



Oral Health Through the Gender Lens: Does Sex Matter?

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Oral Health Through the Gender Lens: Does Sex Matter?



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Why, in 2005, do we need to start talking about health – and oral health – in the context of sex and gender? There is a growing body of literature that tells us that there are marked differences in the way men and women encounter, relate to and interact with the health-care system.

During the 1960s and 70s, the feminist movement highlighted gender-related concerns and inequities in many areas, and brought into focus women's health issues. As a result, women's health issues have emerged and been recognized over the last several decades. However, it was the report published by the Institute of Medicine in 2001,¹ which considered the biological contributions to human health and asked the question: "Does Sex Matter?", thereby raising general awareness about the role of sex and gender in health.

It is now known that many normal physiological functions, as well as pathological functions, are influenced by sex-based differences in biology.¹ Recent research related to gene activity in the X chromosome has shown extensive variation in the pattern of gene expression that is completely unique to women. This is a potential explanatory factor, entirely separate from hormonal factors, in sex-specific traits in complex diseases.² Biologists and medical researchers across all disciplines now believe that every organ in the body has the ability to respond differently on the basis of sex.¹

We have known for some time that there is a relationship between hormonal influences throughout the life span of a women and oral health, and there is anecdotal evidence that a number of orofacial disorders are more prevalent in women. Given the rapidly accumulating evidence in the basic sciences, the behavioural sciences, and from health care services research about the differences between men and women that are *non hormonal* and *not related* to reproductive biology, it follows that research in oral health should pay greater attention to sex differences than is currently the case. This is especially true as we consider the potential bidirectional relationship between oral health and systemic health. This paper will highlight some of what is known about the effects of sex and gender on systemic health; historical influences and current public policy in the development of gender-based medicine; the role of hormonal factors in oral health; and the need for a focus on women's oral health.

Systemic Health: Men Are From Mars, Women Are From Venus

A number of research findings, across a broad spectrum of diseases, have shown that sex and gender differences in health and the delivery of health care are more pervasive than ever imagined in the past.¹ One of the strongest areas of research to date has been in the field of cardiovascular diseases. Until recently, cardiovascular disease (CVD) was thought to be a “man’s disease” even though CVD is the leading killer of American women. In 2000, nearly twice as many American women died of heart disease than from all types of cancer combined, including breast cancer.³ Each year, more women than men die of cardiovascular disease.³ Women under the age of 50 who have a heart attack have nearly twice the death rate during hospitalization than do men of the same age,⁴ and those under 60 years of age who survive hospitalization for heart failure have a higher mortality rate than men.⁵ Cardiac arrest is about three times greater in men than in women; however, women have lower recovery and survival rates than men.⁶ Men and women also differ in symptoms for both heart attack and stroke, with women having more atypical and fewer of the classical symptoms for both diseases.^{7, 8} Sex differences in acute presentation may lead to delayed triage in the emergency department, evaluation and institution of appropriate therapy, and differential management.⁸ Women with cardiovascular disease are less likely to receive standard diagnostic tests or therapy than men, including electrocardiogram during acute chest pain,⁹ cardiac catheterization;¹⁰ anticoagulants for atrial fibrillation;¹¹ and “clot-busting” thrombolytic drugs and invasive cardiac procedures.¹² Women are 35% less likely to undergo coronary bypass surgery when compared to men, and women experience peri-operative neurological complications such as stroke more often than men.¹³

Many other diseases also show marked sex related differences. Women are two to three times more likely than men to suffer from depression¹⁴ related partly to differences in serotonin levels, but influenced to a large degree by social factors experienced by women. As caregivers to children and elderly parents, women often do “double shifts” at home and at work, sometimes in the context of poverty and family violence.¹⁵

Alzheimer’s disease is more common in women than in men and there appear to be sex specific differences in the pattern of brain changes related to Alzheimer’s disease.¹⁶

Women with HIV infection experience more rapid declines in CD4 cell counts over time than do their male counterparts; however, newly infected women have a significantly lower HIV viral load in the blood than men at the same stage of disease, but still progress to AIDS at a similar rate.¹⁷ Treatment recommendations that are

based on viral load rather than on CD4 counts exclude many women from therapy, despite having a similar disease stage to their male counterparts.¹⁷

Women are 2.7 times more likely than men to acquire an autoimmune disease, with the most striking sex differences observed in Sjögren's syndrome, autoimmune thyroid disease and scleroderma – a spectrum of diseases in which the population of women is more than 80%.¹⁸ Similarly, in multiple sclerosis, myasthenia gravis and rheumatoid arthritis, the sex distribution is 60 to 75% women.¹⁸

Men and women respond to a number of drugs differently. In the United States, eight of the 10 prescription drugs withdrawn from the market between 1997 and 2001 posed greater health risks for women than for man because of “physiological differences that make women differentially more susceptible to some drug related health risks.”¹⁹ Four previously approved potassium-channel blockers were withdrawn by the US Food and Drug Administration (FDA) in the late 90s because women had a much greater risk for developing ventricular arrhythmias in response to these drugs.¹⁹

Viewing Health Care Through the Gender Lens

Known differences in the metabolism, efficacy and safety of drugs is quite alarming when one considers the fact that until recently, women were systematically excluded from many drug trials. This was, to a large extent, the fallout from two medical disasters – thalidomide in the 1950s and early 60s; and the 1970s research, which revealed that the daughters of women who had taken diethylstilbestrol during pregnancy had an increased incidence of vaginal cancer. As a result, government agencies, the pharmaceutical industry, researchers, and the public-at-large concluded that women who could become pregnant were not appropriate subjects for clinical trials. This led to guidelines for exclusion of women as research subjects.

Unfortunately, most of the phase 1 teratogenicity studies were not completed until after phase 2 and phase 3 clinical trials were underway. As a result, the guidelines for conduct of clinical research effectively barred women from most phase 2 and 3 clinical trials.

Throughout the 1980s and early 90s it became apparent that a lack of research focus on women's health issues compromised the quality of health information available to women, as well as the health care they received. In 1997, the FDA *Modernization Act* required the inclusion of women and minorities in clinical trials.²⁰

Health Canada has been actively promoting women's health since the early 1990s. The Bureau of Women's Health and Gender Analysis²¹ was established in 1993 and is

guided by Health Canada's Women's Health Strategy,²² developed in 1999. The Strategy has four main objectives:

Objective 1: To ensure that Health Canada's policies and programs are responsive to sex and gender differences and to women's health needs

Objective 2: To increase knowledge and understanding of women's health and women's health needs

Objective 3: To support the provision of effective health services to women

Objective 4: To promote good health through preventive measures and the reduction of risk factors that most imperil the health of women

Despite these policy changes, a significant number of medical research studies still exclude female participants. In addition, in those clinical trials that include women, only a quarter to a third of the studies perform a gender-based analysis to detect sex-related differences.²³⁻²⁵

Similarly, clinical studies in many areas of dentistry in the past have tended to focus on young healthy males, or have not included sex or gender as essential variables in designing, analyzing or reporting the results of studies. It may not be appropriate to extrapolate data derived from predominately male populations to guide oral health care for women.

A recently completed systematic review of clinical trails in the periodontology literature by our research group at Sunnybrook and Women's College Health Sciences Centre has shown that, despite the inclusion of women in periodontal research studies, gender-based data analysis from which inferences can be drawn is largely neglected and gender issues are rarely discussed (submitted paper).

Two historical types of gender bias in research were identified in the 1994 report from the Institute of Medicine, *Women and Health Research*.²⁵ The first type, *male norm bias*, as discussed above, is beginning to be addressed through public policy. In Canada, the creation of the Institute of Gender Health²⁶ by the Canadian Institute of Health Research (CIHR) and the partnership of the Women's Health Research Institute²⁷ with the Faculty of Medicine, University of Toronto, are two examples of the expansion of the research agenda for women's health issues.

The second form of bias, relates to the *male perspective*, a type of observer error bias caused by "adopting a male perspective and habit of thought..."²⁸ Research is shaped by the experience and point of view of the researcher. Because there are fewer women researchers (the majority of whom have been mentored by men), many research questions are asked and studies are designed by men from their male perspective.

“Science tries its best to be objective, but investigators conducting research have their own perspectives and inherent biases whether they admit to them or not. Science is biased by who gets to ask the questions and who determines what research will be funded. For decades, without women in leadership positions, questions about women’s health were not asked, and were not funded.”²⁸ Although there has been an increase in the number of women in research and leadership positions in the past decade,²⁹⁻³¹ all medical researchers – men and women – need to adopt the “gender lens” in terms looking at health-related problems and thinking about framing the research questions.

Oral Health: What Does Sex Have To Do With It?

One component of women’s health concerns conditions that are unique to women on the basis of reproductive biology. Hormonal fluctuations across the lifespan are associated with oral health and disease in women. Changes in the gingiva and oral tissues during menses, pregnancy, menopause, and in oral contraceptive users have been well documented.³²⁻³⁴

With the onset of *menses*, there may be marked increase in gingival inflammation in the ovulation and premenstrual phase.³⁵ Other oral manifestations may include activation of herpes labialis; aphthous ulcers; swollen salivary glands; and, there is evidence in the literature of increased bleeding after oral surgery.³⁶

Women using *oral contraceptives* may experience an exaggerated gingival inflammatory response. An increase in Prevotella species in the gingival micro flora has been demonstrated,³⁷ as well as measurable changes in salivary components, including decreased concentrations of protein, sialic acid, hydrogen and total electrolytes.³⁸ A two to three fold increase of localized osteitis after extraction of mandibular third molars has been reported in women taking oral contraceptives.³⁹

Pregnancy gingivitis is reported in 30 to 75% of pregnant women and ranges from mild to severe, with the severe form characterized by pain, spontaneous bleeding, and markedly erythematous tissues.³² It occurs from the second month of gestation and peaks at the eighth month. Hormonal, immune and vascular changes exaggerate the inflammatory response to bacterial plaque. The severity is reduced after childbirth, but the gingiva may not return to a state of health without aggressive therapy.³²

“*Pregnancy tumor*” is a benign hyperplastic gingival lesion with histological features identical to pyogenic granuloma.³⁴ It has a reported prevalence of 0.2 to 9.6%, and usually occurs at the second or third month, with the most frequent site being the maxillary anterior teeth.³⁴ There may be rapid growth which may be asymptomatic and which is not usually associated with osseous destruction. This lesion usually

resolves spontaneously after delivery, but more severe cases may require excision.

During *menopause*, many women report oral discomfort. This may include mucosal pain or “burning mouth,” altered taste perception and oral dryness.³² There is some suggestion that these symptoms may be relieved with hormone replacement therapy.⁴⁰ Oral mucosal changes range from atrophic pale tissues to gingivostomatitis characterized by dry, shiny erythematous gingiva which bleed easily.³²

In addition to hormonal influences on oral health, there are other orofacial conditions which affect women because of their sex and/or gender. Many of the autoimmune disorders, which often have serious oral manifestations, and all types of non-dental orofacial pain, including TMJ pain, have been reported to be more prevalent in women.⁴¹ It is known that domestic violence is a significant, but under reported cause of maxillofacial trauma, chronic orofacial pain, and temporomandibular joint dysfunction,⁴²⁻⁴⁴ but there is a paucity of research reported in the dental literature in terms of screening or interventional strategies.⁴⁵

The Need for a Focus on Women’s Oral Health

At the outset, this paper asked why we need to talk about women’s oral health. Much of what we know about women and oral health relates to reproductive biology. The lessons learned in medicine must be applied to oral health: sex and gender issues are pervasive through all disease entities and in all aspects of health care.

There are a number of areas where greater understanding of these differences may have a profound impact on the way we care for our patients. For example, the following questions should be investigated:

- How does being female affects the pathogenesis of major oral diseases and the effectiveness of therapies?
- What is the relationship of gender to the association between periodontitis and other oral disorders and systemic disease?
- What is the impact of hormone replacement therapy on oral diseases and therapy?
- What is the role of osteoporosis as it relates to prevalence, incidence, severity and progression of periodontal disease?
- How does gender affect the dentist-patient interaction and potential differences in treatment decisions?
- What is the effect of dentist gender on dental education and research?

Conclusion

The expanding research agenda in women's health and the rapidly increasing knowledge base surrounding the influence of sex and gender on many aspects of health, disease, and the delivery of health care, have important implications for dental research, education, and practice.

Women's health includes diseases that are unique to women, more prevalent in women or more serious among women, or conditions for which risk factors or interventions are different for women.

The women's health movement evolved from the recognition that in health, as in a number of other areas, women historically had been disadvantaged compared to men. The feminist movement sought equality for women in the workplace and in other social spheres. Arguably, many of the changes in society enabled by gender equality, including greater numbers of women in leadership positions and a more balanced sharing of family caregiver roles, have enhanced the lives of both men and women.

The recognition of gender bias in health research has led to widespread policy changes to address past inequities in health for women. Perhaps the most important achievement of the increased focus on the role of sex and gender on health and disease is the implication this has for both sexes. The future of sex- and gender-based health care will serve to highlight and clarify differences, to improve health for women and men, and for girls and boys.

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