



MENOPAUSE AND INDIGENOUS WOMEN IN CANADA:

The state of current research

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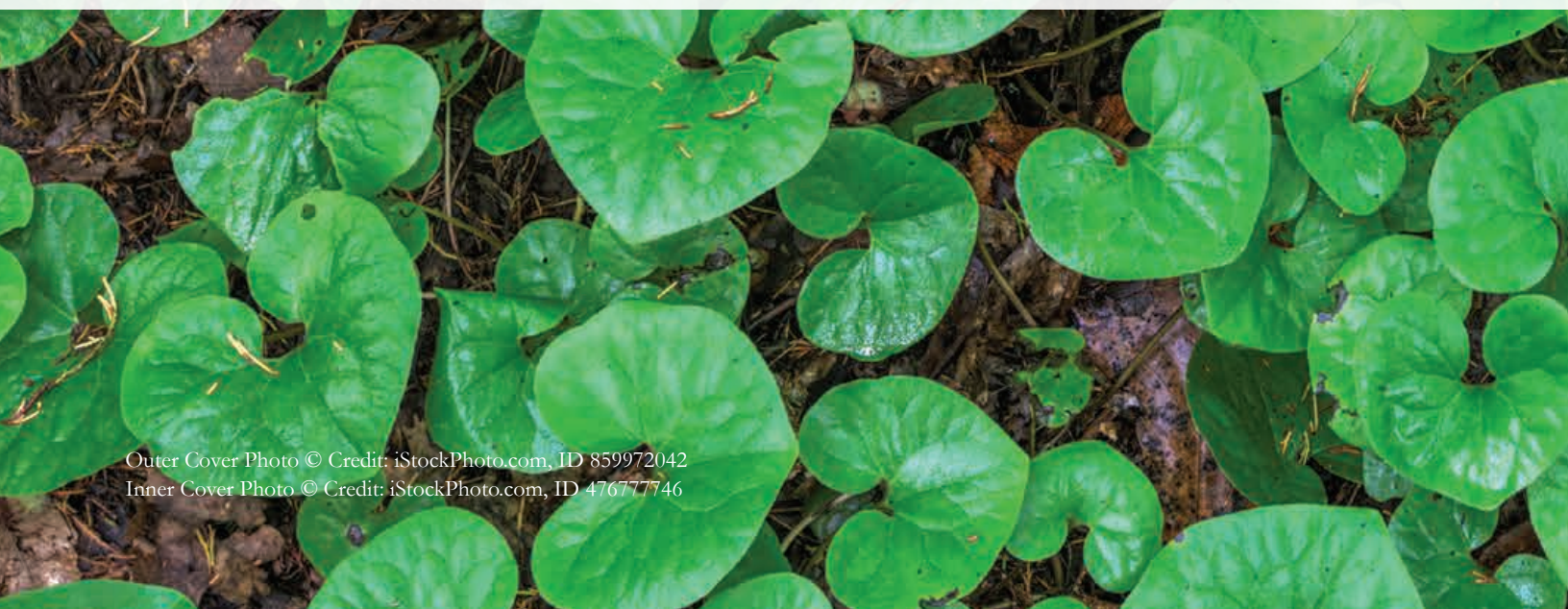
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ABSTRACT

Objective

This study aims to: 1) identify and summarize the state of research on menopause and Indigenous women in Canada, 2) suggest how this existing knowledge can be applied in practice, and 3) identify where further research is required.

Data Sources

The review draws on research (peer and non peer-reviewed) published between 1990 and December 2016, identified through multidisciplinary general and health sciences indexes, including Academic Search Premier, EBSCOHost, Sage Premier, Science Direct, Web of Science, Google Scholar, PubMed, and Medline.

Study Selection

Selection criteria included a significant focus on the characteristics of menopause among Indigenous (First Nations, Inuit and Métis) women in Canada; their perceptions of, and experiences with changes associated with menopause; methods of addressing challenges related to menopause; and the health outcomes associated with menopause. The review identified 22 publications with a focus on Indigenous women in Canada. However, to highlight gaps in knowledge, research on Indigenous women in other countries has also been included where appropriate.

Data Extraction/Data Synthesis

The literature search revealed very limited published research on menopause among Indigenous women in Canada, with the bulk of it focused on their perceptions of, and experiences with, menopause and on bone density loss associated with menopause.

Conclusion

Further research is required on how menopause manifests physically, mentally, emotionally, spiritually and socially among Indigenous women across Canada; how they experience and perceive it; how they address related changes; how menopause impacts health outcomes like cancer, cardiovascular disease, hypertension, and diabetes mellitus; and how best to communicate information on menopause in culturally appropriate ways.

GLOSSARY OF TERMS

Menopause

The cessation of menstrual periods and the end of female reproduction. A woman is said to have experienced menopause when she has had no menstrual periods for 12 consecutive months (Mayo Clinic Staff, 2016a).

Peri-menopause

The period of time (typically a few years), prior to menopause, during which a woman's body is naturally transitioning towards permanent infertility (menopause) (Mayo Clinic Staff, 2016b).

Post-menopause

The period of time after menopause.


Estrogen

A hormone produced in women's ovaries that "influences the course of ovulation during the monthly menstrual cycle, lactation after pregnancy, aspects of mood, and the aging process." After menopause, the production of estrogen is drastically reduced (MedicineNet, 2016a).

Progesterone

A hormone that prepares the uterus to receive and sustain fertilized eggs (MedicineNet, 2016b).



A photograph of several tall, slender plants with dense clusters of small, light pink flowers. The plants are growing on a rocky, light-colored hillside under a clear blue sky. The background is slightly blurred, emphasizing the flowers in the foreground.

Understanding how Indigenous women experience the menopausal transition and address associated changes and health outcomes should be viewed as an emerging priority for this population.

1.0 INTRODUCTION



Menopause marks the end of a woman’s reproductive potential. Menopause is not a disease with symptoms; rather, it is a natural biological process, which can also be induced through the surgical removal of a woman’s ovaries to treat cancer and noncancerous conditions (through a procedure called an oophorectomy), or through medical treatments such as chemotherapy or pelvic radiation therapy, which can damage the ovaries (MedicineNet, 2016c).

After menopause, the production of the sex hormones, estrogen and progesterone, substantially decreases, which may result in permanent or temporary physical, mental, emotional and/or sexual changes. Women who experience early menopause (before age 40) may be at greater risk for heart disease and osteoporosis, as estrogen provides some protection against age-related changes in blood vessels and bone density (MedicineNet, 2016c).

Although the Indigenous¹ population in Canada is a relatively young one compared to the non-Indigenous population, Wilson, Rosenberg, and Abonyi (2011) note that “[o]lder cohorts of the [Indigenous] population are increasing at a faster rate than younger cohorts” (p. 355). Over the period 2006 to 2016, the proportion of the population who was female and aged 45-54 grew for all Indigenous populations with the exception of Métis, while the proportion of the non-Indigenous female population in this age range declined over this period (Table 1).² Yet, research on the health of older Indigenous populations remains limited. Understanding how Indigenous women experience the menopausal transition and address associated changes and health outcomes should be viewed as an emerging priority for this population.

TABLE 1: PROPORTION OF THE POPULATION, WHICH IS FEMALE AND AGED 45-54 YEARS

Population	2006	2011	2016
Indigenous	6.5%	7.0%	6.7%
First Nations	6.0%	6.7%	6.5%
Inuit	4.5%	5.0%	5.5%
Métis	7.3%	7.8%	7.2%
Non-indigenous	8.2%	8.3%	7.4%

Source: Statistics Canada, 2006, 2017a, and 2017b.

¹ The terms ‘Indigenous’ or ‘Indigenous peoples’ are used throughout this paper to refer inclusively to the original inhabitants of Canada and their descendants, including First Nations, Inuit and Métis (Aboriginal) peoples as defined in Section 35 of the *Canadian Constitution of 1982*. The terms ‘Aboriginal’ or ‘Aboriginal peoples’ are used when reflected in the literature under discussion. Whenever possible, culturally specific names are used.

² It is important to note that due to a change in the way the *2011 National Household Survey* (NHS) was conducted, compared to the 2006 Census (from a mandatory survey in 2006 to a voluntary one in 2011), there are issues associated with data quality resulting from a significantly lower response rate (the 2011 NHS had a weighted response rate of 68.6% compared to the 93.8% response rate in the 2006 Census (Smith, 2015).

This paper aims to:

- 1) identify and summarize the state of research on menopause and Indigenous women in Canada,
- 2) suggest how the existing knowledge can be applied in practice, and
- 3) identify where further research is required. Specifically, it identifies and summarizes published research on the characteristics of menopause (including age of onset; physical, mental, emotional, spiritual and social experiences of menopause); Indigenous women's perceptions of menopause; approaches to addressing changes during peri- and post-menopause; and health outcomes associated with menopause among Indigenous women in Canada.

1.1 Methods

Published research on menopause among Indigenous women in Canada was identified through both multidisciplinary general and health sciences indexes, including Academic Search Premier, EBSCOHost, Sage Premier, Science Direct, Web of Science and Google Scholar, as well as PubMed and Medline. Peer reviewed and grey literature published between 1990 and December 31, 2016 was considered. Combinations of the following search terms were used: Aboriginal/First Nation/Métis/

Inuit/Native American/Indigenous + menopause/aging/midlife + women. In addition, several journals were hand-searched including *Menopause* and *BMC Women's Health*, and the bibliographies of relevant publications were checked to identify additional publications. Studies were deemed relevant if they: included a significant focus³ on Indigenous (including one or all of First Nations, Inuit or Métis) women in Canada with respect to the onset of menopause; perceptions of and experiences with menopause; changes associated with menopause; strategies for addressing changes associated with menopause; or health outcomes associated with menopause.

It is important to note that as one objective of this paper is to determine areas where further research is required, the literature search was not restricted to freely accessible publications. Some of the publications may be available only through purchase, while others may be available only in select libraries. Information obtained through publications that are not freely accessible was derived from either the abstract or secondary sources. Further, to highlight knowledge gaps in the context of Indigenous women's experiences with menopause in Canada, wherever relevant, this paper also includes research with Indigenous women in other countries.

1.2 Results

The search revealed very limited published research on menopause among Indigenous women in Canada. While there is a considerable body of research published on menopause among Indigenous women in other countries, only 22 publications could be identified with a focus on Indigenous women in Canada (Appendix 1). Of these, nine were focused specifically on First Nations women, eight were focused on Indigenous women in general, five were focused on Inuit women, with none focused specifically on Métis women. Most of this research was focused on Indigenous women's perceptions of menopause or on bone density loss during menopause and its implications for fractures and osteoporosis.



³ The publication focused entirely on, or at a minimum had one section devoted to, Indigenous women.



2.0 KNOWLEDGE, PERCEPTIONS AND EXPERIENCES OF MENOPAUSE



Close to half of the publications identified in this literature review focused on knowledge of, experiences with, and perceptions of menopause among Indigenous women in Canada. There is overwhelming evidence that the menopausal transition is as diverse an experience as menstruation or birth. The research also highlights the influence that psychological factors, as well as social and cultural context, play in women's conceptualization of and experiences with menopause (Loppie, 1997, 2004). Similar findings regarding the psychosocial and cultural contexts of Indigenous women's knowledge, perceptions, and attitudes about menopause were found in the international literature (Castelo-Branco, Palacios, Mostajo, Tobar, & von Held, 2005; Jones, Jurgenson, Katzenellenbogen, & Thompson. 2012; Michel, Mahady, Veliz, Soejarto, & Caceres, 2006).

2.1 Knowledge

Knowledge about menopause varies widely among Indigenous women (Chadha, Chadha, Ross, & Sydora, 2016). Indigenous women do not always have access to useful information about menopausal changes and challenges, or how best to address them (Banister, 2000; Loppie, 2004, 2005; Stern & Condon, 1995). This may result from a lack of access to health information that is non-medical, straightforward, and balanced (Loppie, 2004). Jurgenson, Jones, Haynes, Green and Thompson (2014) and Loppie (2004) note that a lack of knowledge about menopause among Indigenous women contributed to feelings of stress and fear.



Colonial religious oppression of Indigenous peoples' historic comfort with sexual and reproductive matters, in addition to experiences of sexual repression and/or sexual abuse in Residential Schools (MacDonald & Hudson, 2012), has likely resulted in Indigenous women not always feeling comfortable talking about their sexual and reproductive health.

Several studies have found that Indigenous women often report feeling uncomfortable discussing menopause (Davis et al., 2003; Jurgenson et al., 2014; Michel et al., 2006) or “women’s issues” in general (Madden et al., 2010; Stern & Condon, 1995), which may prevent them from seeking care and support. Colonial religious oppression of Indigenous peoples’ historic comfort with sexual and reproductive matters, in addition to experiences of sexual repression and/or sexual abuse in Residential Schools (MacDonald & Hudson, 2012), has likely resulted in Indigenous women not always feeling comfortable talking about their sexual and reproductive health. In 1995, Stern and Condon found that older Inuit women (who would have been born in the 1940s – before large-scale colonization of the North) generally acquired information about midlife changes

through other women who had experienced them, while younger women primarily accessed medical information about midlife changes from western medical sources.

2.2 Perceptions

Indigenous worldviews conceptualize health holistically, including mental, physical, spiritual, and emotional dimensions (Reading & Wien, 2013), so that menopause is not viewed as simply a physiological transition. The socio-political, historical, cultural and medical contexts within which Indigenous women experience midlife change, including the context and substance of their relationships with partners, family, community and kinship networks, also affects the degree to which they are able to maintain balance during this transition (Banister, 2000, Buck & Gottlieb, 1991; Chadha et al., 2016;

Loppie, 1997, 2004). For example, Buck and Gottlieb (1991) situated menopause within the context of other life experiences and found that Mohawk women who felt in ‘synchrony’ also tended to feel that they were ‘where they should be’ at this stage of life, while those who felt ‘out of synchrony’ were often more uncomfortable or unhappy with this stage of life.

Some researchers have reported dramatic improvements in Indigenous women’s lives at middle age. For instance, Maori women experienced increased prestige and influence, participated more fully in rituals and ceremonies, and became the arbiters of community standards (Sinclair, 1992); and among Koori⁴ women, where age is equated with wisdom, women attained high community status during this stage of their lives (Thomson, 1992). Menopause may

⁴ Koori women are Indigenous Australians from New South Wales and Victoria.

also mark the transition to becoming a grandmother and prioritizing time for grandchildren, as well as an evolution from learning to teaching cultural ways, and a time when women gained greater respect within the community (Jurgenson et al., 2014).

In some studies, freedom, self-discovery and self-reflection were the dominant themes of Indigenous women's perceptions of menopause (Buck & Gottlieb, 1991; Loppie, 2005; Meadows, Thurston, & Lagendyk, 2004; Webster, 2002). This reflection often translated into active steps to enhance women's wellness, including seeking further educational opportunities, reconnecting with traditional knowledge and ways, sharing life experiences and wisdom with other community members, and playing stronger roles within their families and communities (Meadows et

al., 2004). These measures often contributed to women healing from past traumatic and discriminatory experiences and helped enhance their self-confidence. This, in turn, becomes a resource for building local capacity and strengthening existing social capital within their communities (Meadows et al., 2004).

For other Indigenous women, however, fear and apprehension dominated their perceptions of midlife changes (Jurgenson et al., 2014; Loppie, 2004). For example, some of the Indigenous women from Western Australia who participated in a study by Jurgenson et al. (2014), reported negative attitudes about menopause. Banister (2000) asserts that this might stem from negative attitudes about female aging within Western social and cultural contexts, which can challenge women's self-esteem (in contrast to many Indigenous cultures that view aging

more positively). Indeed, within a holistic, naturalistic perspective, Indigenous women can be protected from pathologizing their experience or fearing old age (Loppie, 2004).

Understanding this context can lead to improved strategies for communicating menopause-related information to Indigenous women, and recommending appropriate and acceptable mechanisms for managing menopausal discomforts. Yet, few studies identified in this review focused exclusively on cultural context, though several highlighted aspects of Indigenous women's experiences and perceptions. Some publications highlighted the need for culturally appropriate communication of health information and suggested that health care providers not convey any rigid meanings to the menopause experience so that Indigenous women can make



Menopause may also mark the transition to becoming a grandmother and prioritizing time for grandchildren, as well as an evolution from learning to teaching cultural ways, and a time when women gained greater respect within the community

(Jurgenson et al., 2014).

informed decisions. For instance, Madden and colleagues (2010) noted that the word ‘menopause’ may not exist or have the same meaning in all Indigenous languages, so health practitioners should initiate discussions by referring to “that time when periods stop” (p. 331).

Two publications offered suggestions for improving programs and service delivery for midlife Indigenous women. Banister (2000) argues that health practitioners need to be conscious of how they view Indigenous women’s midlife experiences, particularly in how they relate to and interact with their clients. She argues for the need to employ strategies which encourage clients to articulate their personal meanings of menopause and assume more active and meaningful directions in their lives. Loppie (2004)

further suggests that programs and services for Mi’kmaq women (and Indigenous women more broadly) be based on Indigenous values, focus on intergenerational capacity building, and incorporate opportunities to engage in diverse strategies towards mid-life wellness and healing if necessary.

Collectively, findings from Canadian and international literature point to the need for further exploration of circumstances that might influence perceptions of menopause among Indigenous women, and the ways in which information can be communicated more appropriately so that possible anxieties about menopause can be alleviated. Such research could lead to the development of supports that optimize Indigenous women’s health and wellness during this stage of life.

2.3 Experiences

Another area of research that has received limited attention, within Canada and internationally, relates to the self-reported experiences of Indigenous women transitioning through peri-menopause or during the post-menopausal phase of their lives. There is a particular dearth of information about the characteristics (e.g. age of onset and manifestation) of menopause among Indigenous women in Canada. In fact, only two publications could be identified, and both involved a review of literature from medical and non-medical databases rather than original research. One focused primarily on Indigenous women in Canada, though other Indigenous women from North America were included as well (Webster, 2002), while the other focused on Indigenous women from around the world (Chadha et al., 2016).

There is however a substantial body of literature focused on menopausal experiences, narrowly and bio-medically conceived, among Indigenous women in Latin/Central/South America, Australia, New Zealand, and the United States. Within these studies, the age of onset of menopause and the discomfort of associated changes were found to be dependent upon social factors (e.g. socio-economic status), body composition and geographical region, as well as on tobacco use (Castelo-Branco et al., 2005; Chadha et al., 2016; Hayatbakhsh, Clavarino, Williams, Sina, & Najman, 2012; Johnston, 2001; Monterrosa-Castro et al., 2009, 2013; Palacios, Henderson, Siseles, Tan, & Villaseca, 2010; Ojeda, Monterrosa, Blümel, Escobar-



López, & Chedraui, 2011; Schindler, 2006). For example, in one study of Blackfoot women, the average age of menopause was 51.2 years and was found to be associated with: age at menarche, ever having used birth control, ever having used oral contraceptives, and having been breastfed (Johnston, 2001, 2003). A systematic review of literature on the experiences of menopause among Indigenous women around the world found that the average onset of menopause appeared to be earlier among most Indigenous groups, which was often attributed to malnutrition and harsher lifestyle (Chadha et al., 2016)

Evidence with respect to the characteristics and severity of discomforts associated with menopause among Indigenous women is mixed. Webster (2002) indicated fewer vasomotor changes (i.e. hot flashes and/or sweats) among Indigenous women compared to non-Indigenous North American women. In contrast, Madden et al. (2010) reported that six of the First Nations women in their study (n=18) reported no hot flashes at all, while six others described hot flashes as a main component of their menopausal experience. Among Mi'kmaq women, some women reported no mood swings, no hot flashes, and no memory disturbances, while others experienced changes in mood and eating habits, hot flashes, weight gain, heart palpitations, hot or cold sweats, changes in libido, vaginal

dryness and/or painful intercourse, sleep disturbances, dizziness, depression, fatigue, memory loss, incontinence, and reduced energy (Loppie, 2004). The gradation and variation in reported experiences is best viewed on many continua, related to the frequency, duration, and intensity of these experiences which are similarly reported by non-Indigenous women in North America (Freeman, & Sherif, 2007).

Globally, when compared to reports among non-Indigenous women, some researchers found that rural Navajo women (Mingo, Herman, & Jasperse, 2000), Yucatan Mayan women (Carranza-Kira, Quiroz, González, Alfaro Godinez, & May Can, 2012), Australian Aboriginal women (Thomson, 1992), and rural Mayan Indian women (Martin, Block, Sanchez, Arnaud, & Beyene, 1993) reported fewer or no menopausal discomforts, while others like Monterrosa et al. (2009) and Ojeda et al. (2011), in their studies of Indigenous women in South America, found they had more severe discomforts⁵ associated with menopause, which increased the potential for them to report lower quality of life.


Lynch and colleagues (2010) explored weight and health-related quality of life among postmenopausal women across five ethnic groups in the United States and found that the most common health issues were obesity-related conditions, hypertension and



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osteoarthritis. They also found that American Indian/Alaskan Native postmenopausal women reported moderate/severe pain (including generalized aches or pains, low back pain, neck pain, or joint pain or stiffness) more frequently than the other ethnic groups, and that they were also more likely to report a history of mood disorder and more than five negative life events. Monterrosa-Castro and colleagues (2009, 2013) also noted the role that smoking played in insomnia and the severity of somatic and psychological menopausal discomforts. Research specifically exploring the impacts of menopause on mental health and wellness, as well as its associated manifestations and health outcomes among Indigenous women, is virtually absent.

⁵ The severity of discomforts was measured with the *Menopause Rating Scale*, grouped into three subscales: somatic, psychological, and urogenital. Each type of discomfort was graded on a scale of 0 (not present) to 4 (very severe). Values above 8 (somatic), 6 (psychological), and 3 (urogenital) and 16 (total) were used to define severe 'symptoms'.

A photograph showing numerous strips of bright orange-red dried salmon hanging from a wooden rack. The rack is positioned under a thatched roof, likely part of a traditional drying structure. The background is slightly blurred, showing more of the structure and some greenery. The lighting is natural, highlighting the texture and color of the dried fish.

...forced transition to a Western diet, coupled with living in northern and remote locales and lower socio-economic circumstances, has resulted in a number of nutrient deficiencies among many Indigenous people in Canada, especially Vitamin D and calcium

(Kuhnlein & Receveur, 2007; Halseth, 2015).

3.0 PHYSICAL HEALTH CHALLENGES ASSOCIATED WITH MENOPAUSE



While there is a plethora of research on health challenges associated with menopause among non-Indigenous women, studies involving Indigenous women in Canada are extremely limited. The available literature focuses primarily on bone density, osteoporosis and fractures, with no research on health outcomes such as cancer or cardiovascular disease, and one article focusing on the prevalence of unexplained anaemia.

3.1 Bone density, fractures and osteoporosis

With some variations related to ethnicity, women generally experience a relatively rapid decrease in bone density during the post-menopausal period which can be a risk factor for osteoporosis and bone fractures, and is thus an important health issue for aging women (Ohta et al., 1992; Paunescu, Dewailly, Dodin, Nieboer, & Ayotte, 2013a). Some research suggests that Indigenous women in the United States have higher bone mass before menopause than Euro-American women but lose it more rapidly during the post-menopausal years

(Perry, et al., 1998a/b). Nine studies in this review explored bone density among Indigenous (mostly First Nations) women in Canada (El Hayek, Pronovost, Morin, Egeland, & Weiler, 2012; Evers, Orchard, & Haddad, 1985; Leslie et al., 2004, 2005, 2006a/b, 2008; Paunescu et al., 2013a/b). These studies tended to focus on the Indigenous population in general or on Indigenous women of all ages, rather than on post-menopausal women in particular. While the results of these studies are somewhat mixed (with Indigenous women having relatively lower bone density in some body locations and higher bone density in others), they highlight the need for further research on factors that might put Indigenous women at risk for post-menopausal fractures, such as exposure to environmental contaminants and the prevalence of obesity, diabetes, comorbidity and substance abuse.

Research has demonstrated that Vitamin D, calcium, and fatty acids are important for the maintenance of bone strength (Côté et al., 2004; El Hayek et al., 2012; Paunescu et al., 2013c, 2014; Weiler, Leslie, Krahn, Steiman, & Metge, 2007).

Four Canadian studies have explored the role of nutrition in bone density among Indigenous women, including saturated and monounsaturated fatty acids (Paunescu, Ayotte, Dewailly, & Dodin, 2014), Vitamin D (El Hayek et al., 2012; Weiler, Leslie, & Bernstein, 2008), and calcium (Evers et al., 1985).

Traditional Indigenous food sources, especially fish and marine mammals, are important sources of fatty acids and vitamin D (El Hayek, Egeland, & Weiler, 2011; Lock, Waagbo, Wendelaar Bonga, & Flik, 2010), while beans, fish bones, nuts, and some greens are good sources of calcium (Phillips, 2009). However, forced transition to a Western diet, coupled with living in northern and remote locales and lower socio-economic circumstances, has resulted in a number of nutrient deficiencies among many Indigenous people in Canada, especially Vitamin D and calcium (Kuhnlein & Receveur, 2007; Halseth, 2015).

Surprisingly, Evers and colleagues (1985) found that, after controlling for number of years since menopause, diminished calcium intake was not a predictor of bone



El Hayek and colleagues (2012) found that Inuit women 50 years or older had more nutrient dense diets and higher concentrations of Vitamin D than younger women (40-49 years) because they consumed more traditional foods.

loss in North American Indian (NAI)⁶ women. Similarly, 25(OH)D⁷ was not found to be a significant predictor of bone density in samples of Inuit and First Nation populations, despite its importance in the maintenance of bone density (El Hayek et al., 2012; Weiler et al., 2008). This may be due to a plateau in the concentration of parathyroid hormone (a hormone that is important in bone remodeling), which occurs when a certain concentration of 25(OH)D is reached (Dawson-Hughes et al., 2005).

El Hayek and colleagues (2012) found that Inuit women 50 years or older had more nutrient dense diets and higher concentrations of Vitamin D than younger women (40-49 years) because they consumed more traditional foods. Paunescu et al. (2014) also found that higher levels of saturated and

monounsaturated fatty acids were associated with bone strength among Inuit women in Nunavik. This finding is supported by other research with Inuit from Greenland (Côté et al., 2004; Stark et al., 2002; Paunescu et al., 2013c). One implication of this finding is that, as a result of the nutrition transition, which has led to decreased traditional food consumption among younger Inuit populations, their risk of future osteoporosis and bone fractures may be increased. Promoting the consumption of traditional food sources may therefore be an important component of bone health promotion strategies.

Several studies have examined obesity and chronic health conditions, such as diabetes, as risk factors for osteoporosis and fractures among Indigenous women

in Canada. In 2008, Leslie and colleagues found that First Nations women had significantly lower weight-adjusted bone mineral density (BMD) compared to Euro-Canadian women at two body sites, which they largely attributed to a lower ratio of lean body mass to fat mass. However, El Hayek et al. (2012) found that increased adiposity (fat) predicted forearm bone mineral density (fBMD) in both pre- and post-menopausal Inuit women. Likewise, Evers et al. (1985) found that obesity was positively associated with bone density among NAI women and Paunescu et al. (2014) found no associations between anthropometric measures (the size, shape and composition of the human body) with the Stiffness Index⁸ (SI) among a sample of Inuit women, despite a large proportion of these women being considered obese. They argued that although a high

⁶ The term used by the authors is “North American Indian”; however, they are referring to First Nations women from southwestern Ontario.

⁷ This acronym refers to “25-hydroxy vitamin D,” a biochemical substance that is produced in the liver through the conversion of vitamin D₃; it is used to determine a patient’s vitamin D status (Wikipedia. Calcifediol. 2015; <https://en.wikipedia.org/wiki/Calcifediol>)

⁸ The Stiffness Index is an expression of bone quality relating to density, structure and strength. Bone density is generally screened using dual energy x-ray absorptiometry or ultrasound, and scores are presented in two formats: the T-score compares your bone density to that expected for a healthy, young person and is used to determine fracture risk; and the Z-score which compares your bone density to the average bone density of a person your age, which is not used to determine fracture risk (Osteoporosis and Related Bone Diseases National Resource Center, n.d. Building Strong Bones for Life).

level of fat mass has been identified as a risk factor for osteoporosis and fragility fractures, among Inuit women obesity may not “reflect the same degree of metabolic risk” as in other populations because oleic acid (a fatty acid in meat) contributes to bone strength in this population (p. 8).

Two studies have examined the potential association between diabetes and bone loss and/or fracture, of which only one focused exclusively on post-menopausal Indigenous women. Evers and colleagues (1985) found no association between diabetes and bone loss in NAI women, while Leslie et al. (2006a) found that a greater prevalence of diabetes was associated with higher rates of osteoporotic fractures in the general First Nations population, including post-menopausal women. However, they also indicated that other risk factors, not explored in their study, could be contributing to high rates of osteoporotic fractures in this population.

Some researchers have hypothesized that environmental contaminants such as cadmium (a toxic metal) and organochlorine pollutants (pesticides) are risk factors for osteoporosis in post-menopausal women (Alfvén et al., 2000; Järup & Åkesson, 2009; Rignell-Hydbom et al., 2009; Vahter, Berglund, & Åkesson, 2004). Two studies have investigated the role of environmental contaminants in

the development of osteoporosis among Indigenous women in Canada (Paunescu et al., 2013a/b). These studies found little evidence that exposure to environmental contaminants was related to osteoporosis in a sample of Cree and Inuit women. The findings are supported by a similar study with the Greenland Inuit (Côté et al., 2006). Though evidence that environmental contaminants are associated with osteoporosis is at present limited,⁹ given the high rates of tobacco smoking and the potential for high levels of exposure to environmental contaminants among Indigenous people in Canada, further research in this area may be warranted.

Few studies in this review focused on identifying lifestyle risk factors associated with loss of bone density, osteoporosis and risk of

fracture among Indigenous women, including smoking, physical activity, and substance abuse. Paunescu et al. (2013a) found that smoking was negatively associated with bone density status among Cree women from James Bay, while physical activity was a positive predictor of radial (the long bone of the forearm) bone density in this population. In contrast, Evers and colleagues (1985), who sought to determine differences in risk factors for bone loss in Euro-American and NAI women, found that, after controlling for number of years post-menopause, smoking was not a predictor of bone loss in NAI women. One study found that substance abuse¹⁰ was associated with osteoporotic fractures in both Indigenous and non-Indigenous adults in Manitoba (Leslie et al., 2006a).



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⁹ While there has been some research indicating an association between cadmium and bone density (see for example, Vahter, et al., 2004), other research has found only weak or no associations between other environmental contaminants and bone density or osteoporosis.

¹⁰ Substance abuse was defined as any hospitalization or medical claim with a code for a relevant diagnosis (i.e. alcoholic psychoses, drug psychoses, alcohol dependence, drug dependence or nondependent abuse of drugs).

Although Indigenous peoples in Canada (including post-menopausal women) have higher rates of osteoporosis than non-Indigenous people (Statistics Canada, 2009), this review indicates that the findings of research about impact of substance use (licit and illicit), physical activity, nutrition, obesity and diabetes on bone density, osteoporosis and fracture risk among post-menopausal Indigenous women is inconsistent and not well understood. Future research focused on living conditions (which is an important determinant of smoking, substance abuse, lack of physical activity, obesity and diabetes) may offer additional insights into the risk of fractures among this population.

3.2 Cancer among post-menopausal Indigenous women

Breast cancer is an important health issue for women after menopause, especially among women who are using hormone replacement therapy (HRT). In fact, a number of studies have suggested that HRT is associated with an increased risk of breast cancer (Eaton et al., 1994; Printz, 2014; Wise, 2016). Despite this, no studies were found on breast cancer or its risks among post-menopausal Indigenous women in Canada.

Research in this area is also fairly limited with respect to Indigenous women in other countries, with most of it focused on NAI women (Bartow, Pathak, Mettler, Key, & Pike, 1995; Chlebowski et al., 2005; Eaton et al., 1994; McKenzie et al., 2014; Roubidoux et al., 2003; Slattery et al., 2007). Predictors

of breast radiolucency (fat in the breast, which is associated with an increased risk of breast cancer) included obesity, older age and/or post-menopausal status, and Native American identity (Bartow et al., 1995; Eaton et al., 1994). Roubidoux and colleagues (2003) found that the relationship between breast density (containing less fatty tissue) to diabetes varies with menopause status in Native American women, with diabetes correlating with breast density in pre-menopausal women but not in post-menopausal women. McKenzie et al. (2014) found that post-menopausal Maori women with scores in the top third of the healthy lifestyle index had significantly lower breast cancer risk compared than those in the bottom third. Finally, Slattery et al. (2006) found that physical activity was associated with reduced risk of breast cancer in American Indian women, especially in post-menopausal women and those not recently exposed to HRT.

3.3 Other health outcomes

Only one additional article was identified that explored associations between menopause and other health outcomes among Indigenous women. This article examined and compared the prevalence of unexplained anaemia in Inuit men and post-menopausal women from northern Labrador (Jamieson, Weiler, Kuhnlein, & Egeland, 2016). The study's findings indicate relatively stable rates of anaemia for Inuit women across age groups. However, while iron deficiency explained much of the anaemia observed in pre-menopausal Inuit women, it did not explain the moderate rates of anaemia found among post-menopausal women,

who generally had adequate stores of iron. The authors highlight several factors beyond iron status that may be contributing to the prevalence of anaemia among older Inuit, including inflammation, infections, and low socio-economic status, and argue that the nutrient-rich traditional diets and lifestyle may be protecting Inuit from nutritional anaemias but contributing to lower hemoglobin values through environmental exposures.





4.0 STRATEGIES FOR ADDRESSING CHALLENGES ASSOCIATED WITH MENOPAUSE



Multiple strategies exist for addressing challenges that sometimes occur during peri- and post-menopause. Some women use estrogen and progesterone-based HRT to reduce hot flashes and reduce bone loss; however, as a result of concerns about the safety of these non-human hormones, many women are turning to more natural alternatives which they believe to be safer (Rees, 2009; Wuttke et al., 2014). In addition, there is a small body of literature on other strategies, such as stress reduction and lifestyle changes, which might reduce potential discomforts and thereby improve quality of life.

A few studies explored strategies used by Indigenous women in Canada to address challenges during the peri-menopausal transition. However, there is limited information about the extent to which Indigenous women in Canada seek advice from health professionals about menopause and associated changes; their use of HRT, traditional approaches, and alternative strategies to manage symptoms; and the effectiveness or safety of various strategies used by this population. Similarly, sparse literature exists on the use of HRT, natural supplements, and other coping strategies among Indigenous women elsewhere.



4.1 Hormone replacement therapy

HRT has been reported in studies among Mi'kmaq women (Loppie, 2004), Maori women (Lawton, Rose, Cormack, Stanley, & Dowell, 2008), Australian Indigenous women (Davis et al., 2003; Jurgenson et al., 2014), and American Indian women (Cowan et al., 1997; Redwood, Lanier, Johnston, Murphy, & Murtaugh, 2012). In all but one of these studies, supplemental estrogen use was found to be quite low among Indigenous women. These studies suggest that Indigenous women may not be using, or continuing to use, HRT for a variety of reasons. Mingo and colleagues (2000) found that some Native American women had not heard about HRT and among those who had been prescribed it, many expressed dissatisfaction with its side effects. Women may also be apprehensive about using HRT. For example, Jurgenson and colleagues (2014) found that 20% of the Australian Indigenous women in their sample were reluctant to use HRT for fear of health complications and wanted to go through the process naturally. Similarly, Loppie

(2004) reported that Mi'kmaq women in Nova Scotia were wary of the health effects of HRT and many stopped using it after a short time.

HRT has been associated with an increased risk of breast cancer, especially in obese post-menopausal women (Eaton et al., 1994). This may be an important concern for Indigenous women in Canada who have higher rates of obesity compared to non-Indigenous women (NCCAH, 2012). Jurgenson et al. (2014) found that some Indigenous women in Australia were fearful of seeking help for their symptoms because of concerns that they were due to illnesses such as diabetes or a heart condition. Zhang and colleagues (2002) caution that diabetes should be considered when deciding whether or not to use estrogen. Given the high rates of diabetes among First Nations women, further research in this area is required, as is research to determine the prevalence of HRT use among Indigenous women, and their perceptions of HRT use.

4.2 Alternatives to HRT

Alternatives to HRT include natural supplements, several of which are considered 'traditional medicines' by some Indigenous populations, including 'black cohosh', evening primrose oil, red clover blossoms, and soy isoflavone extracts, which are primarily used to reduce hot flashes and/or sweats. The literature search discovered no studies that exclusively explored the use of such products by Indigenous women in Canada, or their effectiveness within this population. There has been more research on the use of such products among other Indigenous women, including those in the United States as well as South and Central America. There have also been several studies assessing the safety and effectiveness of these products generally. Yet, the evidence has been mostly inconclusive, resulting in some uncertainty about alternative (to HRT) methods to reduce the discomforts of menopausal change.

Most research evidence on the safety and effectiveness of natural therapies relates to the use of a



North American perennial plant known as Black Cohosh (*Cimicifuga racemosa*). This plant is a traditional medicine used by Native American populations to alleviate hot flashes and its safety has been explored (Huntley, 2004; Low Dog, 2005; Rahal et al., 2013). The evidence currently available indicates that Black Cohosh may be effective and safe in reducing hot flashes if taken for limited durations; however, further research is required to assess its safety for long-term use (Chung et al., 2007; Huntley, 2004; Low Dog, 2005; Papps, 2000; Lupu et al., 2003; Wuttke et al., 2014). It also appears to be effective, when used in combination with St. John's Wort, to address mild to moderate depression, with some benefits to lipid metabolism (Chung et al., 2007). In addition, Black Cohosh has been shown to provide antioxidant effects that are beneficial for general health (Rahal et al., 2013).

Less research has been undertaken on the effectiveness and safety of other natural therapies. The Chumash Indians of California have relied on mugwort tea to reduce hot flashes, but it has not been tested

in clinical trials (Adams & Garcia, 2006; Adams, Garcia, & Garg, 2012). Meissner, Kapczynski, Mscisz, and Lutomski (2005) conducted a double-blind placebo-corrected clinical pilot study aimed at assessing the effectiveness of the Andean plant Maca among women during the early post-menopausal period. This plant has been used to relieve menopausal discomforts, to help maintain hormonal balance, to boost energy and, in conjunction with nutritional supplements, to wean women off of HRT. Meissner and colleagues found that although it substantially-reduced discomforts associated with peri-menopause, it also had a distinct placebo effect and further study is required. The benefits of evening primrose oil, red clover blossoms and soy isoflavone extracts appear to be minimal and long-term safety is uncertain (Kang, Ansbacher, & Hammoud, 2002; Low Dog, 2005). At present, there is no robust evidence from randomized trials showing that use of 'alternative and complementary' therapies are effective in alleviating peri-menopausal discomforts and, in fact, there may be cause for concern about the interaction of such products

with the treatment of illnesses like cancer (McBride, 2015; Rees, 2009).

4.3 Other strategies

Other strategies for managing the potential discomforts of peri-menopause among Indigenous women around the globe have included: seeking forms of support, engaging in stress releasing activities, and adopting a healthier lifestyle. Mi'kmaq women report using physical activity, staying busy, socializing, acceptance, humour, and traditional spiritual practices as ways to maintain physical, mental, emotional and spiritual balance during the menopausal transition (Loppie, 2004). Similarly, Jurgenson et al.'s (2014) study offers several suggestions from Indigenous women in Australia including: sticking together for support, watching their weight, exercising, listening to music, consuming alcohol, visiting family, and adopting a sense of humour. However, this area of research is especially thin both domestically and internationally and further research is required.

4.4 Culturally Safe Menopause Care

In Canada, well-documented concerns have been raised about the adequacy and cultural appropriateness of health services for Indigenous peoples (see for example, Macdonald, Rigillo, & Brassard, 2010; Browne & Fiske, 2001; & Tang & Brown, 2008). Particularly in remote/northern regions of Canada, challenges associated with accessing health care and appropriate informational resources can impact the ability of local residents to make decisions about their health care options as well as prevent them from seeking out care when they need it. Leipert and Reutter (2005) note, for example, that in the context of northern residents and their access to health care services generally, options for diagnosis, treatment and health promotion (including menopause and mental health resources), illness prevention services, and alternative therapies are very limited and that northern residents have developed strategies for coping with health challenges on their own. According to Loppie (2004), Mi'kmaq women who pursue traditional healing and/or herbal medicines often feel more empowered about menopause. However, jurisdictional issues related to accessing health services outside those covered by the federal government present barriers to First Nations women who wish to pursue alternatives to HRT and other medical treatment (e.g. anti-depressants) during this natural process of change.

According to Northrup (2012), persistent elevation of a hormone called DEA, which is produced in response to chronic stress, may deplete the adrenal gland, which is an important source of post-menopausal androstenedione, which is converted to estrogen (Larsen, Kronenberg, Melmed, & Polonsky, 2002). Women whose lives have been stressful or who suffer from chronic illness may enter peri-menopause in a state of adrenal exhaustion. The link between adrenal function, historic trauma and hormone sensitivity may place some Indigenous women at increased risk of emotional and/or physical discomforts during peri-menopausal change. Yet, physicians are often insensitive to the multiple and persistent personal, family and community responsibilities that can impact adrenal function in Indigenous peri-menopausal women (Loppie, 2004).





5.0 CONCLUSIONS



This literature review indicates that Indigenous women's perceptions are shaped by a number of cultural (both Western and Indigenous), socio-economic, historical, medical and political contexts, which also impact their physical and emotional balance during midlife. Some women have negative experiences and difficulties maintaining a balance, while others experience improved quality of life; a time to focus on themselves and enhance their relationships.

This review also reveals a number of knowledge gaps that require further research. Given the growing number of aging Indigenous women, it is clear that further research is required to provide an understanding of how menopause manifests in Indigenous women, how they experience and perceive it, how they cope with and ameliorate discomforts associated with it, and how it impacts their health and wellness. Moreover, there does not appear to be much information about Indigenous women's informational needs and the best ways of communicating that information, or about the use and safety of HRT and other strategies within this population.

There is little research on the quality of midlife Indigenous women's lives, beyond a focus on some of the health outcomes associated with menopause. The existing body of research focused on bone density, osteoporosis and fractures indicates that factors which may be placing Indigenous women at increased risk are not well understood, and there is virtually no research on how menopause affects existing conditions like hypertension, cancer and diabetes mellitus. This type of research is essential so that Indigenous women can experience an optimal menopausal experience, and so that health care providers and community supports can enhance Indigenous women's transition through this life stage.

5.1 Recommendations

Given the findings of this literature review, several recommendations can be made to optimize the health and wellness of Indigenous women throughout the menopausal transition.

1. Equitable research

Provide equitable research opportunities for relatively small, qualitative studies that attempt to capture important nuances of menopause among Indigenous women, the knowledge of which creates a more balanced perspective from which to develop and implement culturally appropriate educational, instrumental and emotional supports.

2. Diverse teams

Establish multi-disciplinary teams of researchers, health care professionals, community organizations, and Indigenous women to ensure that multiple perspectives are represented in the development and implementation of self-care and support programs.

3. Local knowledge

Account for the local knowledge of the women themselves in approaches aimed at informing Indigenous women about the challenges and opportunities of menopause change. Health professionals, particularly those from outside communities, can enhance educational approaches by incorporating opportunities for women to share their experiences with one another. This practice not only acknowledges the subjectivity of this experience but also honours the tradition of story telling as a useful tool for learning.

4. Culturally appropriate

Implement culturally appropriate public health initiatives aimed at fostering health equity, especially by increasing opportunities for physical activity and the consumption of traditional foods, which have the potential to reduce bone loss and, therefore, the risk of osteoporosis and bone fractures in post-menopausal Indigenous women. Such initiatives may also help reduce the risk of breast cancer and adverse health issues associated with menopause, and improve the quality of Indigenous women's lives.

5. Tailor messaging

Tailor health promotion initiatives and interventions, and the ways in which they are implemented, to the specific needs of Indigenous women as they transition through menopause. There is a need for culturally appropriate health information about menopause, as well as options for addressing discomforts for Indigenous women.

6. Screening supports

Put in place supports so that post-menopausal Indigenous women can be routinely screened for bone mineral density as a preventive strategy for osteoporosis and bone fractures.

7. Traditional approaches

Given the high prevalence of diabetes among Indigenous women, a diabetes diagnosis should be considered in physician's decisions to prescribe HRT and there may be a need to advocate for more traditional approaches.



REFERENCES



- Adams, J.D., & Garcia, C. (2006). Women's health among the Chumash. *Evidence-based Complementary and Alternative Medicine*, 3(1), 125-31.
- Adams, J.D., Garcia, C., & Garg, G. (2012). Mugwort (*Artemisia vulgaris*, *Artemisia douglasiana*, *Artemisia argyi*) in the treatment of menopause, premenstrual syndrome, dysmenorrhea and Attention Deficit Hyperactivity Disorder. *Chinese Medicine*, 3(3), Article ID 22705. DOI: 10.4236/cm.2012.33019
- Alfvén, T., Elinder, C.G., Carlsson, M.D., Grubb, A., Hellström, L., Persson, B., Pettersson, C. et al. (2000). Low-level cadmium exposure and osteoporosis. *Journal of Bone and Mineral Research*, 15(8), 1579-86.
- Banister, E.M. (2000). Women's midlife confusion: "Why am I feeling this way?" *Issues in Mental Health Nursing*, 21, 745-64.
- Bartow, S.A., Pathak, D.R., Mettler, F.A., Key, C.R., & Pike, M.C. (1995). Breast mammographic pattern: A concatenation of confounding and breast cancer risk factors. *American Journal of Epidemiology*, 142(8), 813-9.
- Browne, A.J., & Fiske, J.A., (2001). First Nations women's encounters with mainstream health care services. *Western Journal of Nursing Research*, 23(2), 126-147.
- Buck, M.M., & Gottlieb, L.N. (1991). The meaning of time: Mohawk women at midlife. *Health Care for Women International*, 12(1), 41-50.
- Carranza-Lira, S., Quiroz González, B.N., Alfaro Godinez, H.C., & May Can, A.M. (2012). Comparison of climacteric symptoms among women in Mexico City and women of a Mayan community of Yucatan. *Ginecología y Obstetricia de Mexico*, 80(10), 644-9.
- Castelo-Branco, C., Palacios, S., Mostajo, D., Tobar, C., & von Held, S. (2005). Menopausal transition in Movima women, a Bolivian native-American. *Maturitas*, 51(4), 380-5.
- Chadha, N., Chadha, V., Ross, S., & Sydora, B.C. (2016). Experience of menopause in Aboriginal women: A systematic review. *Climacteric*, 19(1), 17-26.
- Chlebowski, R.T., Chen, Z., Anderson, G.L., Rohan, T., Aragaki, A., Lane, D., Dolan, N.C. et al. (2005). Ethnicity and breast cancer: Factors influencing differences in incidence and outcome. *Journal of the National Cancer Institute*, 97(6), 439-48.
- Chung, D.-J., Kim, H.-Y., Park, K.-H., Jeong, K.-A., Lee, S.-K., Lee, Y.-I., Hur, S.-E., et al. (2007). Black cohosh and St. John's Wort (GYNO-Plus®) for climacteric symptoms. *Yonsei Medical Journal*, 48(2), 289-94.
- Côté, S., Ayotte, P., Dodin, S., Blanchet, C., Mulvad, G., Petersen, H.S., Gingras, S. et al. (2006). Plasma organochlorine concentrations and bone ultrasound measurements: A cross-sectional study in peri- and postmenopausal Inuit women from Greenland. *Environmental Health*, 5, 33.
- Côté, S., Dodin, S., Blanchet, C., Mulvad, G., Pedersen, H.S., Blanchet, C., Holub, B.J et al. (2004). Very high concentrations of n-3 fatty acids in peri- and postmenopausal Inuit women from Greenland. *International Journal of Circumpolar Health*, 63(Suppl 2), 298-301.
- Cowan, L.D., Go, O.T., Howard, B.V., Devereux, R.B., Pettitt, D.J., Fabsitz, R.R., Lee, E.T. et al. (1997). Parity, postmenopausal estrogen use, and cardiovascular disease risk factors in American Indian women: The Strong Heart Study. *Journal of Women's Health*, 6(4), 441-9.
- Davis, S.R., Knight, S., White, V., Claridge, C., Davis, B.J., & Bell, R. (2003). Climacteric symptoms among Indigenous Australian women and a model for the use of culturally relevant art in health promotion. *Menopause*, 10(4): 345-51.
- Dawson-Hughes, B., Heaney, R.P., Holick, M.F., Lips, P., Meunier, P.J., & Vieth, R. (2005). Estimates of optimal vitamin D status. *Osteoporosis International*, 16, 713-6.
- Eaton, S.B., Pike, M.C., Short, R.V., Lee, N.C., Trussell, J., Hatcher, R.A., Wood, J.W. et al. (1994). Women's reproductive cancers in evolutionary context. *The Quarterly Review of Biology*, 69(3), 353-67.
- El Hayek, J., Egeblad, G., & Weiler, H. (2011). Older age and lower adiposity predict better 25-hydroxy vitamin D concentration in Inuit adults: International Polar Year Inuit Health Survey, 2007-2008. *Archives of Osteoporosis*, 6(1-2), 167-77.
- El Hayek, J., Pronovost, A., Morin, S., Egeblad, G., & Weiler, H. (2012). Forearm bone mineral density varies as a function of adiposity in Inuit women 40-90 years of age during the vitamin D-synthesizing period. *Calcified Tissue International*, 90(5), 384-95.
- Evers, S.E., Orchard, J.W., & Haddad, R.G. (1985). Bone density in postmenopausal North American Indian and Caucasian females. *Human Biology*, 57(4), 719-26.
- Freeman, E. W., & Sherif, K. (2007). Prevalence of hot flushes and night sweats around the world: A systematic review. *Climacteric*, 10(3), 197-214
- Halseth, R. (2015). *The nutritional health of the First Nations and Métis of the Northwest Territories: A review of current knowledge and gaps*. Prince George, BC: National Collaborating Centre for Aboriginal Health.

- Hayatbakhsh, M.R., Clavarino, A., Williams, G.M., Sina, M., & Najman, J.M. (2012). Cigarette smoking and age of menopause: A large prospective study. *Maturitas*, 72(4), 346-52. DOI: 10.1016/j.maturitas.2012.05.004.
- Huntley, A. (2004). The safety of black cohosh (*Actaea racemosa*, *Cimicifuga racemosa*). *Expert Opinion on Drug Safety*, 3(6), 615-23.
- Jamieson, J.A., Weiler, H.A., Kuhnlein, H.V., & Egeland, G.M. (2016). Prevalence of unexplained anaemia in Inuit men and Inuit post-menopausal women in northern Labrador: The International Polar Year Inuit Health Survey. *Canadian Journal of Public Health*, 107(1), e81-e87.
- Järup, L., & Åkesson, A. (2009). Current status of cadmium as an environmental health problem. *Toxicology and Applied Pharmacology*, 238(3), 201-8.
- Johnston, S.L. (2001). Associations with age at natural menopause in Blackfoot women. *American Journal of Human Biology*, 13(4), 512-20.
- Johnston, S.L. (2003). Menopause in Blackfoot women – A life span perspective. *Collegium Antropologicum*, 27(1), 57-66.
- Jones, E.K., Jurgenson, J.R., Katzenellenbogen, J.M., & Thompson, S.C. (2012). Menopause and the influence of culture: Another gap for Indigenous Australian women? *BMC Women's Health*, 12, 43. DOI: 10.1186/1472-6874-12-43
- Jurgenson, J.R., Jones, E.K., Haynes, E., Green, C., & Thompson, S.C. (2014). Exploring Aboriginal women's experiences of menopause: A descriptive study. *BMC Women's Health*, 14, 47. DOI:10.1186/1472-6874-14-47
- Kang, H.J., Ansbacher, R., & Hammoud, M.M. (2002). Use of alternative and complementary medicine in menopause. *International Journal of Gynecology & Obstetrics*, 79(3), 195-207.
- Kuhnlein, H.V., & Receveur, O. (2007). Local cultural animal food contributes high levels of nutrients for Arctic Canadian Indigenous adults and children. *The Journal of Nutrition*, 137, 1110-4.
- Larsen, P., Kronenberg, H., Melmed, S., & Polonsky, K. (2002). *William's textbook of endocrinology* (10th ed.). Philadelphia, PA: Saunders.
- Lawton, B.A., Rose, S.B., Cormack, D.M., Stanley, J., & Dowell, A.C. (2008). The menopause symptom profile of Maori and non-Maori women in New Zealand. *Climacteric*, 11(6), 467-74.
- Leipert, B.D., & Reutter, L. (2005). Developing resilience: How women maintain their health in northern geographically isolated settings. *Qualitative Health Research*, 15(1), 49-65.
- Leslie, W.D., Derksen, S., Metge, C., Lix, L.M., Salamon, E.A., Wood Steiman, P., & Roos, L.L. (2004). Fracture risk among First Nations people: A retrospective matched cohort study. *Canadian Medical Association Journal*, 171(8), 869-73.
- Leslie, W.D., Derksen, S.A., Metge, C., Lix, L.M., Salamon, E.A., Wood Steiman, P., & Roos, L.L. (2005). Demographic risk factors for fracture in First Nations people. *Canadian Journal of Public Health*, 96(S1), S45-50.
- Leslie, W.D., Derksen, S., Prior, H.J., Lix, L.M., Metge, C., & O'Neil, J. (2006a). The interaction of ethnicity and chronic disease as risk factors for osteoporotic fractures: A comparison in Canadian Aboriginals and non-Aboriginals. *Osteoporosis International*, 17, 1358-68.
- Leslie, W.D., Metge, C.J., Weiler, H.A., Doupe, M., Wood Steiman, P., & O'Neil, J.D. (2006b). Bone density and bone area in Canadian Aboriginal women: The First Nations Bone Health Study. *Osteoporosis International*, 17, 1755-62. DOI: 10.1007/s00198-006-0184-0
- Leslie, W.D., Weiler, H.A., Lix, L.M., & Nyomba, B.L.G. (2008). Body composition and bone density in Canadian White and Aboriginal women: The First Nations Bone Health Study. *Bone*, 42, 990-95.
- Lock, E., Waagbo, R., Wendelaar Bonga, S., & Flik, G. (2010). The significance of vitamin D for fish: A review. *Aquaculture Nutrition*, 16(1), 100-116.
- Loppie, C. (1997). *The climacterium: Women's attitudes, sources of information and experience*. Halifax, NS: Unpublished Master's thesis, Dalhousie University.
- Loppie, C.J. (2004). *Grandmothers' voices: Mi'kmaq women and menopause*. Halifax, NS: Unpublished PhD, Dalhousie University.
- Loppie, C.J. (2005). Grandmothers' voices: Mi'kmaq women's vision of mid-life change. *Pimatisiwin: A Journal of Aboriginal and Indigenous Community Health*, 3(2), 45-78.
- Low Dog, T. (2005). Menopause: A review of botanical dietary supplements. *The American Journal of Medicine*, 118(12B), 98S-108S.
- Lupu, R., Mehmi, I., Atlas, E., Tsai, M.-S., Pisha, E., Oketch-Rabah, H.A., Nuntanakorn, P., Kennelly, E.J., & Kronenberg, F. (2003). Black cohosh, a menopausal remedy, does not have estrogenic activity and does not promote breast cancer cell growth. *International Journal of Oncology*, 23(5), 1407-12.
- Lynch, C.P., McTigue, K.M., Bost, J.E., Tinker, L.F., Vitolins, M., Adams-Campbell, L., Sarto, G.E., et al. (2010). Excess weight and physical health-related quality of life in postmenopausal women of diverse racial/ethnic backgrounds. *Journal of Women's Health*, 19(8), 1449-58.
- MacDonald, D.B., & Hudson, G. (2012). The genocide question and Indian residential schools in Canada. *Canadian Journal of Political Science*, 45(2), 427-449.
- MacDonald, M.E., Rigilio, N., & Brassard, P. (2010). Urban Aboriginal understandings and experiences of tuberculosis in Montreal, Quebec, Canada. *Qualitative Health Research*, 20(4), 506-523.
- Madden, S., St. Pierre-Hansen, N., Kelly, L., Cromarty, H., Linkewich, B., & Payne, L. (2010). First Nations women's knowledge of menopause: Experiences and perspectives. *Canadian Family Physician*, 56(9), e331-7.
- Martin, M.C., Block, J.E., Sanchez, S.D., Arnaud, C.D., & Beyene, Y. (1993). Menopause without symptoms: The endocrinology of menopause among rural Mayan Indians. *American Journal of Obstetrics & Gynecology*, 168(6), 1839-43.
- Mayo Clinic Staff. (2016a). Menopause. Retrieved July 18, 2016 from <http://www.mayoclinic.org/diseases-conditions/menopause/basics/definition/con-20019726>

- Mayo Clinic Staff. (2016b). Perimenopause. Retrieved July 18, 2016 from <http://www.mayoclinic.org/diseases-conditions/perimenopause/basics/definition/con-20029473>
- McBride, K.L. (2015). Non-hormonal treatments for the menopause. *InnovAiT*, 8(4), 213-221.
- McKenzie, F., Ellison-Loschmann, L., Jeffreys, M., Firestone, R., Pearce, N., & Romieu, I. (2014). Healthy lifestyle and risk of breast cancer for indigenous and non-indigenous women in New Zealand: A case control study. *BMC Cancer*, 14, 12. DOI: 10.1186/1471-2407-14-12
- Meadows, L.M., Thurston, W.E., & Lagendyk, L.E. (2004). Aboriginal women at midlife: Grandmothers as agents of social change. *Canadian Women's Studies*, 24(1), 159-65.
- MedicineNet. (2016a). Definition of estrogen. Retrieved July 18, 2016 from <http://www.medicinenet.com/script/main/art.asp?articlekey=3329>
- MedicineNet. (2016b). Definition of progesterone. Retrieved July 18, 2016 from <http://www.medicinenet.com/script/main/art.asp?articlekey=5060>
- MedicineNet. (2016c). Definition of surgical menopause. Retrieved July 18, 2016 from <http://www.medicinenet.com/script/main/art.asp?articlekey=8952>
- Meissner, H.O., Kapczynski, W., Mscisz, A., & Lutomski, J. (2005). Use of gelatinized maca (*Lepidium Peruvianum*) in early postmenopausal women. *International Journal of Biomedical Science*, 1(1), 33-45.
- Michel, J.L., Mahady, G.B., Veliz, M., Soejarto, D.D., & Caceres, A. (2006). Symptoms, attitudes and treatment choices surrounding menopause among the Q'eqchi Maya of Livingston, Guatemala. *Social Science & Medicine*, 63(3), 732-42.
- Mingo, C., Herman, C.J., & Jasperse, M. (2000). Women's stories: Ethnic variations in women's attitudes and experiences of menopause, hysterectomy, and hormone replacement therapy. *Journal of Women's Health & Gender-based Medicine*, 9, S27-S38.
- Monterrosa, A., Blümel, J.E., Chedraui, P., Gomez, P., Gomez, B., & Valdez, C. (2009). Quality of life impairment among postmenopausal women varies according to race. *Gynecological Endocrinology*, 25(8), 491-97.
- Monterrosa-Castro, A., Marrugo-Flórez, M., Romero-Pérez, I., Chedraui, P., Fernández-Alonzo, A.M., & Pérez-López, F.R. (2013). Prevalence of insomnia and related factors in a large mid-aged female Colombia sample. *Maturitas*, 74(4), 346-51.
- National Collaborating Centre for Aboriginal Health. [NCCAHA]. (2012). *State of knowledge of Aboriginal health: A review of Aboriginal public health in Canada*. Prince George, BC: Author.
- Northrup, C. (2012). *The wisdom of menopause: The complete guide to physical and emotional health during the change*. New York: Random House.
- Ohta, H., Masuzawa, T., Ikeda, T., Suda, Y., Makita, K., & Nozawa, S. (1992). Which is more osteoporosis-inducing, menopause or oophorectomy? *Bone Miner*, 19(3), 273-85.
- Ojeda, E., Monterrosa, A., Blümel, J.E., Escobar-López, J., & Chedraui, P. (2011). Severe menopausal symptoms in mid-aged Latin American women can be related to their Indigenous ethnic component. *Climacteric*, 14(1), 157-63. DOI:10.3109/13697130903576297
- Osteoporosis and Related Bone Diseases National Resource Center. (n.d). Building Strong Bones for Life, pamphlet.
- Palacios, S., Henderson, V.W., Siseles, N., Tan, D., & Villaseca, P. (2010). Age of menopause and impact of climacteric symptoms by geographical region. *Climacteric*, 13(5), 419-28. DOI: 10.3109/13697137.2010.507886.
- Papps, F.A. (2000). Therapeutic use and associated biochemistry of *Cimicifuga racemosa* in the treatment of menopausal symptoms. *Australian Journal of Medical Herbalism*, 12(1), 22-6.
- Paunescu, A.C., Ayotte, P., Dewailly, E., & Dodin, S. (2013b). Dioxin-like compounds are not associated with bone strength measured by ultrasonography in Inuit women from Nunavik (Canada): Results of a cross-sectional study. *International Journal of Circumpolar Health*, 72, 20843.
- Paunescu, A.C., Ayotte, P., Dewailly, E., Dodin, S., Pedersen, H.S., Mulvad, G., & Côté, S. (2013c). Polyunsaturated fatty acids and calcaneal ultrasound parameters among Inuit women from Nuuk (Greenland): A longitudinal study. *International Journal of Circumpolar Health*, 72, 10.3402/ijch.v72i0.20988.
- Paunescu, A.C., Ayotte, P., Dewailly, E., & Dodin, S. (2014). Saturated and monounsaturated fatty acid status is associated with bone strength estimated by calcaneal ultrasonography in Inuit women from Nunavik (Canada): A cross-sectional study. *Journal of Nutrition Health & Aging*, 18(7), 1-9.
- Paunescu, A.C., Dewailly, E., Dodin, S., Nieboer, E., & Ayotte, P. (2013a). Dioxin-like compounds and bone quality in Cree women of Eastern James Bay (Canada): A cross-sectional study. *Environmental Health*, 12, 54.
- Perry, H.M., Bernard, M., Horowitz, M., Miller, D.K., Fleming, S., Baker, M.Z., Flaherty, J. et al. (1998a). The effect of aging on bone mineral metabolism and bone mass in Native American women. *Journal of the American Geriatric Society*, 46(11), 1418-22.
- Perry, H.M., Bernard, M., Horowitz, M., Miller, D.K., Fleming, S., Baker, M., et al. (1998b). Aging and bone loss in Native American women. *Journal of American Geriatric Society*, 46, 1418-22.
- Phillips, F. (2009). Maintaining healthy bones. *Practice Nurse*, 37(8), 14.
- Printz, C. (2014). Breast cancer risk associated with HRT varies. *Cancer*, 120(3), 315-315.
- Rahal, A., Kumar, A., Chakraborty, S., Tiwari, R., Latheef, S.K., & Dhama, K. (2013). Cimicifuga: A revisiting Indigenous herb with multi-utility benefits for safeguarding human health – a review. *International Journal of Agronomy and Plant Production*, 4(7), 1590-1601.
- Reading, C., & Wien, F. (2013). *Health inequalities and the social determinants of Aboriginal peoples' health*. Prince George, BC: National Collaborating Centre for Aboriginal Health.

- Redwood, D.G., Lanier, A.P., Johnston, J.M., Murphy, N., & Murtaugh, M.A. (2012). Reproductive cancer risk factors among Alaska Native women: The Alaska Education and Research Towards Health (EARTH) Study. *Women's Health Issues*, 22(4), e387-93.
- Rees, M. (2009). Alternative treatments for the menopause. *Best Practices Research in Clinical Obstetric Gynaecology*, 23(1), 151-61. DOI: 10.1016/j.bpobgyn.2008.10.006.
- Rignell-Hydbom, A., Skerfving, S., Lundh, T., Lindh, C.H., Elmståhl, S., Bjellerup, P., Jönsson, B.A.G. et al. (2009). Exposure to cadmium and persistent organochlorine pollutants and its association with bone mineral density and markers of bone metabolism on postmenopausal women. *Environmental Research*, 109(8), 991-6.
- Roubidoux, M.A., Kaur, J.S., Griffith, K.A., Sloan, J., Wilson, C., Novotny, P. et al. (2003). Correlates of mammogram density in southwestern Native-American women. *Cancer Epidemiology Biomarkers & Prevention*, 12(6), 552-8.
- Schindler, A.E. (2006). Climacteric symptoms and hormones. *Gynecological Endocrinology*, 22(3), 151-4.
- Sinclair, K.P. (1992). A study in pride and prejudice: Maori women at midlife. In V. Kernes & J.K. Brown (eds.), *In her prime: New views of middle-aged women*, 2nd Ed. (pp. 113-37). Champaign, ILL: University of Illinois Press.
- Slattery, M.L., Edwards, S., Murtaugh, M.A., Sweeney, C., Herrick, J., Byers, T., Guiliano, A.R. et al. (2007). Physical activity and breast cancer risk among women in the southwestern United States. *Annals of Epidemiology*, 17(5), 342-53.
- Smith, W.R. [2015]. *The 2011 National Household Survey – the complete statistical story*. Ottawa, ON: Statistics Canada.
- Stark, K.D., Mulvad, G., Pedersen, H.S., Park, E.J., Dewailly, E., & Holub, B.J. (2002). Fatty acid compositions of serum phospholipids of postmenopausal women: A comparison between Greenland Inuit and Canadians before and after supplementation with fish oil. *Nutrition*, 18(7/8), 627-30.
- Statistics Canada. (2006). *2006 Census, data tables*. Ottawa, ON: Statistics Canada, Catalogue #97-558-X2006002.
- Statistics Canada. (2009). Bone health: Osteoporosis, calcium and vitamin D. Ottawa, ON: Statistics Canada, Catalogue # 82-003-x.
- Statistics Canada. (2017a). Aboriginal identity (9), Dwelling Condition (4), Registered or Treaty Indian Status (3), Age (12) and Sex (3) for the population in private households of Canada, provinces and territories, census metropolitan areas and census agglomerations, 2016 Census – 25% sample data. *Data Tables, 2016 Census*. Ottawa, ON: Author. Retrieved February 14, 2018 from <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=110521&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=122&VID=0&VNAMEE=&VNAMEF=>
- Statistics Canada. (2017b). Aboriginal identity (8), Condition of Dwelling (4), Number of Persons per Room (5), Housing Suitability (6), Registered or Treaty Indian Status (3), Age Groups (10) and Sex (3) for the population in private households of Canada, provinces, territories, census metropolitan areas and census agglomerations. *2011 National Household Survey: Data tables*. Ottawa, ON: Author. Retrieved February 14, 2018 from <http://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/dt-td/Rp-eng.cfm?TABID=4&LANG=E&A=R&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=01&GL=-1&GID=1118296&GK=1&GRP=1&O=D&PID=107559&PRID=0&PTYPE=105277&S=0&SHOWALL=0&SUB=0&Temporal=2013&THEME=94&VID=0&VNAMEE=&VNAMEF=&D1=0&D2=0&D3=0&D4=7&D5=2&D6=0>
- Stern, P.R., & Condon, R.G. (1995). Puberty, pregnancy, and menopause: Lifecycle acculturation in a Copper Inuit community. *Arctic Medical Research*, 54(1), 21-31.
- Tang, S.Y., & Browne, A.J. (2008). 'Race' matters: Rationalization and egalitarian discourses involving Aboriginal people in the Canadian health care context. *Ethnicity & Health*, 13(2), 109-27.
- Thomson, J. (1992). The challenge of menopause education in isolation. *Journal of the Royal Society for the Promotion of Health*, 112, 179-82.
- Vahter, M., Berglund, M., & Akesson, A. (2004). Toxic metals and the menopause. *Journal of the British Menopause Society*, 10(2), 60-5.
- Webster, R.W. (2002). Aboriginal women and menopause. *Journal of Obstetrics, Gynecology, and Reproductive Sciences*, 24(12), 938-40.
- Weiler, H.A., Leslie, W.D., & Bernstein, C.N. (2008). Parathyroid hormone is predictive of low bone mass in Canadian Aboriginal and white women. *Bone*, 42, 498-504.
- Weiler, H.A., Leslie, W.D., Krahn, J., Wood Steiman, P., & Metge, C.J. (2007). Canadian Aboriginal women have a higher prevalence of vitamin D deficiency than non-Aboriginal women despite similar dietary vitamin D intakes. *Journal of Nutrition*, 137(2), 461-65.
- Wikipedia. (2015). Calcifediol, <https://en.wikipedia.org/wiki/Calcifediol>
- Wilson, K., Rosenberg, M.W., & Abonyi, S. (2011). Aboriginal peoples, health and healing approaches: The effects of age and place on health. *Social Science & Medicine*, 72, 355-64.
- Wise, J. (2016). Combined HRT may raise breast cancer risk, study finds. *BMJ (Clinical Research Ed.)*, 354, i4612
- Wuttke, W., Jarry, H., Haunschild, J., Stecher, G., Schuh, M., & Seidlova-Wuttke, D. (2014). The non-estrogenic alternative for the treatment of climacteric complaints: Black cohosh (*Cimicifuga* or *Actaea racemosa*). *The Journal of Steroid Biochemistry and Molecular Biology*, 139, 302-10.
- Zhang, Y., Howard, B.V., Cowan, L.D., Yeh, J., Schaefer, C.F., Wild, R.A., Wang, W. et al. (2002). The effect of estrogen use on levels of glucose and insulin and the risk of Type 2 diabetes in American Indian postmenopausal women. *Diabetes Care*, 25(3), 500-4.

APPENDIX 1

Publication	Menopause topic	Methodology
Webster (2002)	Characteristics of menopause; knowledge/experiences/perspectives	Literature review
Banister (2000)	Knowledge/experiences/perspectives	Ethnographic study
Buck & Gottlieb (1991)	Knowledge/experiences/perspectives	Qualitative study – interviews
Chadha et al. (2016)	Knowledge/experiences/perspectives	Systematic review
Loppie (1997)	Knowledge/experiences/perspectives	Qualitative study – interviews/focus groups
Loppie (2004)	Knowledge/experiences/Perspectives; Implications for programs/services	Qualitative study – participatory model/focus groups
Loppie (2005)	Knowledge/experiences/perspectives	Qualitative study – participatory model/focus groups
Madden et al. (2010)	Knowledge/experiences/perspectives	Qualitative study - interviews
Meadows et al. (2004)	Knowledge/experiences/perspectives	Qualitative study – ethnography; group and individual interviews
Stern, & Condon (1995)	Implications for programs/services	Methodology uncertain – only abstract available
El Hayek et al. (2012)	Associated health outcome	Quantitative/qualitative – questionnaire, anthropometric measurements and laboratory testing of samples
Evers et al. (1985)	Associated health outcome	Quantitative and qualitative – interviews, physical measurements; statistical analysis techniques
Jamieson et al. (2016)	Associated health outcome	Cross-sectional survey, lab testing
Leslie et al. (2006a)	Associated health outcome	Quantitative/qualitative – questionnaires, physical measurements; statistical analysis techniques
Leslie et al. (2006b)	Associated health outcome	Retrospective, population-based matched cohort study using Manitoba administrative data
Leslie et al. (2004)	Associated health outcome	Quantitative using Manitoba administrative data
Leslie et al. (2005)	Associated health outcome	Retrospective, population-based matched cohort study using Manitoba administrative health data
Paunescu et al. (2013a)	Associated health outcome	Laboratory testing for concentrations of dioxins in blood plasma
Paunescu et al. (2013b)	Associated health outcome	Laboratory testing for concentrations of dioxins in blood plasma
Weiler, Leslie, & Bernstein (2008)	Associated health outcomes	Laboratory testing of serum biomarkers
Paunescu et al. (2014)	Associated health outcome	Cross-sectional descriptive study; multiple linear regression used to explore associations. Bone measures and qualitative survey techniques
Lix, Metge, & Leslie (2009)	Associated health outcome	Qualitative research methodology – questionnaire; confirmatory factor analysis techniques to test hypotheses



