendix). The survey questions were divided into three sections: *vaccination attitude*, *perceived stress*, and *the generalist conspiracy scale*.

1. The vaccination attitude questions were formed with assistance from a previous scale (Akel et al., 2021) which was modified to reflect attitudes specific to COVID-19 vaccines (Cronbach's $\alpha = 0.90$).
2. The perceived stress questions were adopted from the Perceived Stress Scale (Cohen et al., 1994) (Cronbach's $\alpha = 0.81$).
3. The generalist conspiracy scale questions were obtained from http://openpsychometrics.org (Brotherton et al., 2013) and measure general conspiracy theory beliefs which are unrelated to COVID-19 (Cronbach's $\alpha = 0.95$).

Data analysis

Simple mediation analysis was completed in JASP (0.16.1) (JASP Team, 2022). Mediation analysis is used to explain whether the effect of a predictor variable (X) on a criterion variable (Y) can be accounted for by a mediating variable (M). In the current study, the direct and indirect regression coefficients between variables were calculated using standardized estimates, with 95% Confidence Intervals determined using a bootstrapping procedure of 1000 replications. The hypothesis that General Conspiratorial Beliefs (GCB) mediate a predictive relationship between Perceived Stress (PSS) and vaccination attitude (vca) was tested in this model.

RESULTS

The direct and indirect effects were tested – via mediation analysis – of PSS and GCB on the dependent variable (vca), , the means and standard errors of which are presented in Table 1. We evaluated the model (see Figure 1) which predicts that the relationship between Perceived Stress and Vaccination Attitude is mediated by the tendency to adopt conspiracy-based beliefs, testing the hypothesis that as stress levels increase, so will conspiracy theory-based thinking, resulting in higher vaccination hesitancy (Georgiou et al., 2020).

As shown in Figure 1, the model predicting an indirect (mediating) effect of GCB on the relationship between perceived stress and vca was not statistically significant ($p = 0.69$). Similarly, the regression coefficients indicated no predictive relationship ($b = -0.01$) of perceived stress levels on either GCB ($p = 0.86$) or vca ($p = 0.59$). There was, however, a significant direct effect of GCB on vca ($p < .001$), indicating a negative relationship between the two variables ($b = -0.46$, 95% CI [-0.81, -0.21]).

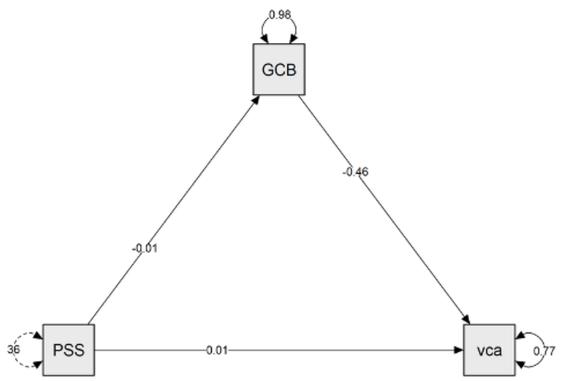

Figure 1 Mediation of the relationship of Perceived Stress (PSS) and Vaccination Attitude (vca) via General Conspiracy Belief (GCB)

Vaccination Attitude	Perceived Stress Scale	General Conspiracy Beliefs
3.845 (0.12)	18.118 (0.85)	2.739 (0.15)

Table 1 Table depicting the average (mean) scores on Vaccination Attitude, Perceived Stress, and General Conspiracy Beliefs. Standard deviations are provided in brackets.

Note: Vaccination Attitude and General Conspiracy Belief were scored out of 5, while the highest score obtainable on Perceived Stress was 40 (with higher scores indicating greater stress). Higher scores on Vaccination Attitude indicate a more favourable reaction to vaccines, while higher scores on General Conspiracy Beliefs indicate greater adoption of conspiracy-based reasoning in day-to-day life.

DISCUSSION

To summarize, the results do not support the existence of a mediated (indirect effect) relationship between perceived stress and vaccine hesitancy through conspiratorial belief (see also Georgiou et al., 2020). However, we found evidence that increased hesitancy toward COVID-19 vaccines is associated with conspiratorial beliefs, consistent with those demonstrated previously in UK samples (Georgiou et al., 2020 and Kuhn et al., 2021).

Additionally, we found that perceived stress indicated higher average stress rates now than when it was originally normed 20 years ago across multiple demographics. The highest score for a demographic recorded in 1994 was 14.7 out of 40 (Cohen et al., 1994), whereas in our sample we found a perceived stress mean of 18.1. We conclude that while stress-levels are clearly high across both people with pro and anti-vaccine sentiments, this stress is not specifically a factor in whether they adopt conspiracy-based beliefs about COVID-19.

The current study has a number of important limitations to consider. Firstly, our sample should rightfully be considered a non-probability, convenience sample, which is limited in both size and scope. Furthermore, given the nature of the topic, we thought it was important to protect the privacy of our participants and opted not to collect demographic details – but can confirm that the survey was only submitted to current residents of the Vancouver area. Additionally, we cannot confirm which vaccines were available to our participants, as some level of hesitancy may also be determined in part by the perceived health risk(s) attached to certain types of COVID-19 vaccines (mRNA, viral vector, etc.). In summary, we found that conspiracy-based thinking in general is a related factor to hesitancy of COVID-19 vaccines, which may prevent vaccine uptake. At the time of writing (August 2021), the vaccination rates for COVID-19 in British Columbia are 67% fully vaccinated and 75 % partially vaccinated (Little, 2020), with policymakers looking to increase vaccination rates. While mental health concerns, including anxiety and depression, have been exacerbated in Canada by the pandemic (Dozois & Mental Health Research Canada, 2021), the current results suggest that campaigns aimed at addressing/reducing the anxiety or stress of conspiracy-belief-prone individuals may not be particularly effective at increasing vaccination rates in this sub-population and that the use of mandates may only further distrust, as it can be easily incorporated into a conspiracy-based narrative.

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APPENDIX

All questions will have a Likert scale to analyze the degree to which the participant agrees or disagrees to a statement, or how often the question applies to them (Part 2). The survey is split up into 3 parts.

For Parts 1 and 3: 1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, 5 = Strongly Agree. For Part 2: 0 = never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, 4 = Very Often.

Part 1: Vaccine Attitudes

1. The Coronavirus vaccine is important for my health.
2. The Coronavirus vaccine is effective.
3. Getting the Coronavirus vaccine is important for the health of others in my community.
4. If you are young and healthy you do not need to the coronavirus vaccine.
5. New vaccines pose a greater risk than old ones.
6. The information regarding the Coronavirus vaccine expressed by the CDC is reliable and trustworthy.
7. Getting the Coronavirus vaccine is the best way to prevent the disease.
8. If a doctor told me to get the Coronavirus vaccine I would listen.
9. 9I am concerned about the serious and adverse side effects of the Coronavirus vaccine.
10. The reason I am concerned about the Coronavirus vaccine is because it was created very quickly.

Part 2: Perceived Stress

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you felt confident about your ability to handle your personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things that you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that were outside your control?
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Part 3: General Conspiracy Beliefs

1. The government is involved in the murder of innocent citizens and/or well-known public figures and keeps this a secret.
2. The power held by heads of state is second to that of small unknown groups who really control world politics.
3. Secret organizations communicate with extraterrestrials but keep this fact from the public.
4. The spread of certain viruses and/or diseases is the result of the deliberate, concealed efforts of some organization.
5. Groups of scientists manipulate, fabricate, or suppress evidence in order to deceive the public.
6. The government permits or perpetrates acts of terrorism on its own soil, disguising its involvement.
7. A small, secret group of people is responsible for making all major decisions, such as going to war.
8. Evidence of alien contact is being concealed from the public.
9. Technology with mind-control capacities is used on people without their knowledge.
10. New and advanced technology which would harm current industry is being suppressed.
11. The government uses people as patsies to hide its involvement in criminal activity.
12. Certain significant events have been the result of the activity of a small group who secretly manipulate world events.
13. Some UFO sightings and rumours are planned or staged in order to distract the public from real alien contact.
14. Experiments involving new drugs or technologies are routinely carried out on the public without their knowledge or consent.
15. A lot of important information is deliberately concealed from the public out of self-interest.