

GENDER DISPARITIES IN DIAGNOSIS AND PAIN MANAGEMENT

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ABSTRACT

The proliferation of social media and other online forums has allowed female patients to share their experiences in the healthcare system. Female patients and women's health advocates can more easily speak out about instances of gender bias in medicine, which impact women's access to equitable healthcare and positive healthcare experiences. Although there are some medical studies addressing gender disparities in various aspects of medicine, the impacts of gender bias on healthcare remain understudied and poorly understood. Patient narratives therefore provide an essential insight into the state of gender bias in medicine today. This paper aims to explore these narratives for common themes, to determine whether the current medical literature supports the presence of gender-based disparities, and to highlight the biological, psychological, and sociocultural factors impacting any disparities. Patient narratives frequently cite frustrations with diagnostic errors or delays and inadequate pain management, and the medical literature generally supports women's accounts of gender disparities in these areas. Several studies of diagnostic disparities show that women more frequently experience delays in diagnosis, missed diagnoses, and incorrect psychiatric diagnoses. Multiple pain management studies have found that women face longer delays in care, lower rates of analgesic administration (particularly opiates), and fewer referrals for nonpharmacologic management strategies. Explanations for these disparities are likely multifactorial, and include provider ignorance of female-specific presentations and diseases, prevalence of understudied diseases in women, misattribution of symptoms to psychogenic causes, communication differences, normalization of female pain, and misconceptions about pain tolerance.

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CHAPTER 1: INTRODUCTION

A modern day medical student studying pathology in female patients would be unlikely to find an explanation such as “resentment of motherhood” for a symptom as commonplace as nausea in pregnancy. For a student in the 1970s and earlier, however, such explanations for female illnesses were commonplace. Women with unexplained or misunderstood diseases were often conceptualized as “hysterical” by scholars, and medical textbooks attributed symptoms such as migraines, pregnancy-related complaints, and menstrual cramps to rejections of femininity, personality disorders, immaturity, or resentment of motherhood (Kempner, 2014; Munch, 2004). Female emotional frailty resulting from reproductive biology was assumed to be the cause of poorly understood physical symptoms, leading to frequent erroneous psychiatric diagnoses in women during this era. Furthermore, genuine psychiatric illnesses were misunderstood and falsely linked to female anatomy, leading to misdiagnosis of common ailments such as depression and anxiety (Tasca, Rapetti, Carta & Fadda, 2012). Fortunately, second-wave feminist activists and scholars challenged the social constructs that were driving these unsubstantiated practices (Munch, 2004). These groups identified that sex and gender bias, which was being confronted in the workplace and elsewhere in society, had seeped into the medical profession’s treatment of female patients. Despite the limited empirical evidence to support the presence of gender bias in medicine at the time, in large part because it wasn’t considered worthy of study, there was agreement among many medical professionals and activists that mismanagement and misdiagnosis of women was commonplace. Their agreement was largely based on anecdotal evidence from providers, activists, and patients citing their experiences with gender bias (Munch, 2004). Due to the

work carried out by second-wave feminists and scholars who heeded these anecdotal accounts, much of the language referencing hysteria and similar psychogenic descriptors of female symptoms has been eliminated from the current medical literature (Munch, 2004; Tasca et al., 2012). Diagnostic practices based on explicit gender stereotypes largely fell out of favor in lieu of empirical evidence of pathophysiology which had previously been misunderstood, under-researched, or poorly implemented into general practice (Munch, 2004). “Hysterical neurosis” was eliminated from the DSM-III in 1980, and some of the symptoms previously attributed to female reproductive biology and hysteria were later understood to represent conditions affecting men and women, such as conversion disorders, depression, anxiety, and migraines (Kempner, 2014; Tasca et al., 2012).

Today’s medical students are less likely to encounter such outdated and sexist terminology during their studies; at least not in print. Institutions such as the National Institutes of Health (NIH) have continually renewed their commitment to supporting female-specific and female-inclusive studies, and the subsequent research has broadened the medical field’s understanding of female diseases and presentations (Hamberg, 2008; Including Women and Minorities, n.d., National Institutes of Health, 2017). Despite this progress, however, some healthcare professionals and activists remain unconvinced that gender bias has been effectively addressed in patient care, reporting that the view of women as hypochondriacal or hysterical still pervades medical care, as does women’s fears of being perceived this way by doctors and nurses (Adler, 2017; Dador, 2011; Mickle, 2017; O’Connor, 2013; Singh, 2015). Women across the United States and throughout the world continue to share stories of instances where they felt that their care

was suboptimal, and some believe that gender bias was partly or wholly to blame. The proliferation of social media and other online platforms has given these patients multiple avenues to share their stories, and for activists and writers to speak out on their behalf. Anecdotal accounts of perceived gender bias in medicine can be found everywhere from personal blogs to the New York Times. These women were seen in medical environments ranging from inpatient hospital care and emergency departments (EDs) to outpatient primary care settings. Their stories encompass many disease states, from acute presentations such as myocardial infarction to chronic symptoms and illnesses (Anderson, 2016; Digh, 2016; Edwards, 2013; Parker & Williams-Hauwanga, 2017; Thomas, 2013).

Women's stories about their unfavorable experiences with the healthcare system deserve attention and reflection from the medical community; as researchers and activists in the 1970s realized, they can indicate serious underlying problems in patient care practices (Munch, 2004). Establishing a more comprehensive understanding of female patient experiences and gender bias will be essential as healthcare systems continually change. Hospitals cannot afford any disparate impact of gender bias on efficiency and patient outcomes as these metrics become increasingly important for hospital reimbursement. Furthermore, medical ethics standards emphasize equity of care for all patients regardless of gender or sex and, in light of continued reports of mistreatment by female patients, require healthcare systems to reexamine whether they are meeting this goal. To examine the state of gender equity in patient care, this paper explores the self-reports from women who have perceived gender bias, the corresponding literature on sex and gender disparities in diagnosis and pain management, and the biological,

psychological, and sociocultural factors that may impact women's access to equitable care.

Patient Narratives

I became interested in female patients' narratives related to gender bias after reading Elisabeth Finch's (2016) article for *Elle* where she discusses her decision to confront the doctor who had repeatedly dismissed her complaints, which were later diagnosed by another doctor as bone cancer. Had the author not scheduled an appointment with her former doctor about his misdiagnosis, gender bias, and the ways in which he effectively silenced her and minimized her experiences, he would have continued to believe that he had treated her effectively (Finch, 2016). This article highlighted the power of the patient narrative and the educational value in hearing the experiences of patients that are typically absent from the traditional peer-reviewed medical literature that most doctors devote their time to studying. While the medical literature has focused relatively little on gender bias in medicine, there is a plethora of online first and second-hand patient accounts available to doctors and other medical professionals who are interested in educating themselves about the biases that their patients face. Therefore, this paper utilizes both published, peer reviewed medical literature and online patient narratives to fully illustrate the effects of gender bias on patient experiences and outcomes.

Research into online patient narratives was achieved through general online search engine queries, using the keywords such as "gender bias in medicine", "misdiagnosis in women", "pain mismanagement in women", and "gender discrimination

in healthcare.” A non-comprehensive literature search into the peer-reviewed medical literature on gender bias in diagnosis and pain management was completed using PubMed and Google Scholar, using similar keyword searches. After a preliminary overview of the patient narratives, several topics were noted to be repeatedly addressed. Many women cited frustrations with delays or errors in diagnosis, symptoms being disbelieved or dismissed, and the perception that their symptoms were not taken seriously by their doctors. Two major themes were subsequently chosen for further analysis; diagnostic errors or delays, and mismanagement of symptoms, particularly pain.

CHAPTER 2: DISPARITIES IN DIAGNOSIS

A common theme emerging from many circulating patient narratives is the frustration with misdiagnosis and delayed diagnosis (Adler, 2017; Dwass, 2017; Fassler, 2015; Parker & Williams-Hauwanga, 2017; Pfeifer, 2015). Diagnostic errors and delays are phenomena that are ubiquitous to all patients (Wu et al., 2016). Diagnosis of rare diseases or injuries, or even atypical presentations of common diseases, can challenge even the most accomplished of diagnosticians, and it is impractical to expect a doctor or other healthcare professional to quickly and accurately diagnose their patients in one hundred percent of cases. However, it is reasonable and ethical for medical professionals to minimize the extent to which gender and sex-based biases cause or influence misdiagnosis and diagnostic delays. Patients should also reasonably expect that their doctors are aware of research regarding sex-based differences in patient presentation. Patient testimonials indicate that this goal is not always met during their encounters with healthcare professionals. There is a substantial subset of patient stories which propose that gender-stereotyping and ignorance of female-specific presentations and female-predominant diseases are contributing factors to diagnostic mistakes (Adler, 2017; Dwass, 2017; Parker & Williams-Hauwanga, 2017; Thomas, 2013).

For example, writer Emily Dwass (2017) discussed her experiences with delayed and missed diagnosis in the Los Angeles Times:

Although there have been no major studies on the misdiagnosis of nonmalignant brain tumors, women I've met in support groups said it took months or years before they received an accurate assessment — even though women are more than twice as likely as men to develop these kinds of noncancerous growths. In my case, it took four years and several doctors before I learned that I had a meningioma. . . . By then, the mass in

my skull had grown to be the size of a baseball, causing permanent problems and making surgery much more dangerous. (para 3)

Emily's story highlights that even when symptoms are suggestive of a disease that should align perfectly with doctors' epidemiological expectations, patients may still experience delays in diagnosis.

Other stories described practitioners who misdiagnosed patients by attributing their symptoms to non-pathological causes such as menstrual pain (Mickle, 2017; Parker 2017). One woman wrote:

I went to the ER a couple weeks after I had my gallbladder removed. I was in terrible pain, completely keeled over. My husband pretty much had to carry me into the ER and talk for me because I couldn't move. The doctor told me it was just cramps and sent me home. When the pain wouldn't go away, I went to a different urgent care. The doctor there did an MRI and found that a gallstone had actually been stuck and sealed in a bile duct. It required another surgery to remove it, and if I hadn't gone elsewhere it would have gotten much, much worse. (Parker, 2017, Section 28)

While these narratives may be dismissed as merely anecdotal misinterpretations of well-intentioned but imperfect doctors, with no proof of gender bias other than the patient's impression, there is also experimental evidence indicating that women face a higher burden of misdiagnosis and delayed diagnosis. For example, delays in diagnosis in men versus women was examined by endocrinology researchers and physicians Bleicken, Ventz, Quinkler and Hahner (2010) in their study of 216 patients with adrenal insufficiency. This rare disease had a high rate of delayed diagnosis and misdiagnosis for all patients, with just 15% of nonoperative patients receiving a correct diagnosis after their first visit to a physician for their symptoms. Only 47% of nonoperative patients were diagnosed within the first year of symptom onset, and 20% waited five years before

a diagnosis. Notably, women were diagnosed later than man, and were significantly more likely to be incorrectly diagnosed than men, with misdiagnosis rates at 79% and 46% respectively ($p < 0.001$). The authors postulated that women's symptoms appear to not be taken as seriously. These diagnostic failures have serious implications for patients' health. Not only do patients who face delays in diagnosis suffer longer from symptoms such as fatigue, muscle weakness, weight loss, headache, nausea, vomiting, diarrhea, etc., they also have greater anxiety and probable increased risk for development of chronic symptoms than patients who receive prompt diagnosis within three months of onset. These consequences disproportionately affect women, who typically suffer longer without a diagnosis (Bleicken et al., 2010).

In another example, physicians Hamberg, Risberg, Johansson, and Westman (2002) conducted a study where 239 intern physicians read clinical vignettes of a bus driver presenting with neck pain and a tense family situation. All aspects of the clinical history and presentation were the same in each vignette, except for gender. Despite the identical clinical presentation, non-specific and somatic diagnoses were significantly more common for female patients in the vignettes, as were requests for diagnostic support from physiotherapists and orthopedists. These findings indicate that doctors feel greater diagnostic uncertainty with female patients, even when they present the same as men (Hamberg et al., 2002). Additional research by Newman-Toker, Moy, Valente, Coffey, & Hines (2014) showed how misdiagnoses also disproportionately impact women in the ED in the case of stroke. In this analysis of 2,088 patients discharged from the ED with a probable misdiagnosis of stroke, male patients had 25% lower odds of misdiagnosis than women, putting women at increased risk of premature discharge from the hospital in this

potentially fatal and debilitating condition (OR 0.75 [0.68-0.82], $p < 0.001$) (Newman-Toker et al., 2014).

Cardiovascular disease, or CVD, is another condition where diagnostic failures disproportionately affect women. Over 85 million Americans have CVD. It is the leading cause of death in the United States, and more women die of CVD than men every year (Mozaffarian et al., 2014). The high prevalence of this deadly condition amplifies the inequities in the rates and methods of diagnosis, which have been explored in several studies. For example, a multi-center cohort study by Wu et al. (2016) of patients discharged from the hospital with a diagnosis of myocardial infarction found that men experiencing ST elevation myocardial infarctions were significantly less likely than women to be misdiagnosed on initial presentation, with an OR of 0.63, 95% CI (0.57-0.70) (Wu et al., 2016). Similarly, in a multi-center prospective trial of 10,689 patients with symptoms suggestive of acute cardiac ischemia, investigators found that women less than 55 years old had significantly greater odds (OR 6.7, 95% CI [1.4 to 32.5]) of not being hospitalized than age-matched men presenting with acute cardiac ischemia (Pope et al., 2000).

Some of the inequalities in diagnosis rates are related to genuine differences in pathophysiology between men and women. Women tend to have more single-vessel coronary artery disease (CAD), higher incidence of some of the rarer causes of CAD, and are more likely to present with nonobstructive CAD and more diffuse disease (Mehta et al., 2016). As a result, women are more likely to present with disease that is less easily identified by traditional methods such as angiography (Maas & Appelman, 2010; Vaccarino, Parsons, Every, Barron, & Krumholz, 1999). However, these

pathophysiological differences do not explain all diagnostic inequality, as female patients on average receive a less aggressive workup than male patients even in the initial stages of presentation (Lehmann, Wegner, Lehmann, & Savory, 1996). Women, particularly those age 55 and under, are less likely to be referred for diagnostic testing or cardiology consultation, experience delays in invasive and noninvasive diagnostic testing, and are more likely to have their conditions attributed erroneously to noncardiac etiologies (Arber et al., 2006; Maserejian, Link, Lutfey, Marceau, & McKinlay, 2009; Mieres et al., 2005; Pelletier et al., 2014; Pope et al., 2000; Vaccarino et al., 1999). For example, one multinational study analyzing the timeliness of procedures for patients with acute coronary syndrome found that women were less likely to receive a timely electrocardiogram (ECG), an essential and noninvasive initial diagnostic tool, than men presenting with acute coronary syndrome to the ED (Pelletier et al., 2014). Diagnostic inequalities extend beyond the emergency setting as well. In another multinational study, 256 primary care physicians viewed video-vignettes of standardized patients with typical coronary heart disease (CHD) symptoms and were then asked multiple questions about their diagnostic decision-making and management strategies for the patients. Results indicated that the physicians were less likely to refer the female patients for CHD testing, and ordered fewer CHD medications for women than men with the same presentation (Arber et al., 2006). These studies indicate that errors and delays in diagnostic testing can disproportionately affect women with various presentations of CVD. Although typical diagnostic modalities for CVD may be less effective in women due to biological differences, these differences do not explain why the initial workup is delayed or never

ordered for more women than men. Thus, alternative reasons for diagnostic disparities must be considered.

Causes and Consequences of Diagnostic Disparities

Although evidence suggests that women bear a higher burden of misdiagnosis and delays, the reasons behind such disparities are multifactorial and often overlapping, making it challenging to identify specific problems to target. One reason is that healthcare professionals lack awareness of female-specific presentations for diseases that occur in men and women. Despite efforts by the NIH since the 1990s to improve representation of women in clinical and preclinical trials, women remain underrepresented (Geller, Koch, Pellettieri, & Carnes, 2011; National Institutes of Health, 2017). An analysis of randomized controlled trials conducted in 2009 indicated that women comprised just 37% of subjects in studies that included both men and women, and that 75% of studies did not report outcomes by sex (Geller et al., 2011). Sex-specific research is particularly needed in CVD, as the gap in knowledge contributes to much of the provider confusion and insufficient female-specific diagnostic practices. Historically, CVD was viewed as a man's disease, and the research largely focused on men (Hamberg, 2008; Martin, Gordon, & Lounsbury, 1998; Mehta et al., 2016; Melloni et al., 2010; Mieres et al., 2005). Women were excluded from or underrepresented in early trials regarding disease presentation, diagnostic options, and treatment strategies (Doshi, 2015). The results of these studies were used to create early recommendations which were applied to women, despite providing little insight into female-specific CVD presentations.

Even now, studies which generalized results to men and women have influence on standards of care (Hamberg, 2008). For example, while developing its 2007 guidelines for cardiovascular disease prevention in women, the American Heart Association (AHA) drew many of its recommendations from 156 randomized clinical trials. Of these trials, 20 included men only, while just one enrolled women only. Female enrollment in trials where men and women were both included increased after 1970, when female enrollment was only 9%, but by 2006 women still represented just 34% of subjects in these studies. Moreover, only 31% of the primary studies used by the AHA in these guidelines included sex-specific results (Melloni et al., 2010). The overrepresentation of men in these trials has made it difficult to change the perspective of CVD as a male condition that affects some women. As a result, practitioners often view men's symptoms as the default presentation, leading to confusion and uncertainty when women present in a different way. As Dr. Bernadine Healy (1991), former head of the NIH, stated, "The problem is to convince both the lay and the medical sector that coronary heart disease is also a woman's disease, not a man's disease in disguise" (para 2). Doctors who fail to recognize the differences between men and women may cause delays and errors in the medical workup of at-risk patients.

Even when differences are well established in the literature, such as more frequent atypical symptoms in women with CVD or higher mortality rates for women with CVD, healthcare professionals may fail to familiarize themselves with those differences, adjust their practice accordingly, and pass on appropriate knowledge to their patients (Granot, Goldstein-Ferber, & Azzam, 2004; Mozaffarian et al., 2014; Weiss, 2009). For example, just 8% of primary care physicians and 17% of cardiologists are aware that heart disease

kills more women than men every year, even though this statistic has been true since 1984 (Mosca et al., 2005; Mozaffarian et al., 2014). One interview-based qualitative study investigating the care-seeking experiences of young women diagnosed with myocardial infarctions revealed that their healthcare providers were often sources of misinformation about CVD risk factors and presentations in women; several patients cited misunderstanding of what a heart attack should feel like as a reason to delay care-seeking (Lichtman et al., 2015). A 2003 national randomized telephone survey of 1,024 respondents found that 46% of women were aware that CVD is the leading cause of death for women, an improvement from previous studies in 2000 and 1997. However, just 38% reported that their doctors had ever discussed heart disease with them (Mosca, Ferris, & Robertson, 2004). A survey of physicians over a decade later found that CVD was a top concern for only 39% of primary care providers surveyed, and just 22% and 42% of primary care physicians and cardiologists, respectively, felt comfortable using current guidelines to assess CVD risk in women (Merz et al., 2017). Unfamiliarity with the available information about female-specific diagnostic practices and outcomes is therefore a likely contributor to diagnostic inequalities between men and women.

Another explanation for diagnostic disparities is that symptoms commonly seen in life-threatening conditions are often nonspecific or overlap with conditions that are more benign. Doctors may prematurely assume a less severe etiology in such cases. In Newman-Toker et al.'s (2014) study of patients with missed strokes, researchers postulated that strokes may be missed more frequently in women because they are more likely to present primarily with symptoms such as dizziness and headache, which are symptoms found frequently in less severe conditions. Similarly, in addition to chest pain,

women with unstable angina often have more stomach pain, shortness of breath, irritability, and dizziness than men (Granot et al., 2004). Doctors often attribute these symptoms to more benign etiologies, perhaps because of reduced awareness of different presentations of high risk conditions in women.

Ignorance of female-specific presentations does not account for all differences in diagnosis, however. For example, in Hamberg et al.'s (2002) study of neck pain evaluation strategies, female patients were presented the same as male patients and yet more diagnostic uncertainty and somatic diagnoses were reported for women. These results illustrate that "female" is a sufficiently confusing variable for many physicians to alter their diagnosis and diagnostic strategy. Similarly, in a study where 128 physicians watched videotapes of scripted patients presenting with classic CHD symptoms, subjects were significantly more confident in their diagnosis for male patients than female patients, with a mean maximum certainty of 81 and 71, respectively, on a scale of 1-100 ($p=0.006$). This effect, which was statistically significant in all patient age groups, was observed despite identical scripts and symptom descriptions for male and female patients. (Maserejian et al., 2009). Thus, even when female patients present in the exact same way as male patients they are still frequently misdiagnosed, which indicates that the lack of knowledge of female-specific disease states does not fully explain why these disparities exist.

In contrast, an overemphasis of known differences between male and female patients may also lead to diagnostic confusion and delays. This especially manifests in patients with cardiovascular disease, where women's risk lags behind men's risk by about ten years (Chiaromonte, 2007; Maas & Appelman, 2010; Maserejian et al., 2009).

Overemphasis of these risk differences may result in dismissal and under-diagnosis of even the most clear-cut CHD presentations in younger women. Arber et al.'s (2006) video-vignette study, which examined doctors' workup of patients presenting with prototypical CHD symptoms, showed that despite identical clinical presentation, physicians were significantly more certain of a CHD diagnosis for male than female patients aged 55, with a certainty of 59% and 41%, respectively, out of a possible 100% certainty ($p=0.029$). Despite this uncertainty, doctors asked fewer questions of women than men (5.2 and 7.9 questions, respectively, $p=0.018$). Moreover, fewer providers prescribed appropriate CHD medications to 55-year-old women than men (41% and 66%, respectively, $p=0.048$). These differences were not seen for patients at age 75, when overall risk for CVD is similar in men and women. These findings suggest that doctors sometimes disproportionately react to sex-based differences, leading to missed diagnosis even when the clinical presentation is straightforward and no difference in workup is warranted (Arber et al., 2006).

Other studies have proposed that communication differences and variations in descriptive language also contribute to misdiagnosis. There is some research to indicate differences in how men and women describe their symptoms on average, suggesting that women use more emotional references in their narratives, while men tend to use more performance-based descriptions (Hedegaard, Ahl, Rovio-Johansson, & Siouta, 2014). In the context of CVD, language differences may impact a physician's interpretation of chest pain as either noncardiogenic or cardiogenic in origin. One questionnaire-based study of 29 women and 32 men diagnosed with unstable angina found that 84% of female patients described their chest pain as "pressure", while just 37% of men described the

pain this way ($p < 0.0001$). The results also indicated that more women (41.4%) were unable to define their chest pain than men (15.6%) ($P = 0.025$) (Granot et al., 2004). Dr. Catherine Kreatsoulas, who conducted additional research into cardiac symptom descriptions in women and men, postulated on the impact of communication differences (Kreatsoulas, Shannon, Giacomini, Velianou, & Anand, 2013). She stated:

What we found fascinating in that study is that women would use a host of descriptive language to describe their heart attack symptoms, whereas men's symptom vocabulary was generally more succinct. I cannot count the number of times I observed a physician leaning over a female heart patient prior to going for an angiogram, while asking: 'So tell me about your chest pain', and the woman very quick to respond: 'Well, I don't really have chest pain. I have a discomfort, it's more like pressing. I wouldn't call it chest pain, I would describe it more as a bad ache.' And much to my amazement, I would observe the physician/resident record in the patient's notes, 'No CP' – meaning no chest pain! We have no way of accurately estimating just how many patient's charts have documented 'No CP' – when perhaps a more descriptive term for 'chest pain' expressed was used by the patient. (Thomas, 2014, para 3)

Doctors, therefore, should note that failure to adapt to the communication style more frequently used by half of their patients could cause gross misunderstandings and subsequent diagnostic errors.

Other forms of communication such as clothing, affect, and body language may also impact a physician's diagnostic workup. In one video-vignette study, internists viewed one of two videotaped versions of an actress portraying a patient with chest pain. In one version, the patient appeared "histrionic" by wearing brightly colored clothes and excessive jewelry, and by using more emotive body language and tone. In the other version, the patient appeared "businesslike" by dressing conservatively and using unemotive tone. Both taped interviews used the exact same script. Results showed that a cardiac diagnosis was chosen by 50% of physicians as their initial diagnostic impression

in the businesslike portrayal, while just 13% physicians viewing the histrionic portrayal chose a cardiac diagnosis, and instead favored a functional diagnosis such as panic attack or anxiety ($p=0.045$). In addition, cardiac likelihood estimates were significantly lower for the histrionic group (10%), than the businesslike group (20%) ($P=0.04$). Although physicians' likelihood estimates were no longer significantly different after they were given laboratory data such as cholesterol and a complete blood count, just 53% of physicians viewing the histrionic portrayal chose to pursue further cardiac diagnostic testing, while 93% of those viewing the businesslike portrayal chose to pursue further cardiac workup ($p<0.0001$) (Birdwell, Herbers, & Kroenke, 1993). These results are concerning, as they suggest that women who are more emotive in their expressions of symptoms are at higher risk of having their symptoms dismissed as psychogenic rather than cardiac. They also indicate that doctors are less willing to order diagnostic testing for "histrionic" patients even when they have objective laboratory data helping them to risk stratify for CAD.

Another contributor to the burden of missed or delayed diagnosis in women is the relatively high prevalence of women with poorly understood and understudied conditions such as autoimmune disease and chronic pain disorders. Women are more likely than men to be diagnosed with autoimmune disorders, a disease class which is especially prone to misdiagnosis and diagnostic delays. Women make up 75% of patients with autoimmune disease in the United States, and 90% of patients with lupus. Most patients with an autoimmune disorder must see almost five doctors over the course of 4.6 years before a diagnosis is reached. Unfortunately, instead of perceiving such patients as people suffering from diseases inadequately addressed by the healthcare system, many doctors

perceive those patients as “chronic complainers”, a label that 45% of autoimmune disease patients report receiving while seeking care and a diagnosis. (Women & autoimmunity, n.d.). Patients with chronic pain disorders such as migraines, irritable bowel syndrome, endometriosis, chronic tension headaches, osteoarthritis, facial pain, fibromyalgia, rheumatoid arthritis, and musculoskeletal pain face similar challenges. For example, in a study of the diagnostic experiences of over 4,000 women with endometriosis, a condition which produces chronic pelvic pain in women, the mean time to diagnosis was 4.7 ± 0.1 years after patients sought medical care for their symptoms. Not only did these patients experience delays in diagnosis and treatment, they also found it difficult to get physicians to legitimize their symptoms, with 59.6% of all patients reporting that they were overall not taken seriously by their doctors (Greene, Stratton, Cleary, Ballweg, & Sinaii, 2009).

Difficult-to-diagnose conditions such as autoimmune disease, chronic pain disorders, and medically unexplained symptoms in general are understandably frustrating for physicians to manage. Unfortunately, this frustration can cause physicians to inappropriately label patients as “difficult” simply because they are battling conditions that do not respond to typical treatment and diagnostic strategies (Forrest, 2012). As sociologist Joanna Kempner (2014) discusses in her book *Not Tonight*, society and the medical professions tend to attribute moral and psychological deficits to patients who have chronic complaints that evade treatment or explanation. They subsequently deny legitimacy to disorders that are poorly understood, further perpetuating the cycle of misinformation by decreasing interest and funding for medically unexplained symptoms and chronic pain disorders (Ballweg, Drury, Cowley, McCleary, & Veasley, 2010; Dusenbery, 2018; Kempner, 2014). Medical professionals often deny validation to

patients labelled as chronic complainers, and find them to be non-rewarding patients. Some physicians project anger and frustration onto patients who seek their help when they fail to solve the patient's medical problem, partially due to an ingrained intolerance for uncertainty (Forrest, 2012; Stone, 2014). Physicians' discomfort with uncertainty can contribute to physician burnout, inhibit shared decision-making, and reduce their willingness to engage in open communication with the patient regarding their care (Alam et al., 2017; Seaburn et al., 2005). Women tend to experience chronic pain and medically unexplained symptoms at higher rates, and with more associated pain than men with the same diagnosis, which may force women into frustrating encounters with physicians more frequently (Bartley & Fillingim, 2013; Racine et al., 2012; Richardson & Holdcroft, 2009; Tsang et al., 2008). The problematic ways in which some doctors behave in these scenarios may partially explain why women so frequently feel dissatisfied with their diagnostic experiences.

Some physicians inappropriately respond to uncertainty by prematurely selecting a diagnosis or suggesting multiple nonspecific diagnoses, often without directly addressing the patient's concerns or answering questions sufficiently (Alam et al., 2017). Narratives by female patients frequently pinpoint the hasty assumption of a psychiatric diagnosis, such as anxiety and depression, as the cause of a missed or delayed diagnosis of their disease (Qualls, 2017; Digh, 2016; Thomas, 2012; Edwards, 2013). These misdiagnoses may result from the emphasis of somatic symptoms such as insomnia and poor appetite in the diagnostic criteria for depressive disorders; these symptoms overlap with a vast range of pathological conditions that are unrelated to depression, but physicians may fail to rule out those other etiologies before assuming the psychogenic

cause (Fishbain, Goldberg, Meagher, Steele, & Rosomoff, 1986). Women also frequently feel frustrated with the “it’s all in your head” diagnosis, which also indicates that the physician believes that there is nothing organically wrong with the patient, and that the etiology is purely psychogenic (Anderson, 2016; Dusenbery, 2018; Dwass, 2017). These psychogenic diagnoses sometimes occur when the diagnosis remains elusive after appropriate testing, but can also occur prior to a medically appropriate workup and may impact a doctor’s likelihood to pursue diagnostics for a non-psychiatric diagnosis. Such a practice falls within the umbrella of *premature closure*, a cognitive bias that causes physicians to decide on a diagnosis without adequate evidence, and without considering or seeking out information that could contradict their initial diagnostic impression (Rajkomar & Dhaliwal, 2011). One patient, a college freshman who happened to be a theater major, reported the following experience with a prematurely assigned psychiatric diagnosis while presenting to the ED with spasms and loss of consciousness:

A female nurse ran alongside my gurney to tell the other medical professionals to not take me as seriously because I was an actress. They decided to do less testing than they originally planned to do, and when I was sent back to the bed in the ER I had been assigned to, I signed myself out AMA (against medical advice) because I felt that I was being ignored. (Parker, 2017, Section 10)

The patient was ultimately found to be having a reaction to a medication she was taking for her organ transplant. In this case, the medical professionals prematurely assumed that her symptoms were psychogenic, and did not seek out information which would have confirmed her real diagnosis. Premature closure wherein symptoms are attributed to a psychogenic cause is frustrating to patients and can lead to an insufficient

workup of the patient for non-psychiatric conditions, increasing patient suffering, morbidity, and mortality.

Another female patient typifies this frustration in a videotaped narrative. She stated:

When I was 15 years old . . . I started to feel this horrible horrible pain in my abdomen . . . I just thought I was dying. My mom took me to the ER. I had my letterman on the chair next to me and I had an ‘in memory’ button for a classmate that had passed away. And the doctor saw the button on my coat and asked me what it was for. And I told her that my friend had passed away. Immediately her tone changed and she looked at my mom and said, ‘I know what’s going on here.’ She looked at my mom and then looked at me and said, ‘Your daughter is just sad. This is very common for teens to go through after one of their classmates passes away or goes through a tragedy.’ She then took the button off of my letterman, held it up to my face, and told me to say goodbye to my friend. . . . So I looked at the button and tried to do whatever she was asking even though I still wasn’t totally sure and just tried to say goodbye to this button. Once I got through that I kind of just looked at her and waited for her to tell me what test she was gonna run or what she was gonna do to figure out what had caused my pain, but instead she left the room because she thought that she had figured out why I had the pain. The one emotion I remember feeling the most is just shame and embarrassment. I felt stupid for going to the hospital. . . . I felt like I was being a crybaby, and I felt like I was imagining the pain that I had gone through, even though deep down I knew that the pain I was experiencing was real. And so the next time that it happened to me I didn’t want to go to the doctor. I just wanted to lay alone in my room and die if that’s what it took. When I was finally diagnosed with endometriosis and also told that I had ovarian cysts quite often on my ovaries, I felt vindicated but also angry. I wanted to go back in time and look those doctors in the eye and say, ‘You know what, something is wrong with me, and if you actually did your freaking job, you could have told me that.’ (As/IS, 2017, Lara)

This patient’s story demonstrates both the absurdity of a premature psychiatric diagnosis absent a full medical workup in a patient with severe abdominal pain, and the consequences of such an experience. Not only did she not receive adequate care, she felt shame for seeking help, a feeling which impacted her willingness to seek medical

attention in the future. Hasty dismissal of a patient's symptoms as psychogenic without any medical workup may cause a patient to doubt their intuition about their own body and health. Telling patients that their pain is "all in their head" can prevent them from seeking help for similar or different pain in the future, for fear of further humiliation (As/Is, 2017). These types of interactions disrupt the patient's trust in the medical system, a consequence that can cause delays in seeking care and disrupt the therapeutic alliances with future physicians.

Many women cite the fear of being told that they are simply anxious or a hypochondriac as a reason to delay seeking care for chest pain, and some even feel relief at receiving a diagnosis of myocardial infarction rather than being told that the symptoms were psychogenic in origin (Lichtman et al., 2015; Rosenfeld, Lindauer, & Darney, 2005). For example, one patient described the shame associated with being given a psychogenic diagnosis and her subsequent delay in seeking reevaluation. She wrote that the doctor treating her in the ED stated to a medical student, in front of her:

'What we really are dealing with here is anxiety. Because it is anxiety that would take her to the ER on a Saturday with what might be a blood clot. Most people would wait until Monday and call here to get an appointment, but she went to the ER. This is just anxiety we need to be treating'. (Digh, 2016, para 9)

The patient had a heart attack shortly after, and wrote of her reluctance to return to the hospital:

I waited because I felt shamed into feeling like an hysterical female, shamed into feeling like I was just anxious. JUST anxious. Like anxiety itself is something that isn't real when we know that it is. Like anxiety is something to be ashamed of or embarrassed by. When our lives, bodies, souls, are in distress, anxiety is a likely outcome. Wear it proudly. It might save your life one day, and it can be treated, too. (Digh, 2016, para 17)

This patient touches on an important point in her testimonial: Healthcare professionals may incorrectly identify anxiety as a cause of a woman's symptoms, rather than the natural and appropriate response to pain or fear of death or serious illness. Cardiologist Dr. Adam Splaver put it bluntly in an interview, where he stated, "In training, we were taught to be on the lookout for hysterical females who come to the emergency room" (Dador, 2011, para 8). In such patients, the person's anxiety or other psychiatric symptom is perceived as central to the patient's disease process, rather than the result of an underlying physical abnormality (Chiaramonte, 2007). Patients who are told that their pain is psychogenic may internalize this interpretation, believing the "hysterical female" narrative which can be a barrier to adequate care. Furthermore, adding "anxiety" to a patient's electronic medical record incorrectly will result in multiple other providers seeing that diagnosis, which can prompt subsequent instances of bias and a cycle of misdiagnosis (Thomas, 2012).

The medical literature exploring differences in diagnosis of men and women, though in need of expansion, reinforces the experiences of women whose symptoms are incorrectly interpreted as psychogenic. In Maserejian et al.'s (2009) study of CHD interpretation via video-vignette, 55-year-old females presenting with typical CHD symptoms were significantly more likely to receive a mental health diagnosis as the underlying cause of their symptoms than age-matched males (31.3% versus 15.6%, respectively, $p = 0.03$). In the research by Bleicken et al. (2010) on adrenal insufficiency diagnosis, women were significantly more likely to receive a misdiagnosis related to psychiatric and psychotic complaints than men (53% versus 16%, $p < 0.001$). In a study by

Chiaramonte (2007), family physicians were instructed to read vignettes of patients, some with stress and some without, presenting with a constellation of symptoms designed to suggest CHD as the most likely diagnosis. Though not sufficiently powered for statistical interpretation, results suggested that for female patients, despite the clear CHD-like clinical picture, the mention of stress was associated with a marked decrease in the number of family physicians who agreed that the chest pain was organic (78% to 29%), and an increase in physicians who believed that a psychogenic origin was most likely (22% to 50%). In contrast, the changes in interpretation of the origin of chest pain in men after the addition of stress to the clinical picture appeared to be less pronounced, showing an increase in psychogenic origin from 4% to 8%, and a decrease in organic chest pain from 92% to 75%. Thus, the addition of stress to a history appears to substantially change doctors' leading diagnosis from organic to psychogenic in women, but less so in men. Misdiagnosing CHD as a psychiatric disorder, as in these examples, is likely to result in inadequate treatment and poorer outcomes.

In a similar study design, Chiaramonte (2007) also studied the impacts of stress and gender on diagnostic interpretation in internists. She found that women in the CHD/stress condition received significantly lower CHD diagnosis (3.27, SD 2.23 versus 6.41, SD 2.38, $p < 0.00001$), cardiologist referral (4.64, SD 3.61 versus 8.59, SD 1.99, $p < 0.0001$), and cardiac medication prescription scores (2.05, SD 2.13 versus 6.91, SD 2.54, $p < 0.0001$) than women with CHD/no stress. However, no significant differences in these outcomes were found for men with stress compared to men without stress. Furthermore, women in the CHD/stress condition received significantly lower CHD diagnosis (3.27, SD. 2.23 versus 6.10, SD 2.32, $p < 0.0001$), cardiologist referral (4.62, SD

3.61 versus 7.29, SD 3.10, $p < 0.01$), and cardiac medication scores (2.05, SD 2.13 versus 5.24, SD 3.29, $p < 0.001$) than men with CHD/stress. These results indicate that female patients with stress are less likely to be diagnosed and managed correctly for their CHD than men with stress and women without stress. In contrast, the addition of stress to men's clinical history has little influence on doctors' diagnoses. This study is particularly useful in understanding how patient stress can influence a physician's interpretation of symptoms because other variables such as communication and age were controlled for. It employed written clinical vignettes so that no verbal or physical cues would influence interpretation, and women were presented as eight to 10 years older than men to account for the delay in cardiovascular risk for women. As noted by the author, these findings are especially concerning given that anxiety disorders are more prevalent in women than men, and that women are therefore more likely to present with stressors and anxiety while being evaluated for various disorders (Chiaramonte, 2007).

The inappropriate dismissal of patient complaints as psychogenic produces several problems for women's health. As previously discussed, an incorrect psychiatric diagnosis is an example of premature closure, resulting in patient dissatisfaction and delays in correct treatment (Rajkomar & Dhaliwal, 2011). In addition, women may be reluctant to divulge information about their mental health for fear that their complaints will not be taken seriously, recognizing that psychiatric diagnoses may divert the focus away from more likely or more dangerous etiologies. Withholding psychiatric diagnoses and symptoms from healthcare workers could have multiple consequences. First, it may prevent doctors from performing accurate risk assessments and enacting treatment plans for various conditions that are impacted by mental health. For example, depression is

more common in women, and a more potent risk factor for CHD in women than in men, with studies indicating that presence of depression may increase a woman's risk of cardiac death by 50% or more (Mehta et al., 2016). Furthermore, psychiatric symptoms such as anxiety may impact people's' perception of pain, and are thus factors to consider when addressing acute and chronic pain treatments (Kivrak, Kose-Ozlece, Ustündag, & Asoglu, 2016). In addition, a doctor who is not informed of a psychiatric diagnosis might not consider that the patient could be taking psychoactive medications such as antidepressants and anxiolytics, which would impair her assessment of a patient's risk for medication side effects and of potential drug interactions when prescribing new medications. Accurate appraisal of a patient's medical history is a core component of providing adequate and safe care. Doctors and other medical professionals should therefore be wary of creating an environment where female patients feel that they must withhold certain diagnoses to be taken seriously. Perpetuating a system where patients are afraid to reveal their mental health problems is contrary to compassionate, safe, and patient-centered healthcare.

A possible further consequence of psychogenic misdiagnosis in women is increased resentment and perceived insult in female patients who are given good-faith recommendations for psychiatric referral, medication, and care. Doctors who genuinely believe that a patient would benefit from psychiatric care, either as a primary treatment for their symptoms or in combination with a workup for organic etiologies, may inadvertently upset women who interpret these recommendations as a sign that they are being dismissed by the doctor. There is a plethora of organic diseases and conditions that cause psychiatric symptoms, or are exacerbated by comorbid psychiatric conditions or

certain coping mechanisms (Elboim-Gabyzon, Rozen, & Laufer, 2012; Mehta et al., 2016; Vlaeyen & Linton, 2000). For example, diseases of the thyroid are most commonly found in women, and present frequently with either depression or anxiety, depending on the type of imbalance (Thyroid disease, 2017). Although it is essential for the underlying thyroid disorder to be diagnosed and treated, it is appropriate for a doctor to recommend adjunct psychiatric care.

It is reasonable and important for doctors to address mental health symptoms in order to reduce their impact on the patient's overall health. Mental health is intimately intertwined with physical health and symptoms, and it is imperative that doctors address both in comprehensive care of patients. Therefore, it is of utmost importance to help patients understand the links between mental and physical health. Unfortunately, this will be more difficult to achieve if women continue to feel that recommendations for mental health care are akin to their symptoms being ignored. Reframing appropriate psychiatric treatment as an essential component of comprehensive management, rather than a dismissal of symptoms, may be challenging if women are frequently shown through empirical evidence and personal experiences that psychiatric diagnoses are often premature and incorrect.

In summary, patient testimonials and scientific studies indicate that women are burdened by misdiagnosis and delayed diagnosis while seeking care. Missed and delayed diagnosis, whether due to provider ignorance, inability to adapt to communication differences, premature closure in uncertain presentations, inappropriate psychiatric diagnoses, or gender bias in general should be aggressively minimized, as the consequences of a medical system where women receive suboptimal diagnostic workup

are severe and far reaching. Increased awareness of the current medical literature on sex-specific care, commitment to furthering the research on diagnostics for women, and confrontation of gender bias in current diagnostic practices are needed to correct these problems.

CHAPTER 3: MANAGEMENT DISPARITIES—A FOCUS ON PAIN

Symptom management is a core component of patient care, and one of the most important symptoms that physicians must address in their practice is pain. It is the number one reason people seek emergency care, with 52.2% of patients presenting primarily for pain, and 61.2% of patients having pain documented in their chart (Cordell et al., 2002). For adult men and women, the two most frequent primary complaints of patients presenting to the ED are pain related: abdominal pain and chest pain (National Hospital Ambulatory Medical Care Survey, n.d.). Worldwide, between 37% and 41% of people endure chronic pain. Chronic pain affects more women than men, contributing to the higher rates of chronic pain medication use in women (Leresche, 2011; Tsang et al., 2008). Pain is a frequently cited chief complaint in new patients presenting to primary care as well (Fleischer, Gardner, & Feldman, 2001). Given this prevalence, it is unsurprising that many women who share their disappointing experiences with the healthcare system specifically identify pain as the reason they presented, and cite failure of pain management as a reason for their frustration.

Some women's stories indicate that they found it difficult to obtain adequate pain management until the doctor confirmed that their pain had a physiological basis. One woman recalled presenting to the ED for abdominal pain, stating, "I bit my tongue until it bled to stifle the pain, and they reluctantly agreed to a CT. Only when they had irrefutable evidence that my pain was real—I was passing three kidney stones—did they give me pain medication" (Finch, 2016). Her experience is an example of a common scenario where women's pain is not believed, or not considered to be severe, until a doctor can establish a reason for the pain through "objective" findings such as laboratory

results and diagnostic imaging. This, and other similar encounters where women are forced to insist upon the reality of their own illness, illustrates a concept known as *Yentl Syndrome*, wherein a woman must first show that she is sick before she receives the same care as a similarly positioned male patient (Healy, 1991; Johnson et al., 1996).

Other women felt that their pain was minimized, undertreated, and interpreted as an overreaction by an overly sensitive woman. Another patient writes:

I had abdominal surgery and the doctor took me off my pain meds two days later. That night, I experienced the most excruciating pain in my abdomen. It was very intense. The next morning, still in pain, I told my doctor. He said I was being sensitive and sent me home. I ended up back in the hospital 24 hours later with a deadly infection called peritonitis and was suffering sepsis. My doctor almost killed me by brushing off my pain. (Parker, 2017, Section 15)

Oligoanalgesia, or the undertreatment of acute pain, and inadequate chronic pain management are well documented problems for male and female patients (Albrecht et al., 2013; Breitbart et al., 1996; Cleeland et al., 1994). However, given the popular perception that women's pain is more frequently dismissed by doctors, it is important to identify any increased burden of pain mismanagement for women. Essential factors to consider within this topic are whether women receive different treatment than men, whether any differences are justified by the current understanding of how pain manifests differently in men and women, and what patient or provider behaviors and beliefs may contribute to any disparities.

The question of whether women receive different treatment for pain than men has been addressed by studying multiple different clinical endpoints. One way that researchers have attempted to identify differences in management is by comparing the likelihood of receiving analgesic medication for pain in men and women. However, the

current literature yields inconsistent results. One prospective cohort study attempted to answer this question through the analysis of pain management outcomes in 981 nonpregnant adults presenting to the ED for acute abdominal pain. The investigators found that despite similar pain scores, women were 7% less likely than men to receive any analgesia, with 95% CI (1.1% to 13.6%) (Chen et al., 2008). Similarly, a retrospective study of prehospital analgesia rates in 953 patients with musculoskeletal injuries found that, even after controlling for confounding factors, men have significantly greater odds of receiving analgesia while being transported to the hospital than women (OR 1.65, 95% CI [1.16-2.36] (Michael, Sporer, & Youngblood, 2007). However, other studies of musculoskeletal pain find no gender differences (Heins et al., 2006; Raftery, Smith-Coggins, & Chen, 1995; Uri, Elias, Behrbalk, & Halpern, 2013). For example, in a prospective study of pain management measures conducted in a hospital where a pain management protocol had been successfully implemented, no difference in the percentage of men and women who received analgesia for musculoskeletal-related pain was identified (Uri et al., 2013). Similarly, in a study of gender's effect on analgesic administration in 190 patients presenting for emergent care of headache, neck pain, or back pain, researchers found that although female patients were significantly more likely to receive medications than men, those differences were accounted for by higher pain severity in women, indicating that patient gender was not an independent predictor of analgesia administration (Raftery et al., 1995).

Some researchers have attempted to clarify whether discrepancies exist in analgesia administration by studying the types of medications offered to men and women and how they were dosed. In the study of abdominal pain management in the ED by Chen

et al. (2008), women overall were 11% less likely than men to receive opiate medication, with 95% CI (4.1% to 17.1%). Even when gender-specific diagnoses were excluded and factors such as triage class, race, and pain score were controlled for, the difference remained significant. These differences were primarily due to significantly decreased likelihood of opiate administration for women under 50 years old, as no difference in opiate administration was found between men and women 50 and older. However, there were no differences in the receipt of non-opiate analgesia in any age group. This study indicated that young women may be less likely to receive potent analgesia than young men, despite similar levels of pain (Chen et al., 2008). Another study which used virtual-human vignettes to assess 193 nurses' and doctors' pain management strategies found that providers were significantly more willing to administer opiate medication to male patients than female patients (Wandner et al., 2014). In contrast, however, the study by Uri et al., (2013) of musculoskeletal pain management in the setting of an established pain protocol found no significant difference in the percentage of male and female patients who received opiate medication.

An investigation of nurses' postoperative pain management of 180 male and female patients who underwent uncomplicated appendectomies found that nurses gave male patients significantly higher amounts of narcotic medication in the initial preoperative dose, when patients were just coming out of anesthesia, but that differences in the total postoperative dose were not statistically significant. The authors postulated that in the initial post-operative period, when other indicators of pain such as the patient's self-reported pain levels are not available, healthcare providers may rely on gender stereotypes about pain tolerance and pain levels to make decisions about analgesia

(McDonald, 1994). Another analysis of nurses' postoperative analgesia management of 60 patients revealed that male patients received doses of pain medication more frequently than female patients after coronary artery bypass surgery, and that female patients received sedative medication more frequently than men. However, this study did not analyze whether pain severity in men and women changed after the first administration of an opiate. Thus, it is not possible to conclude whether the difference in dosing frequency was simply due to greater effectiveness and/or longer lasting effects of opiates in women than men, rather than gender bias (Calderone, 1990).

Other studies have examined delays in medication administration between men and women, adding an additional layer to the complex analysis of pain management disparities. In a multicenter retrospective cohort study, 6,931 patients presenting for either fracture pain or abdominal pain were compared in terms of time to medication order, time to administration, and dosing of morphine (Siddiqui et al., 2015). The authors found that women with abdominal pain experienced longer delays in the ordering of pain medication by physicians and in administration of those medications than men with similar complaints. The odds of receiving any analgesic were significantly lower for women at 180 minutes into the visit (OR 0.906, 95% CI [0.842 to 0.974]), $p=0.008$), but the difference was no longer significant at 270 minutes. Women were also less likely to receive opiates at or below 180 minutes into the visit (OR 0.872, 95% CI [0.798 to 0.951], $p = 0.002$). In contrast, they found no significant differences in fracture pain management for men and women. This study indicates that the presenting complaint may interact with gender to selectively impact women's pain management, and that women may be particularly vulnerable to undertreatment of pain in the first few hours of their

care (Siddiqui et al., 2015). Other researchers have found similar results. Chen et al. (2008) showed that women waited longer to receive analgesia for abdominal pain than men in the acute setting (median time 65 min versus 49 min, difference of 16 min, 95% CI [3.5 to 33 min]). The authors postulate that delays specific to young women may be partially explained by the need for pregnancy testing and pelvic exams, although these factors should not significantly delay analgesia if care pathways are organized properly. Another study of abdominal pain management in 100 ED patients showed a trend toward longer delays in analgesic administration for women (mean 129 min) than male patients (mean 69 min), but this did not reach statistical significance ($P=0.09$), likely due to a low number of patients in the study and lack of statistical power (Shabbir et al., 2004). Uri et al.'s (2013) study of protocolized musculoskeletal pain management more clearly indicated an absence of disparity in analgesic delays between men and women (54 ± 38 min for men, 51 ± 34 min for women, difference of 3 min, 95% CI -5 to 11, $p=0.45$). These studies suggest a trend towards increased delays for women, although implementation of pain protocols may be effective in preventing such delays. They also suggest that a presenting complaint such as abdominal pain may confer greater risk of analgesic disparities than musculoskeletal pain.

There is also evidence that gender disparities emerge when strategies other than traditional pain medications are considered as well. These therapies should not be overlooked as they may have great impact on long term relief from pain and its sequelae, in contrast to the temporizing pain relief that comes from narcotic medications. For example, in a study comparing total knee arthroplasty recommendations for male and female patients, 38 family physicians and 33 orthopedic surgeons carried out blinded

assessments of male and female standardized patients presenting with moderate osteoarthritis of the knee (Borkhoff et al., 2008). The patient presentations differed only by patient sex; age, pain levels, osteoarthritis severity on imaging, functional disability, etc., were all standardized. Results showed that 42% of physicians recommended total knee arthroplasty to the male patient and not the female patient, while only 8% of physicians recommended arthroplasty to the woman and not the man. Furthermore, the likelihood that an orthopedic surgeon would recommend the procedure to a male patient was 22 times higher than for a female patient with the exact same clinical presentation (OR 22.1, 95% CI, [6.4–76.0], $p < 0.001$). For a family physician, the odds of total knee arthroplasty recommendation were 2 times higher for men than women (OR 2.21, 95% CI [1.04–4.71], $p = 0.04$) (Borkhoff et al., 2008). In another example, a study of chronic musculoskeletal pain patients referred to pain specialist rehabilitation showed that women were significantly less likely to be recommended physiotherapy and radiological workup than men, despite controlling for confounding variables such as working status, pain severity, and location of pain (Stålnacke et al., 2015). Finally, in a retrospective cohort study of the prehospital management of 683 patients with chest pain, female patients were significantly less likely than men to receive aspirin (RR 0.76; 95% CI [0.59 to 0.96]) and nitroglycerin (RR 0.76, 95% CI [0.60 to 0.96]) while being transported by emergency medical services. These medications can relieve pain and are also potentially life-saving components of treatment protocols for chest pain, so their omission may have long lasting effects on morbidity and mortality (Meisel et al., 2010). These studies indicate that women have reduced access to pain treatment strategies other than typical pain medications such as opiates and NSAIDs.

In summary, research into gender disparities in pain management strategies for men and women is variable. These variabilities may be due to several factors, including level of training physicians, presenting complaint, implementation of pain management protocols, location of the hospital, ED overcrowding, academic status of the hospital, study method, etc. However, it is evident that in some settings women face delays in care, lower levels of overall analgesic administration, decreased use of opiate medications, and fewer recommendations for pain relieving therapies and procedures more than men in comparable situations.

Sex and Gender-Based Differences in Pain Experience

It is essential to recognize that there are differences in how the healthcare system addresses pain in men and women. However, additional analysis is needed to discern whether these differences are unjust and due to bias, or whether they result from a deliberate and appropriate response to known sex-based differences in patients with pain. Therefore, it is important to note any true biological and psychological differences that may justify differences in pain management strategies. One such reason may be genuine discrepancies in how women and men process pain, and even respond to pain medications differently. Differences in pain experience have been explored through various methodologies in the literature. Recent efforts have attempted to compensate for the exclusion of women from pain studies, which was commonplace before the 1990s, at which time the NIH began several initiatives aimed to increase research into pain, sex, and gender (Racine et al., 2012). There is still much work to be done in the exploration of

gender, sex, and pain management, but some important themes have emerged from the current literature.

First, studies indicate that women generally have lower pain tolerance than men receiving the same stimuli. This trend has been observed for various types of pain (cold pain, heat pain, pressure pain) in studies where healthy subjects are exposed to a controlled stimulus and evaluated for pain threshold and tolerance differences (Racine et al., 2012). Women also tend to report higher levels of pain for conditions experienced by men and women outside of the controlled experimental setting. For example, in a study of patients with osteoarthritis of the knee who were assessed through self-report questionnaires and performance-based testing, women generally reported higher levels of pain than men with the same functional status (Elboim-Gabyzon et al., 2012). A retrospective study of the diagnosis-associated pain scores recorded in patients' ED electronic medical records showed that women had higher recorded pain scores than men for multiple diagnoses, including infections, poisoning, and diseases of the musculoskeletal, respiratory, digestive, and circulatory systems (Ruau, Liu, Clark, Angst, & Butte, 2012).

These differences are likely mediated by a variety of factors, including genetic, anatomical, hormonal, psychological, and sociological variances. For example, there is evidence that hormone levels influence pain perception for men and women (Bartley & Fillingim, 2013; Musey et al., 2014; Richardson & Holdcroft, 2009; Vallerand & Polomano, 2000). The impact of hormones was exemplified by a study of the effects of androgen and estrogen on pain perception in 73 transgender patients taking hormone therapy. This study found that approximately one third of male-to-female patients

developed chronic pain while taking estrogen therapy, while approximately half of female-to-male patients experienced improvements in chronic pain conditions after taking testosterone (Aloisi et al., 2007). Research also suggests that the endogenous opioid system may be different in men and women, altering pain perception and response to opioid medications. Women may be more responsive to pain medications, with some studies reporting that women use less patient controlled analgesia (PCA) than men (Bartley & Fillingim, 2013; Gear et al., 1996; Miaskowski & Levine, 1999). Women also tend to experience more side effects related to analgesic use, which may impact their desire to self-administer opiates through PCA, or to ask their provider for additional medications (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams, & Riley, 2009; Richardson & Holdcroft, 2009).

Considerable attention has been paid to the impact of patient behaviors and psychiatric symptoms on pain experience. For example, anxiety has been cited as a mediating factor in pain perception, though the current literature on the interaction between gender, anxiety, and pain is difficult to definitively interpret and generalize (Soetanto, Chung, & Wong, 2006). For example, a study of pain from venipuncture found that the pain perception differences identified between women and men in the study were due to higher levels of anxiety in women, and when anxiety was controlled for no sex-based difference in pain perception persisted. (Kivrak, Kose-Ozlece, Ustündag, & Asoglu, 2016). Another study elaborated on this theory by differentiating *state anxiety*, or a transient anxious state in response to an immediate threat, from *trait anxiety*, where the patient has anxiety at baseline. They found that women experienced significantly more pain than men in an experimental setting, but when trait anxiety was controlled for, the

differences in pain perception were no longer significant. State anxiety did not alter the gender difference in pain perception significantly, indicating that a person's anxious disposition at baseline, but not temporary anxiety from a current painful situation, mediates the differences between pain perception in men and women (Goffaux et al., 2011). However, other studies indicate that men, rather than women, are more susceptible to the influences of anxiety on pain perception (Elklit & Jones, 2006; Fillingim et al., 2009; Soetanto et al., 2006). In one study of 178 subjects without any baseline pain who were subjected to laboratory pain testing, women had lower thresholds and tolerance for pressure pain, despite overall self-reported state and trait anxiety levels being the same between the male and female groups. However, it was found that men who reported higher levels of trait anxiety also tended to experience higher levels of pain intensity than men with low trait anxiety. This correlation was not found in women, indicating that anxiety did not account for the sex-based differences in pain perception in this study, and that men may actually be more sensitive to anxiety's influence on pain perception (Soetanto et al., 2006).

Additional focus has been placed on sex-based differences in coping strategies, which mediates the differences in pain perception and outcomes between men and women in some studies. One such coping strategy is *catastrophizing*, where a patient ruminates on negative outcomes related to pain and disability, and has a feeling of helplessness related to their inability to handle the pain. This coping strategy is more frequently used by women, and can contribute to differences in pain-related outcomes in men and women. *Self-efficacy*, on the other hand, is a coping mechanism more often employed by men than women, and describes the belief that people can influence their

own outcomes by personal effort. These strategies have been found to influence pain perception, chronic pain, and disability. (Bartley & Fillingim, 2013; Elboim-Gabyzon et al., 2012; Etherton, Lawson, & Graham, 2014; Keefe et al., 2000; Vierhausl, Lohaus, & Schmitz, 2011; Vlaeyen & Linton, 2000).

To summarize, studies of pain perception and responsiveness to pain medications are variable, but generally suggest that women have lower tolerance for pain stimuli than men, experience higher levels of pain than men with similar disease severity, and may respond better than men to certain opioid medications. These findings may be impacted by psychological factors such as trait anxiety and variable coping strategies, although the role of these factors in mediating sex and gender differences is inconsistent and needs further exploration. Given these trends, there is little indication in the literature that offering women analgesics or other therapeutic resources less frequently is appropriate, that women should typically be offered analgesics with lower potency than men, or that women are equipped to handle longer treatment delays than men. There is some evidence that women may need lower doses of narcotic medications, or less frequent dosing, than men to achieve adequate analgesic effects, but patients should be assessed individually for adequate response rates and side effects. Unfortunately, the current research on pain management suggests that women may experience increased delays in analgesia, lower likelihood of receiving any analgesics or opioids in acute settings, and fewer recommendations for nonpharmacologic therapies in comparison to men. These practice patterns are not in accordance with pain management strategies that the medical community should expect based on what is known about women's pain. Therefore, biological and psychological differences between men and women do not justify the

differences in pain management, and other explanations for these disparities must be explored.

Causes of Pain Management Disparities

Societal forces, norms, and beliefs acting on both patients and providers permeate our healthcare system, and likely contribute to pain management disparities. One such pervasive and harmful societal belief is that women's bodies are physiologically more suited to handle pain (Bendelow, 1993; Richardson & Holdcroft, 2009). The root of this assumption is likely multifactorial, but significantly stems from two known facts about female biology. First, most women's bodies are adapted for childbirth, widely considered one of the most painful non-pathological human experiences. A questionnaire and interview-based study assessing public beliefs about health, illness, emotional experience of pain, and gender differences in pain coping found that:

Repeatedly, the view was expressed by both women and men that the combination of female biology and the reproductive role served to equip girls and women with a 'natural' capacity to endure pain, both physically and emotionally. Many of the men expressed a sense of awe, at times almost of reverence, to the idea of childbirth, seeing it as the 'ultimate' in pain experience. (Bendelow, 1993, p. 286)

Second, many women experience menstrual pains throughout much of their lives without any explicit underlying pathology (Hoffman & Tarzian, 2001; Fenton, 2016). This fact can cloud physicians' interpretations of unusual pain and cause them to incorrectly assign a non-pathologic etiology to the patient.

Women's healthcare narratives frequently describe incidents where doctors normalized their pain as non-pathological gynecologic symptoms, implying that women

who complain about pain are simply complaining about a physiological inevitability (Parker, 2017). One patient stated:

I was around 17 when I first started getting paralyzing pain in my abdomen. Every doctor I saw said it was just my period. This went on for years. I knew it wasn't just period pain, though. It was different. One day, I was at airport getting ready to catch a flight when the pain overwhelmed me. I couldn't move, the pain was so bad. They ended up having to call an ambulance, because all I could do was lie on the floor of the airport writhing in pain. I really started to question myself, and truly I felt like I was losing it. After so many doctors suggesting that it was just period pain, I almost started to wonder if it was. I questioned whether or not I would have to deal with this pain for the rest of my life until menopause.

It wasn't long before I, once again, was back at the doctor with extreme abdominal pain. Except this time I demanded an ultrasound...which showed a 13cm cyst on my fallopian tube. It was just sitting there on my tube the entire time, getting worse, because it wasn't being treated. Because my doctors just kept insisting that it was period pain. It was such an infuriating thing to go through and even now I look back on it and it's like... five years of my life that are missing. All because my doctors didn't believe me when I told them how much pain I was in. (Parker & Williams-Hauwanga, 2017, Tania)

The attribution of pathological pain to “normal” menstrual pain severely impacted care in this patient. This phenomenon also manifests itself glaringly in the workup of endometriosis. Greene et al.’s (2009) study of women diagnosed with endometriosis found that 63% were told that nothing was wrong with them by at least one physician.

Pain related to childbirth and menstrual cycles can reinforce society’s belief that women are physically built to cope with and withstand pain, and that female pain is expected and normal. Unfortunately, as pointed out by Bendelow (1993), the perception that women are better suited to withstand pain may lead to the general expectation that women should be able to handle more pain than men, and that their pain does not need to be taken as seriously. Healthcare workers are not impervious to this misperception. In one study, 160 nurses read vignettes of imaginary patients and were asked to calculate the

approximate time they would spend on each patient in various aspects of care. The nurses planned significantly more time for ambulation, analgesia, and emotional support for male patients than female patients with the same clinical features (McDonald & Bridge, 1991). Another survey of 362 nurses regarding their beliefs about pain and gender found that 41% believed that men experienced more pain distress than women, while just 18% believed that women experienced more distress. Contradictory to the current research on pain perception in men and women, 47% of the surveyed nurses believed that women tolerate more pain than men, while just 15% believe that men are more tolerant (McCaffery & Ferrell, 1992). These observations indicate that the healthcare community is not immune to the incorrect notion that women are naturally built to handle pain, and that such misconceptions can greatly affect women's access to adequate care.

The fact that women tend to communicate differently about their pain symptoms further impacts the care that providers provide their female patients. First, women generally are more willing to report pain symptoms than men, communicate more openly about the presence of pain, the severity of pain, and how the pain affects their lives. Men, on the other hand, tend to use fewer contextual references when describing their pain and use less emotional language in describing their symptoms (Hoffmann & Tarzian, 2001; Robinson et al., 2001). Interestingly, a study of patients treated in the ED for abdominal pain found that, at the time of discharge, women were more likely than men to feel that they needed analgesia during their stay (74% versus 67%, $P = 0.02$), but did not correspondingly ask for pain medication more frequently than men (Safdar et al., 2009). A possible explanation for these findings is that women may be more uncomfortable directly asking for medication even when they feel pain that they believe warrants

analgesics. Such communication differences are sometimes cited as possible contributing factors to discrepancies in pain management when the reason is unknown (Borkhoff et al., 2008; Stålnacke et al., 2015).

Furthermore, studies of social perceptions of pain indicate that most men and women believe that women are more likely to report pain than men, that it is more socially acceptable for women to report pain than men, and that men are expected to be more stoic in the face of pain (Bartley & Fillingim, 2013; Robinson et al., 2001; Soetanto et al., 2006). However, stoicism appears to be valued more highly than honest communication of pain symptoms, as patients with chronic pain complaints, particularly women, can be perceived as morally inferior (Kempner, 2014). This may be because refractory pain results in more difficult and frustrating work for the treating provider, and because frequent expression of pain may make the patient appear as a “boy who cried wolf” (Forrest, 2012; O’Connor, 2013). The lack of credibility often assigned to a person who complains of pain was recognized by Fassler (2015) in his retelling of his wife’s experience in an ED while experiencing severe abdominal pain. He made sure to inform the reader that his wife was stoic woman who did not typically complain about pain, apparently to reinforce the credibility of her complaints during their trip to the ED. He stated:

Rachel’s not the type to sound the alarm over every pinch or twinge. She cut her finger badly once, when we lived in Iowa City, and joked all the way to Mercy Hospital as the rag wrapped around the wound reddened with her blood. Once, hobbled by a training injury in the days before a marathon, she limped across the finish line anyway. So when I saw Rachel collapse on our bed, her hands grasping and ungrasping like an infant’s, I called the ambulance. (Fassler, 2015, para 4)

The effort the author makes to boost the legitimacy of his wife's complaints is not unreasonable, as being too vocal and open about pain can actually be a barrier to achieving relief. One writer found this out the hard way when she presented to the ED for kidney stones. She recalled, "being doubled over in agony in the ER during graduate school. A doctor and two nurses told me: 'We'll help you when you stop screaming'" (Finch, 2016, para 14). Women who express pain in ways deemed unacceptable or noncredible to a provider may find their access to pain control hindered. Outward expression of pain may be perceived as attention-seeking rather than true expression of internal pathology. However, as one woman aptly stated during her patient testimonial, "Sometimes women don't want to be seen as complaining, or dramatic, or attention-seeking. But why wouldn't you want attention when you're in pain? Like, why do we make ourselves feel bad that we want someone to listen to us" (As/Is, 2017, Kelsey). Unfortunately, medical professionals create an impossible situation for many patients, forcing them to seek attention for their symptoms while simultaneously not appearing attention-seeking.

Many women find it difficult to appear credible while reporting persistent pain symptoms, and fear that seeking attention for a real problem will be perceived as seeking attention for "nothing". They are forced to expend great effort on saying exactly the right things, dressing and appearing a certain way, and expressing their complaints in a way that does not make them seem like a chronic complainer or attention-seeker with illegitimate problems (Werner & Malterud, 2003). These efforts are not overcompensation; physical communication of sickness does play a role in determining whether providers believe that women's pain is as severe as they claim. In one study of

bias due to patient appearance, physically attractive female patients were viewed by subjects as more able to cope with their pain and were perceived to be experiencing less pain than less attractive female patients. However, no such differences were found in subjects' interpretations male patients (Hadjistavropoulos, McMurtry, & Craig, 1996). Ultimately, an otherwise healthy, attractive-looking female patient complaining of pain may face a negative attention-seeking label that results in poor pain management, even though seeking care should be encouraged in all patients experiencing pain. Medical professionals who delegitimize the complaints of patients who do not appear or communicate in the ways that those providers would prefer or expect may inadvertently contribute to pain management disparities that affect women's access to equitable care.

There is also evidence to suggest that the gender of the provider may impact pain management. For example, Safdar et al.'s (2009) study of patients with abdominal pain in the ED found that male physicians were more likely to prescribe opioid medications to male patients, while female physicians were more likely to prescribe analgesics to female patients. Female physicians were more likely to give pain medications in general than male physicians (Safdar et al., 2009). Similar results were found in a study of 111 primary care physicians who were asked to read clinical vignettes depicting patients with lower back pain and then answer questions regarding their management plan for those patients. Female physicians provided higher doses of hydrocodone to female patients, while male doctors gave higher doses to male patients (Weisse, Sorum, Sanders, & Syat, 2001). The authors suggest that providers may empathize with patients of the same sex, or perhaps more easily recognize their pain related behaviors. Others have proposed that patients' willingness to admit pain symptoms may be impacted by the provider sex.

However, significant impact of provider sex on pain management has not been consistently seen across all studies, and may be mediated by factors such as patient and provider age and race, level of training, type of presenting complaint, presence or absence of pain protocols, and provider type (Filligim et al., 2009; Uri et al., 2013). Regardless, interactions between patient and provider sex may play some role in treatment disparities between men and women. Given that, as of 2015, just 34% of all currently practicing physicians, 27% of emergency medicine physicians, 38% of family medicine physicians, 37% of internists, 19% of general surgeons, and 5% of orthopedic surgeons are female, these provider-gender effects may disproportionately affect female patients (Active Physicians, n.d.).

Pain and its treatment are poorly understood, leading to frustration by providers and suffering by patients. Despite the high economic burden and associated loss of productivity in affected patients, glaringly little attention and funding has been given to pain management research (Ballweg et al., 2010). The Academic Emergency Medicine community developed a research agenda to address the lack of research in sex, gender, and pain at their consensus conference in 2014, and more such efforts are needed to grant pain research the support that it requires (Musey et al., 2014). The little information that practitioners currently have regarding treatment of men and women in pain is inconsistently put into practice, leaving many women to face insufficient pain management. Failure to account for provider biases, communication differences, and societal misconceptions contributes to the disparity in pain-related care. Furthermore, little is done at the medical school level to improve future-provider knowledge of gender and sex-specific care; few schools address pain management in their curricula, and less

than half of medical school graduates report that their medical school's curriculum has improved their understanding of sex and gender in medicine (Ballweg et al., 2010; Jenkins et al., 2016). The impact of gender and sex on pain management strategies, and how biases may impact practitioners' ability to provide objective and equitable care, should not be overlooked in medical education. Furthermore, hospitals must take steps to examine whether a patient's gender impacts his or her ability to achieve adequate pain management at their individual institutions. Systems-based efforts such as protocolized pain management, elimination of unnecessary delays in pre-analgesic testing or procedures, and implementing pain management outcomes as quality indicators may improve women's experiences in seeking care for pain. Minimizing patient suffering through pain management is one of the most important tasks facing physicians in the inpatient and outpatient setting, and inequitable care of male and female patients must be adequately addressed as a key component of this effort.

CHAPTER 4: CONCLUSION

The medical community has made a considerable amount of progress in reducing gender bias in medicine over the last half-century. Credit is due to activists and medical scholars who heeded the voices of women expressing that the sexist, often psychogenic, terminology used to explain away their symptoms was not in line with their personal experience of their own bodies. Thanks to the hard work of these individuals, and to the rapid reframing of women's roles in society, medicine achieved significant changes in its treatment of women (Munch, 2004). These successes highlight the importance of listening to patients, and not simply relying on the voices of those in power in medicine, when judging whether the healthcare system treats patients equitably.

The late 20th century advances in care of female patients are also notable because they demonstrate the level of change that is possible within a relatively short period of time in response to evidence of insufficient medical practices (Munch, 2004). Today's activists, patients, medical professionals, and scholars might find inspiration in the victories of this movement as they identify current problems in need of change. Recognizing the remaining work to be done in eliminating gender disparities in medicine may be daunting, but the fact that empirical and anecdotal evidence dramatically redirected the history of bias against women in medicine shows what can be accomplished (Munch, 2004).

One can celebrate the elimination of words such as "hysterical neuroses" from the official medical lexicon while simultaneously recognizing that such changes have not been sufficient in achieving equity of outcomes and access to care (Tasca et al., 2012). Substantial work remains to be done in achieving gender parity in healthcare for men and

women, particularly when it comes to diagnosis and pain management. Women continue to experience the effects of bias while seeking care for a variety of illnesses, and have taken to multiple mediums to make their voices heard (Parker & Williams-Hauwanga, 2017; Thomas, 2013). Writers and activists continue to elevate these women and their stories to incite change (Dusenbery, 2018; Doshi, 2015; Fassler 2015). Popular culture references to gender bias in medicine have emerged, including an entire episode of the popular medical drama *Grey's Anatomy* which focuses on the difficulty women face when attempting to get doctors to take their chest pain seriously; these references may improve the public's awareness and should prompt ethicists and providers to take heed of the increasing recognition of this problem (Rhimes & Finch, 2018). Subsets of academic medicine have responded by refocusing their attention and resources on identifying areas of disparities (Musey, 2014; National Institutes of Health, 2017). In response, there is a small but increasing body of research on modern-day diagnostic and pain management disparities impacting men and women. However, a minority of studies have studied the effects of policy or educational changes on those disparities. This is an area where research is desperately needed, as the causes of gender disparities in medicine are complicated, and the answers to these problems are unlikely to be straightforward either. Additional effort is needed by those in all levels of medical care to prioritize research into future solutions. Furthermore, an improved understanding of the way that other factors such as socioeconomic status, education level, religion, race, sexual orientation, etc., interact with gender to impact healthcare inequalities will be essential to adequately addressing disparities. In the meantime, common sense policies and solutions that have

been studied thus far, such as pain protocols, should be explored and implemented when possible (Uri et al., 2013).

Most doctors and medical professionals are motivated to enter the medical field by a desire to affect positive change in patients' lives. However, even the most caring among them may inadvertently contribute to the diagnostic and pain management disparities facing their patients. Implicit and explicit biases against women exist throughout society, and medical professionals are unable to dispose of those biases before they walk into work. Despite the inevitable presence of bias, however, healthcare workers should not consider the impact of provider bias on patient outcomes to be inevitable. Instead, they can attempt to increase their own awareness of the problems women face in medicine, and subsequently address identifiable issues in their own attitudes and behaviors. These efforts might start with listening to the plentiful narratives of women who have felt wronged by their providers, and considering the ways that they as individuals might reduce the prevalence of such experiences. Systemic gender inequalities in healthcare and other aspects of society are deeply entrenched, and may not be eliminated within the near future, but individual practitioners should feel empowered to reduce the influence of their own biases on patient care.

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