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Current Practice and Knowledge of Postpartum Depression: Alberta Physicians' Survey

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Current Practice and Knowledge of Postpartum Depression: Alberta Physicians' Survey" submitted by Bushra Iram Wasil in partial fulfillment of the requirements for the degree of Master of Science in Community Health Sciences

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ABSTRACT

Objectives: Postpartum Depression (PPD) is under-diagnosed and under-treated. Understanding physicians' knowledge/practice can help improve PPD management. This study describes the current knowledge and practice of Alberta physicians related to PPD and their opinions about strategies to improve management.

Methods: A self-report mailed and web-based survey of Alberta physicians whose practices included providing care to childbearing age women. PPD knowledge and practice including screening practices, risk factor recognition, use of medication and other therapies and referral practices were examined. Data analysis was primarily descriptively.

Results: 717(33.7%) usable questionnaires were received. More females recognized $\geq$ median number of risk factors (70.6% vs 54.1%, $p<0.0001$) and screened all postpartum patients (68.7% vs 47.3%, $p<0.0001$). Only 31 respondents (4.2%) used standardized self-report instruments and/or structured interviews. Fewer respondents correctly answered diagnosis-related items than items related to recognition of PPD pathology and its treatment and sequelae. More respondents reported using pharmacotherapy for non-breast-feeding than breast-feeding women (92.1% vs 81.8%). Most respondents (80.4%) expressed a need for Continuing Medical Education programs on PPD.

Conclusion: Current practice related to PPD among Alberta physicians is reasonably compliant with new guidelines, but areas for improvement exist, especially in relation to screening, diagnosis and knowledge of available referral resources.

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To My Loving Family

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

Postpartum Depression is a common condition that can adversely affect the normal functioning of the mother and the cognitive and psychological development of the child [1-4]. Despite a large body of literature on Postpartum Depression (PPD) that includes publications on risk factors, treatments, and effects of PPD (on the mother, the child and the family), little data are available describing diagnosis and treatment practices of physicians. Even though the condition is diagnosable and treatable in most instances, it has been suggested that PPD is under-detected and under-treated [5]. To date, little effort has been made to identify and bridge the gaps between research knowledge about PPD and the detection and management practices of physicians who provide obstetric and peri-natal care to women. Understanding of the current knowledge and practice of physicians related to PPD is important for achieving best practice in detection and management of this condition. Baseline information on current practice can be used to enhance related medical school curricula, to plan Continuing Medical Education (CME) programs, and to develop and evaluate clinical practice guidelines for PPD. The purpose of this study was to describe the current knowledge and practice of Alberta Physicians related to PPD. The results provided a detailed description of the current state of practice as well as identified potential targets for further education and other interventions, which may ultimately reduce the impact of PPD on new mothers and their infants and families, as well as on the health care system and society more broadly.

1.2 Statement of the Research Problem

At the initiation of this study, knowledge and practice of physicians in relation to PPD had not yet been described in the literature, despite a relatively high prevalence of PPD and the opportunity for detection and treatment arising from almost universal contact among women with physicians during the postpartum period.

1.3 Rationale

Postpartum Depression (PPD) has been reported as one of the most common complications of the postpartum period with prevalence of up to 23% in women within the first year after delivery [1, 6-8]. Canadian estimates are consistent with these reports. In an Ontario study in 2000 that used the Edinburgh Postnatal Depression Scale (EPDS) as the screening tool, the prevalence was found to be as high as 15.9% of the women studied at six weeks after delivery [9]. Other studies conducted in Montreal in 1999 and in London, Ontario in 1989 showed an even higher prevalence of depressive symptomatology, up to 38%, during the postpartum period [10, 11]. These studies used the Beck Depression Inventory (BDI) as the screening tool.

On the individual level, PPD is a potentially and sometimes severely debilitating condition for new mothers who suffer from this often-recurrent disease [12]. These women find themselves unable to perform everyday work [13]. Other diagnostic criteria for major depression also apply including an inability to participate in normal pleasure seeking activities [14]. Suicidal thoughts are also frequent [13, 15]. A report from the Norwich Department of Health found that about 10% of maternal deaths (including death of a woman while pregnant or within one year of termination of pregnancy including term deliveries and miscarriages) during 1994-96 in the United Kingdom were suicides and psychiatric illness was implicated in all of those cases [16]. In addition to individual misery, PPD has been found to be associated with problems in maternal-child attachment. Many studies show that women suffering from PPD have difficulty in maternal role attainment and establishing a normal mother-infant attachment [17-19]. PPD has also been found to be associated with depression in the father [20], which might have additional adverse effects on the family. A distressing aspect of PPD is that it may adversely affect infants' development and in extreme cases may jeopardize their safety. At least one study has a shown statistically significant association between maternal depression and impaired infant cognitive/psychological development [21] although the direction of causality is uncertain. In addition, women with PPD have frequent thoughts of harming the infant and become afraid of actually committing such an act [22, 23]. Cases of infanticide have been reported in the literature [24] and the risk should always

be considered in the presence of PPD in order to ensure infant safety. Even a single unfortunate event of infanticide is a matter of great concern and should be prevented.

There is good evidence that PPD can be detected by a short screening questionnaire in most clinical settings [25, 26]. The screening process requires 5-10 minutes and has been found to be acceptable to participants and clinicians [15]. PPD can be treated with pharmacotherapy [27] and in severe cases electro-convulsive therapy (ECT) [28]. If treated promptly the duration of the illness is reduced to 4-6 weeks as compared to 1-2 years if untreated [29].

Although many authors contend that PPD is not promptly detected in the primary care setting [4, 30], few have provided evidence in the form of details or data on this issue. However, one recent Canadian study has confirmed this impression. The study was the Ontario Mother Infant Survey (TOMIS) conducted in five regions of Ontario in 2000 by Dr. Watt et al. It was a cross-sectional study of 875 Ontario mothers who had had uncomplicated, singleton, vaginal deliveries of healthy babies. The prevalence of PPD as determined by a score of 12+ on the Edinburgh Postnatal Depression Scale, was found to be 4.3% to 15.9% in the five sample groups (by region) at 4-6 weeks after hospital discharge. Although all these women were in contact with a medical care provider after delivery, none was diagnosed to be suffering from PPD and none was receiving any antidepressant treatment [9]. In view of the associated risks, it is imperative that PPD is diagnosed and treated promptly. Horowitz noted in his 1995 article "Postpartum depression: issues in clinical assessment" that, although clinicians typically gathered information concerning clients' history and concerns during the prenatal period, there was no accepted protocol for linking those data to risk of PPD; nor was there a standardized procedure for assessing mental health status during the perinatal period [31]. This lack of a standardized procedure/protocol existed at the time of this study. In Alberta, postnatal care routinely includes a six-week postnatal visit to the physician, usually the family doctor or Obstetrician. No data about PPD screening/detection practices of Family Physicians or Obstetricians were available either locally or in any other jurisdiction. In the absence of a systematic protocol for the assessment/management of PPD, it seemed like the first research step toward optimizing

practice would be to characterize current practice. This study described current practice and knowledge of physicians on PPD in this context. The findings may ultimately inform areas for improvement toward an evidence-based approach to the management of PPD.

1.4 Objectives

1. To assess knowledge of Alberta physicians about risk factors and management of PPD.
2. To describe current practice of these physicians related to screening and treatment of PPD.
3. To solicit opinions from Alberta physicians about both barriers to and solutions for improving PPD management.

CHAPTER TWO: LITERATURE REVIEW

2.1 Puerperal Mood Disorders

Negative and abnormal postpartum emotional reactions are often seen in new mothers. These are categorized as postpartum blues, postpartum depression (PPD) and postpartum psychosis (Table 2.1). A brief description of these conditions is given below, followed by a more detailed description of PPD.

2.1.1 Postpartum Blues

Postpartum blues is a mild mood disorder characterized by a labile mood with tearfulness, irritability, anxiety and sleeplessness. Mood swings are common, with periods of elation and depression. The blues typically begin three to four days after delivery. No clear correlations have been established with a variety of psychological factors examined. The prevalence of postpartum blues is reported to range from 25% to 80% of new mothers [32]. As prevalent as the blues are, some authors suggest that they are normal rather than pathologic [32, 33]. Most women simply require reassurance and recover completely from this condition in a few days to two weeks without any specific treatment [34].

2.1.2 Postpartum Depression (PPD)

Postpartum depression (PPD) is characterized by the symptoms of a major affective disorder. It usually occurs in the first few weeks to a year after delivery. Varying prevalence of PPD (from 4% to 38%) has been reported by different studies (see section 2.2). In most instances, the episodes of PPD are treatable with prompt management that includes pharmacotherapy, psychotherapy, and in more severe cases, electro-convulsive therapy (ECT). The risk of developing PPD after subsequent pregnancies is significantly increased after one episode of PPD. If left untreated the episode of PPD may persist for several months to years and significantly affect the functioning of the mother and the psychological and cognitive development of the infant. Further details about PPD are given in section 2.2 of this chapter.

2.1.3 Postpartum Psychosis

Postpartum psychosis is a more severe but less common psychotic illness that affects 1-2 women per 1000 deliveries. The usual onset is between 3 to 14 days postpartum. The episodes tend to be severe with presence of delirium, delusions, irritability, hallucinations, and an impaired concept of reality. Because of clinically obvious and severe symptoms, these patients almost always need to be hospitalized. As with PPD, the women with a history of postpartum psychosis are at higher risk of being hospitalized after subsequent childbirths because of this condition [29, 32, 35].

Table 2.1: Postpartum Psychiatric Disorders

	Postpartum Blues	**Postpartum Depression**	**Postpartum Psychosis**
Prevalence	30% - 80%	10% - 23%	1%
Usually starts	3-5 Days	2-6 Weeks PP	3-14 days PP
Usual Duration	2 Days to 2 Weeks	Months to year (4-6 Weeks if treated)	6-12 Weeks almost always treated
Clinical Features	Labile mood	Major Depression	Psychotic features
Treatment	Reassurance	Pharmacotherapy Psychotherapy ECT	Pharmacotherapy Hospitalization

This information has been adapted from Rosenthal and O'Grady [29].

2.2 Postpartum depression (PPD)

PPD is likely to have a very large impact on postpartum mental health due to its relatively high prevalence and longer duration.

2.2.1 Prevalence

The most recent and relevant study of PPD prevalence was the Ontario Mother Infant Survey (TOMIS) conducted by Watt et al. [5] in 2000. This was a cross-sectional survey with follow up after 4 - 6 weeks of delivery. Twelve hundred and fifty women who had singleton vaginal deliveries of healthy infants were recruited from five Ontario hospitals with varied size, practice characteristics, and location. Data on 875 women (70%) were

available for analysis. This study used the Edinburgh Postnatal Depression Scale (EPDS) as the screening tool with a cut off point of 12 and found that the prevalence of PPD ranged from 4.3% to 15.9% across hospitals. EPDS is a specifically designed screening tool for PPD and a cut off point of 12 is indicative of the presence of PPD [25].

Earlier, Seguin et al. (1999) conducted a longitudinal study on low socioeconomic status women in four hospitals in Montreal. Inclusion criteria included less than 11 years of education and a household income below the poverty level as established by the Canadian Council of Social Development. Ninety-eight women were recruited at 30 weeks of pregnancy and followed until six months postpartum. All women were primiparous, French-speaking and at least 18 years of age. Out of the 68 women (70% of the original sample) who were still in the study at six months postpartum, 38.2% scored 10 or more on the Beck Depression Inventory (BDI) [10]. BDI is an extensively used depression screening tool and a score of 10+ represents mild-moderate depression [36].

Another Canadian study [11] conducted in 1989 in London, Ontario recruited 420 consecutive pregnant women from a large urban hospital and from the private practices of more than 15 physicians. The BDI was administered three times, at 23 and 36 weeks gestation and 4 weeks after delivery. Both pre- and postpartum data were available for the final sample of 295 women. At the postpartum assessment, 24.8% of the women were found to score 10 or greater on BDI. The women who scored over 10 on the BDI in any of the three evaluations were administered the shortened version of the Schedule for Affective Disorders and Schizophrenia (SADS) that was sufficient to yield Research Diagnostic Criteria (RDC) [11] for the presence of PPD. Twenty cases of diagnosable depression were identified at the postpartum assessment, yielding a prevalence of 6.8%. It should be noted, however, that this was a conservative estimate because the SADS was administered to only those who scored 10 or higher on the BDI, and the sensitivity of BDI is only reported to be 85% [37]. Studies conducted in other parts of the world also reported PPD prevalence ranging from 5% to 35% (Table 2.2). Variation in prevalence is certainly attributable to differences in diagnosis/screening instruments and methods as well as differences among the populations themselves. For example, studies conducted on high-risk populations (e.g. low socio-economic populations) tend to find higher

prevalence estimates of PPD [8, 10]. Similarly, studies that use the Beck Depression Inventory (BDI) as the screening tool also seem to report higher prevalences [11]. Some studies give two estimates of prevalence using two cut off points on the screening tool. Fisch et al. found that 12.4% of their sample of postpartum women scored 10 or more on EPDS while 5.2% scored 12 or more [38]. It should be noted that the screening tools are not diagnostic for PPD and using a lower cut off point on the screening tools likely over-estimates the prevalence.

Table 2.2: Recent Studies Reporting PPD Prevalence

Author (Year)	Setting	Study design Sample Size	Screening Tool & cut off score	% Prev. of PPD 4 – 20 weeks
Watt (2002) [5]	Community based, Canada	Cross-sectional 875	EPDS 12/13	10.1
Seguin (1999) [10]	Hosp. Based Canada	Pros. Cohort 68	BDI > 10	38.2
Gotlib (1989) [11]	Hosp. Based Canada	Pros. Cohort 295	BDI > 10	24.8
Glasser (1998) [8]	Hosp. based Israel	Pros. cohort 288	EPDS 9/10	22.6
Tamaki (1997) [39]	Clinic Based Japan	Pros. cohort 627	EPDS 9/10	12.1
Fisch (1997) [38]	Hosp.based Jerusalem	Pros. cohort 327	EPDS 9/10	12.4
Georgiopoulos (1999) [15]	Clinic based USA	Cross-sectional 909	EPDS 11/12	11.4
Warner (1996) [40]	Hosp.based S.Manch	Cross-sectional 2375	EPDS 12/13	11.8
Martin (1997) [41]	Clinic Based UK	Cross-sectional 152	EPDS 14/15	14.5
Morris-Rush (2003) [42]	Hospital based USA	Cross-sectional 121	EPDS 10/11	22
Hickey (1997) [43]	Hosp. based New S. Wales	Pros. Cohort 425	EPDS 12/13	9.9
Righetti (1998) [44]	Hosp.based Geneva	Pros. Cohort 57	EPDS 12/13	10.2

EPDS = Edinburgh Postnatal Depression Scale, BDI = Beck Depression Inventory

2.2.2 Biological and Psycho-social Correlates

Both biological and psychosocial factors have been implicated in the etiology of PPD. There are many hormonal/biological changes during pregnancy and the postpartum period and an increased risk for depression during this period suggests a role for hormonal influences. However, evidence also exists for psychosocial factors as being associated with PPD. Most likely, the psychosocial and environmental factors interact with biological factors to account for greater susceptibility to depression for women in the perinatal period.

There is evidence that sudden changes in estrogens and progesterone levels are related to PPD. Bloch et al. conducted a double blind study in 16 non-pregnant and non-postpartum women. Eight of the women had history of Postpartum Depression and eight did not. Supra-physiologic gonadal steroid levels of pregnancy were simulated in these women by extrinsic administration of leuprolide acetate (the gonadotropin-releasing hormone agonist), estradiole (a type of estrogens) and progesterone. The hormones were then withdrawn to simulate puerperium. Five of the eight women with a history of postpartum depression (62.5%) and none of the eight women in the comparison group developed significant mood symptoms during the withdrawal period as measured by daily self-rating of subjects' mood, BDI, and EPDS. The researchers concluded that the reproductive hormones estrogen and progesterone were involved in the development of postpartum depression in a subgroup of women [45].

In another double blind placebo controlled study long-acting progestogen contraceptive, norethisterone enanthate, given within 48 hours of delivery, was found to be associated with an increased risk of developing postpartum depression [46].

Postpartum thyroiditis is an inflammation of thyroid gland that occurs in some women within weeks after delivery. This condition presents with periods of hypo and hyperthyroidism. Thyroid dysfunction, at the same time, has been found to be common among depressed patients [47]. These findings together, point to the possible implication of thyroid dysfunction as a cause of PPD.

Numerous studies have examined associations between various psychosocial factors and the development of PPD. These studies vary a lot in their methodology,

results, study populations, risk factors studied and their definitions. Despite their heterogeneity, the studies provide useful information about important risk factors. It should be noted that causality has not been established for any of these factors.

A past history of psychiatric illness including history of psychotropic medication use, trait anxiety or depressive symptoms during pregnancy and/or within three days after delivery has consistently been found to be associated with the development of PPD [20, 38, 44, 48-50]. A score of 45 or more on the State-Trait Anxiety Inventory Trait (STAIT) during late pregnancy has also been found to be significantly correlated with high EPDS scores during the postpartum period [39].

Low socio-economic status (SES) and variables that represent low SES have been found associated with PPD. These include annual household income of less than 20,000 dollars and unemployment of self or that of the head of the household [5-7, 44, 48, 51, 52]. At least one negative study is also published for this factor [38]. Many studies have also found significant associations between PPD and stressful life events including being laid off from a job or changing jobs, moving, financial crisis, serious disease or injury, and separation from the spouse [20, 39, 43, 44, 48, 53]. Another important factor that has been found to be associated with PPD in some studies is immigrant status [8, 38]. Righetti et al., in a longitudinal study conducted in Geneva, found that more of the postnatally depressed patients came from non-European countries [44]. Not having strong religious observations or affiliations has also been found to be associated with PPD [8, 38, 54].

Women of more than 30 years of age at time of childbirth have been found to be at an elevated risk of developing PPD [38]. Similarly, an age of less than 16 years at the time of delivery has been found to be significantly associated with PPD [48]. However, some studies did not find significant differences in the mean age of their subjects and controls [8, 39, 40, 44].

Most studies that have investigated a lack of social and/or emotional support (or related variables such as marital dissatisfaction, single status, poor relationship with the partner, social isolation etc.) have found significant associations between them and PPD

[5, 48, 50, 52, 53, 55]. However, some negative studies for the lack of social support from family/spouse are also found in the literature [38, 39].

Difficulties with physiological aspects of childbirth are also important factors to consider when evaluating women at an elevated risk of developing PPD. Compared to non-depressed mothers, women suffering from PPD have been found to be more likely to have postnatal complications [56], to have a perceived difficult childbirth experience [7, 44] and to want to stay longer in the hospital [5]. They have also been found to be more likely to have had unwanted or unplanned pregnancies [38, 40, 52] and to have breast-feeding difficulties [40, 52].

Many other psychosocial and perinatal factors have been investigated for their associations with PPD but no convincing or consistent evidence is found for them. These include low educational levels [38, 43, 54], not having a professional education [44], gestational age [39], and birth weight of the baby [39, 40].

2.2.3 Clinical Course

The Diagnostic and Statistical Manual of Mental Disorders version IV (DSM-IV) by the American Psychiatric Association specifies PPD as Major Depression occurring within four weeks of delivery. However, PPD has also been described as depression occurring within several months to a year after delivery [41]. According to the DSM-IV, the same diagnostic criteria for a diagnosis of depression at any other time of life also applies to PPD (Table 2.3). To summarize, the diagnosis requires that the patient experience either dysphoric (depressed) mood or anhedonia (loss of interest in pleasure seeking activities) most of the day, nearly every day, for at least two weeks. Additionally, at least four (or three if both depressed mood and anhedonia are present) of the following symptoms must be present in the same two week period: difficulty concentrating or making decisions; psychomotor agitation or retardation; fatigue; changes in appetite; changes in sleep; recurrent thoughts of death or suicide; feelings of worthlessness or guilt [14]. The cardinal symptoms of major depressive disorder are depressed mood and loss of interest or pleasure. Other symptoms vary enormously. For example, insomnia and weight loss are considered classic signs, even though many depressed patients gain weight and sleep excessively [57]. The symptoms of depression

seem especially variable for women in the postpartum period. Specifically, these women present with predominant anxiety, feelings of guilt usually focusing on failure at motherhood, and thoughts of harming their infants. Depression with psychotic features may be present with delusions frequently focusing on the child's health [23, 58, 59]. Weight and appetite changes in recently delivered (and often breast-feeding) women are not as specific as those associated with depression in other people. Sleep deprivation is almost universal in new mothers [59] and should be carefully distinguished from decreased or excessive need of sleep. Suicidal ideation is common in postnatally depressed women [15].

Table 2.3: DSM-IV A Criteria for Major Depressive Episode (DSM-IV)

Five (or more) of the following symptoms have been present during the same two-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure.

1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g. appears tearful). Note: In children and adolescents, can be irritable mood.
2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation made by others).
3. Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day. Note: In children, consider failure to make expected weight gains.
4. Insomnia or hypersomnia nearly every day.
5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down).
6. Fatigue or loss of energy nearly every day.
7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick).
8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others).
9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

2.2.4 Sequelae and Societal Impact of PPD

Studies consistently show a statistically significant association between PPD and an unhealthy mother infant relationship [60-63]. The disorder has also been found to be associated with psychiatric problems [64] and poor adjustment in school [3] in the

children. Cognitive development of the infant is also adversely affected [2]. PPD has also been found to be associated with depression in fathers [20]. A report from the Norwich Department of Health found that about 10% of maternal deaths during 1994-96 in the United Kingdom were found to be suicides and psychiatric illness was implicated in all of those cases [16]. The report included death of a woman while pregnant or within one year of termination of pregnancy including term deliveries and miscarriages.

It is important to recognize the impact of PPD beyond individuals and families. For example, Boath et al. reported average per patient cost of 2710 pounds sterling for routine primary care of postpartum depression in Staffordshire, UK over a 6-month period [65]. Although not specific for PPD, the economic and societal burden of Major Depression has been studied and reported at length. In developed nations, the economic brunt of Major Depression including the costs of lost productivity has been estimated in the order of tens of billions of dollars per year [66-68]. It is difficult to isolate the impact of PPD from such reports. Still, it is conceivable that this condition would have a substantial contribution to this burden considering that depression is twice as common in women as in men [69] and that postpartum period is a high risk time for an episode of depression [41].

2.2.5 Screening and Diagnosis

In view of the adverse effects of PPD, it has been recommended that all postnatal women should be screened for PPD [15, 31]. Women who are identified to be at a higher risk of PPD should be followed closely during the postnatal period for several months. These women can be identified by objective psychosocial assessment during pregnancy [70] or presence of unusual symptoms after delivery like frequent tearfulness and irritability [71]. The sleep, appetite, and fatigue symptoms are not very predictive during the postpartum period because atypical sleep and appetite patterns are common during this period. Hence, the detection of pathological changes requires specifically directed questions such as if the mother is able to sleep when the infant sleeps, or if food appeals and tastes good to her [72]. It is more discriminating to focus on the cognitive symptoms of depression: guilt, hopelessness, diminished self-esteem, etc to make a diagnosis of depression during the postnatal period.

Many diagnostic/screening methods are available and can be used to detect the presence of PPD including the Edinburgh Postnatal Depression Scale (EPDS), the Postpartum Depression Screening Scale (PDSS), the Beck Depression Inventory (BDI), the Hamilton Depression Scale, and the Zung scale.

Of these, the EPDS is the most widely used instrument. It is a well-validated measurement instrument specifically designed to detect PPD [25, 73-75]. EPDS is a 10-item self-administered questionnaire that takes 5-10 minutes to complete. Women scoring above a threshold of 12 are likely to be suffering from a depressive illness. At this cut off point, the instrument is 86% sensitive and 78% specific and has a positive predictive value of 73% [25]. It is recommended that a threshold of 10 or above may be used if the scale is considered for routine use by primary care workers to identify possible cases of PPD. At a cut off point of 10 or above, the failed detection of cases could be reduced to fewer than 10% [25]. However, it may increase the number of false positives.

The Postpartum Depression Screening Scale (PDSS) is a recently developed instrument specifically designed to screen for PPD. It is a 35-item instrument that assesses seven dimensions: Sleeping/Eating Disturbances, Anxiety/Insecurity, Emotional Lability, Cognitive Impairment, Loss of Self, Guilt/Shame, and Contemplating Harming oneself. The authors did hospital based psychometric testing of PDSS for major depression during the postpartum period and found that the instrument had a sensitivity of 94% and a specificity of 98% when a cut-off score of 80 was used. For both major and minor depressions a cut off point of 60 yielded sensitivity of 91% and specificity of 72% [76]. The authors recommended it as a routine screening instrument for mothers.

The BDI was originally designed to measure the depth or intensity of depression in psychiatric patients but has frequently been used as a community-screening instrument and for clinical research [77]. Since its development in 1961, the BDI has been translated into many languages (including Chinese, Spanish, French, German, Dutch, Arabic, Persian) and has been used in over one hundred studies [78]. The reliability and validity of BDI have been extensively examined and are reported to be fairly high [77]. The scoring on the BDI is used to describe different levels of depressive symptomatology: 0-9 are within the normal range; 10-18, mild-moderate depression; 19-29, moderate-severe

depression; and 30 and above, extremely severe depression [36]. Despite its wide use for general depression, the BDI has not been specifically validated for PPD [25]. In addition, a cut-off score of 10 seems to be prone to false positive inflation [78] even though the BDI has been used in several studies of PPD with a cut off score of 10.

The Hamilton Depression Rating Scale is an observer rated scale commonly used in community based practice and research to screen for depressive symptoms [79]. Another self-report instrument in common use for detecting depression is the Zung Depression Rating Scale [80]. These instruments are not specifically designed to detect PPD although they have been used in studies of PPD for this purpose.

No study was found evaluating patient outcomes resulting from screening for PPD by physicians. Enhancement of early detection and treatment of PPD has been reported as a result of a PPD screening project used by health visitors [81]. However, the authors did not provide data or estimates of the effect size found.

2.2.6 Treatment

According to the latest guidelines for PPD by the Scottish Intercollegiate Guidelines Network, postnatal depression should be managed in the same way as depression at any other time, but with the additional considerations regarding the use of antidepressants when breast-feeding [82]. Conventional treatment of depression, (and hence of PPD) may include antidepressants or other pharmacotherapy, psychotherapy, and/or Electroconvulsive Therapy (ECT). Unconventional treatments (complementary and alternative medicine (CAM)) have also become popular in recent years [83, 84] and some physicians might consider them as treatment options for PPD.

2.2.6.1 Anti–Depressant Pharmacotherapy

Antidepressant medications are an important part of the conventional treatment plan for depression including PPD [27, 34, 85] and should be considered in all cases of moderate to severe depression and most cases of mild depression [34]. During the 1950s and 1960s, tricyclic antidepressants (TCA's) and monoamine oxidase inhibitors (MAOI's) were developed. These agents provided relief of specific symptoms as opposed to general symptoms of mental disorders treated by the tranquilizers that were available before 1950s [85]. In late 1980s selective serotonin reuptake inhibitors (SSRIs)

emerged and became prominent [85] due to their better side effect profile. In addition, a variety of "other" or "atypical antidepressants", each with a different mechanism of action, have emerged since the introduction of SSRIs. Antidepressants are generally equally effective in treating major depression, however, individual patients may respond to one agent better than they do to another [34, 85]. Thus an individualized treatment plan is recommended that may involve other considerations as well e.g. safety, side effects, tolerability of side effects, cost etc [34, 85, 86]. The safety of the nursing infant is an important issue in selecting antidepressants for PPD in breast-feeding mothers because most antidepressant medicines are secreted in breast milk. A limited number of studies have assessed the efficacy of either pharmacological or non-pharmacological therapies for treatment of PPD. The following description pertains to the use of antidepressants during the postpartum period. A detailed description of their pharmaco-kinetics and side effects is beyond the scope of this paper.

2.2.6.1.1 Selective Serotonin Reuptake Inhibitors (SSRI)

If the woman is not breast-feeding the infant, PPD would be treated as Major Depression at any other time in life [82], and in that case, one of the SSRI's may be chosen as the first line agent [27]. Even in the breast-feeding woman, there is no clinical indication to stop breast-feeding while taking paroxetine, sertraline or fluoxetine (which are SSRIs), provided the infant is healthy and his or her progress is monitored [82]. All the SSRIs including the above named and citalopram are secreted in breast milk [87-93]. At least one report of infant irritability with exposure to fluoxetine through lactation [94] and another with citalopram [92] has been published. In most instances, these medicines are undetectable in the infant serum [87-89]. The elapsed time between maternal dosing and infant feeding has been shown to affect the amount of antidepressant medication to which the nursling is exposed [95]. In one of their studies, Stowe et al. identified a concentration gradient that paralleled the gastrointestinal absorptive phase. They also found that the concentration of the medicine is higher in the first part of the milk compared to the last part. Peak concentrations occurred 7-10 hours after the maternal dose, and by simply discarding one feeding (at 7-8 hours after the maternal dose), they determined that the total daily dose to which an infant would be exposed could be

decreased by nearly 25% [93]. Paroxetine may be the preferred drug because of the low milk/plasma ratio [82].

2.2.6.1.2 Tricyclic Antidepressants (TCA)

These medicines may be used in select patients of major depression and non-breast-feeding PPD cases. The TCA's are reported to be secreted in the breast milk with a serum milk ratio of one and variable amounts are found in infant serum [96, 97]. However, it has been suggested that there is no clinical indication for women treated with TCAs (other than doxepin) to stop breast feeding, provided the infant is healthy and its progress monitored [82]. Some authors have supported the use of secondary amine tricyclics (nortriptyline & desipramine) as the first line agents in nursing women [71, 95].

2.2.6.1.3 Monoamine Oxidase Inhibitors (MAO)

These medicines are contraindicated in pregnancy [71] due to their possible associations with congenital anomalies. No data regarding their use during the postpartum period are available.

2.2.6.1.4 Other Antidepressants

Bupropion, venlafaxine, trazodone, and mirtazapine are described as "other" or "atypical" antidepressants, since these do not fit into any of the categories above [98]. Nefazodone and trazodone are classified as Triazolopyridines. Nefazodone has recently been withdrawn from the Canadian market because of reports of hepatotoxicity. Venlafaxine is reported to be secreted in the breast milk with milk/plasma ratio of 2.8 – 4.8 and has been detected in the sera of nursling infants, though no adverse effects are reported [99]. No controlled trials for these agents during pregnancy or lactation are found in the literature.

If pharmacotherapy is the treatment of choice, treatment should be initiated with one of the SSRIs (fluoxetine, paroxetine, citalopram, sertraline) or TCAs (amitriptyline, desipramine, nortriptyline) [27, 100]. Continuation of the treatment should be guided by the patient's response to the initial treatment. It is recommended that if there is no response, the dose should be increased in 2-4 weeks and switching to another first line antidepressant medicine may be considered after another 2-4 weeks of treatment. Switching within the class may also be considered for SSRIs. If there is still no response,

changing to an agent with a different mechanism of action should be considered. During 16-20 weeks following remission, the same medicine with the same dose should be maintained to prevent relapse [27]. If a breast-feeding mother is taking psychotropic medication, infant development should be monitored and a careful assessment of the risks and benefits of prescribing should be made. Medications prescribed to breast-feeding mothers are best taken as a single dose where possible and should be administered before the baby's longest sleep period [82].

2.2.6.2 Other Pharmacotherapy

Other medicines used in the treatment of depression include benozodiazepines, mood stabilizers, antipsychotics, and hormones. They are usually added to the antidepressants but occasionally are used alone.

2.2.6.2.1 Benzodiazepines

It is recommended that Benzodiazepines should be avoided in the first trimester of pregnancy and new prescriptions for benzodiazepines should not be given in mothers who are breast-feeding [82].

2.2.6.2.2 Mood Stabilizers

This group includes lithium, valproate, carbamazepine, gabapentin, and lamotrigine. In view of the deleterious effects of these medicines on the fetus and on breast-fed infants, women taking these medicines during pregnancy or lactation should be treated under specialist supervision [82]. Their serum levels and fetal/infant development should be carefully monitored [82]. Marcus et al. suggests carbamazepine as a safer agent for nursing mothers because it is metabolized rapidly neonatally as compared to lithium that is excreted without being metabolized [71].

2.2.6.2.3 Antipsychotics

Depressed patients with psychotic features might require antipsychotic medication in rare cases. If necessary, these medicines should be prescribed with caution in lactating women with careful mother and infant follow up [82].

2.2.6.2.4 Hormones for PPD

Few studies evaluating the role of hormones in the treatment of PPD have been published. In one study, Gregoire et al. found that transdermal estrogen patches may be

an effective treatment for PPD [101]. Ahokas presented two case reports of women who responded successfully to treatment with sublingual estradiol [102]. It has been suggested that there is no role of progesterone in the treatment of PPD and it may even be harmful [46]. The Canadian Psychiatric Association (CPA) recommend estrogen as third line treatment for depression with level two evidence (i.e. at least one randomized controlled trial with an active comparison group) [27].

Thyroid dysfunction has been found to be common among depressed patients and by adding thyroid hormones with TCA's in treating depression, the antidepressant effect of the drug occurs much faster than with TCA alone [103]. In view of the occurrence of postpartum thyroiditis it has been suggested that thyroid hormones (triiodothyronine or thyroxine) may be considered as augmentation strategy for cases of PPD who do not respond to antidepressant treatment [104].

2.2.6.3 Psychotherapy

Psychotherapy is also an important component of the conventional treatment plan for depression (and PPD). A specific psychotherapeutic approach may be considered in the initial treatment plan in mild to moderate depression and/or in patients with psychosocial issues [34]. Several models of psychotherapy have been described including Cognitive Behavioral Therapy (CBT), Interpersonal Psychotherapy (IPT), Psychodynamic Psychotherapy, Brief Dynamic Psychotherapy (BDP), and group therapy. IPT has been recommended as an efficacious treatment for postpartum depression [27, 105]. Cognitive Therapy has also been found effective in treating PPD [106]. Counseling, enhanced social support, and psychoeducation have also been recommended for the treatment of PPD [27]. Family Therapy and Marital Therapy have important roles in the treatment of postpartum depressive mood, as it is often associated with maternal role attainment and adjustment difficulties.

2.2.6.4 Electroconvulsive Therapy (ECT)

The historical origin of ECT dates back to the late nineteenth century. Initially, ECT was performed with the patient alert and awake. The procedure was disfavored because it was frightening and associated with complications resulting from the often-violent tonic-clonic convulsions produced. Today, ECT is administered under

anaesthesia with the patient paralyzed. Hence, ECT is gaining a place as a respected and legitimate method of treatment for selected patients with mental disorders including depression [85]. In general, the indications of ECT during PPD are the same as in other circumstances [104] and it has been found to be effective in treating severe cases of PPD [28]. ECT is recommended for patients who need rapid resolution of life-threatening symptoms (refusing food or being suicidal or infanticidal), who cannot tolerate the medical risks of other treatments, or who have poor response to other treatments [34, 85]. ECT is more effective than antidepressants alone for the treatment of major depression with psychotic features [85]. Patients who receive ECT may experience some degree of confusion after treatment and temporary amnesia [85, 104]. Both heart rate and blood pressure rise significantly during seizures and special care should be exercised while administering ECT to patients with cerebrovascular or myocardial disease. The risk of adverse effects is one in 1300-1400 patients and that of death is 4.5 in 100,000 treatments [85].

2.2.6.5 Non – Conventional Treatments – Complementary and Alternative Medicine (CAM)

Many Complementary and Alternative Medicine (CAM) approaches including herbal medicine (e.g. St. John's Wort), dietary supplements, massage, aromatherapy, and acupuncture etc. have been used to treat depression [107]. There is some evidence from randomized controlled trials that St. John's Wort is somewhat effective in the treatment of depression [108, 109]. However, systematic research to evaluate the efficacy and safety of CAM during pregnancy and lactation is lacking. An important aspect of herbal remedies is self-medication by some women, and physicians should be aware of such use when managing these women.

2.2.7 Prophylaxis

Prophylaxis in relation to PPD usually refers to secondary prevention of PPD after subsequent pregnancies. Only a few studies have explored preventive measures for PPD and the results are not conclusive to date. The studies differed in their methodology, interventions studied, and results. Wisner et al. found negative results from a randomized controlled trial of Nortriptyline in preventing PPD [12]. Harris et al. studied effects of

thyroxine to prevent PPD and did not find any effect [110]. At least five studies that explored psychosocial interventions for the prevention of PPD in high-risk women did not find any effect of these interventions [111-115]. On the other hand, evidence also exists that some depressions can be prevented by brief psychosocial interventions in the first three months of delivery [116, 117].

2.3 Clinical Practice Aspects of Depression and PPD

One important aspect of management of PPD is the ability of primary care physicians to diagnose the condition and to start treatment. Watt et al. found a high prevalence of PPD at six weeks postpartum in Ontario in 2000. Although all these postnatally depressed women were in contact with a medical care provider after delivery, none was diagnosed to be suffering from PPD and none had been taking any antidepressant treatment [9]. Many other researchers have recognized that childbirth-related mood disorders are often overlooked and have emphasized the need for prompt recognition and efficacious treatment of puerperal mood disorders [4, 31, 118]. Nonacs suggests that both patients and caregivers often dismiss postpartum depressive symptoms as normal or natural consequences of childbirth [86]. Nicolson commented in her book, "Post-Natal Depression" that an increased interest in research on PPD has increased the number of "identified cases" but little is done to enable the women suffering from PPD to cope with their domestic and child-care responsibilities [119].

A recent report from the United States Surgeon General's Office, although not specific to PPD, provides insight into the problem of mood disorders in primary care.

> *... So much is known about the assortment of pharmacological and psychosocial treatments for mood disorders that the most salient problem is not with treatment, but rather with getting people into treatment.... It is essential for first-line (primary care) contacts in the community to recognize mental illness and mental health problems, to respond sensitively, to know what resources exist, and to make proper referrals and/or to address problems effectively themselves. For the general public, primary care represents an important opportunity to obtain*

mental health treatment or an appropriate referral. Yet, primary health care providers vary in their capacity to recognize and manage mental health problems. Many highly committed primary care providers do not know referral sources or do not have the time to help their patients find service [57].

Research shows that depressive disorders are not only a common presentation in primary care but also are often overlooked by many physicians [120-122]. Education and training programs specifically designed to enhance physicians' ability to detect and treat depression have produced encouraging results in some studies [123-125]. Other studies have shown improvement in physicians' knowledge about depression but not in their diagnostic skills after training [126, 127]. Some studies have shown no improvement in either physicians' skills or patient outcomes after training programs [128, 129]. Tiemens et al. found a positive effect of physician training on patient outcomes at three months but the effects faded away in one year [130].

2.4 Research on Physicians' Knowledge and Practice related to PPD

2.4.1 Literature Search Strategy

A systematic literature search was conducted to find studies addressing the issue of physicians' knowledge and practice related to PPD. For this purpose, the comprehensive online database Medline was searched. Medline covers the international literature on biomedicine, including the allied health fields and the biological and physical sciences, humanities, and information science as they relate to medicine and health care. The following phrases were used as keywords for mapping the search; "postpartum depression" or "postnatal depression" or "postpartum mood disorder" or "postnatal mood disorder". The search was limited to the year 1999 to 2004, human, and English language articles. Next, the search was further mapped using the following terms; "family practice" or "primary care" or "family medicine" or family physician" or "obstetrics" or obstetrician" or "gynecology" or "gynecologist" or "treatment" or "prevention". The two searches were then combined by using the Boolean term "AND". This search strategy yielded 168 articles. The titles and abstracts of these articles were

read to identify empirical studies (i.e. reporting original data) that directly addressed physicians' knowledge and/or practice in relation to PPD. The bibliographies of the articles were also searched to identify further such studies.

2.4.2 Physicians' Knowledge and Practice related to PPD

Only three studies were identified that addressed some aspect of physicians' knowledge or practice related to PPD. Due to the limited number and diverse nature of these studies, a quantitative synthesis of results was not possible. Hence, a qualitative review is presented here.

In 2002, Olson led a research team with interest in Pediatrics to conduct a nation-wide cross-sectional survey of primary care pediatricians in the United States [131]. Their objective was to describe the attitudes and approaches of these physicians in the identification and management of postpartum and other maternal depression. Survey questionnaires were sent to 888 pediatricians by mail with two additional mail reminders and up to two follow-up phone calls. Fifty-seven percent (n=508) usable surveys were returned. Of these, only 290 (57%) felt that recognizing maternal depression was one of their responsibilities. The authors reported that this perceived responsibility did not vary by gender, practice location, or practice structure but they did not provide specific data for these comparisons. Three hundred and ninety one respondents (77%) recalled cases of maternal depression and reported management practices for those cases. It should be noted, however, that the management for one particular case (the last recalled case) might not be reflective of usual practice. Identification of cases was based, primarily, on mother's behavior, appearance, and complaints (86%). The diagnostic approaches used were, overall impression (58%) or impression plus inquiry about 1-2 symptoms (37%), formal diagnostic criteria (4%). Notably, screening questionnaires were never used (0%). Sixty six percent of the pediatricians reported to have provided brief interventions (counseling <5 minutes = 32%; $\geq$ 5 minutes = 18%; involve family member = 18%). Referrals to mental health services were made by 29% of respondents and to primary care providers by 28%. Only 2% reported treating maternal depression with medication. Three quarters of pediatricians reported that they provided the mothers with education or written materials. The major barriers that were believed to limit their diagnosis or

management were insufficient time for counseling (73%) and for adequate history taking (70%) and inadequate training for diagnosis/counseling (64%). Twenty percent of the pediatricians mentioned lack of mental health resources as a barrier. Pediatricians reported that they were very likely to implement the following changes in the next six months; self-study and/or guided readings = 26%; attend CME = 17%; use depression screening = 8%.

Lepper and colleagues [132] set out to assess the knowledge and awareness of PPD among obstetric nurses and obstetricians in California, USA. A survey questionnaire was sent to 1196 obstetric nurses and a random sample of 1000 obstetricians/gynecologists with a predetermined quota of 300 women and 700 men. The authors did not mention any follow up methods or any procedure used to weight the results. Seven hundred and twenty five (61%) of the eligible nurses and 204 (20.8%) of the obstetrician/gynecologists completed the survey. The researchers used a two-factor scale to assess recognition of psychosocial antecedents to PPD and impact of PPD. Female physicians showed more awareness than males on both scales (for both scales, $t = -2.2$, $p < 0.03$). The paper addressed the important issue of physicians' knowledge about PPD but discrepancies in the organization of the paper were noted. For example, a noteworthy point is that values for "t" are given in the text but the corresponding table gives the frequencies of respondents in various categories of knowledge accuracy. Some results are given in text that are not supported with numbers or data. Those results are not mentioned here.

A study conducted by Gunn J et al. [133] primarily aimed to report the views of Australian general practitioners as to what physical examination and discussion should take place at the routine six-week postnatal check-up and to determine the influence of gender on the approach to the check-up. The authors conducted a cross-sectional mailed survey of Australian general practitioners (GPs) and received 715 responses from a sample of 1022 (response rate = 70%) with the use of three mailings, one follow up phone call, and an incentive for completion of three practice assessment points for Continuing Medical Education (CME) purposes. One unique aspect of the information collected was whether and the extent to which maternal feelings were discussed. Female

physicians (GPs) were found to be more likely to believe that maternal feelings, mother's sleep, mother's diet, and tiredness should be discussed routinely at the 6-week postnatal checkup (OR's adjusted for age, practice location, provision of intrapartum care, provision of shared care and postgraduate qualifications in obstetrics (95% CI's) 3.1(1.6-5.9); 1.8(1.2-2.6); 1.8(1.4-2.3); 2.4(1.7-3.5)). It should be noted, however, that these results pertained to the respondents' beliefs and it was likely that most GP's were unable to achieve in actual practice what they thought should be done on all encounters with the postnatal women.

None of the above-mentioned studies was Canadian and the targeted professional groups and locations were diverse. These are just three reasons why the previous results are difficult to generalize to Alberta physicians. However, these studies did identify some factors that might be related to practice and/or knowledge of Canadian physicians in this regard, and provide some data for crude comparisons.

Apparently, very little research is available on the topic of physicians' practice and knowledge about PPD. The few available studies do not provide data on family physicians and obstetricians/gynecologists' approaches to PPD. Moreover, these studies are not generalizable to Alberta physicians. If progress is to be made on detection and evidence-based treatment in the province, then basic descriptive information on current practice and perceived barriers is very important.

CHAPTER THREE: METHODS

3.1 Research Design

The design of this study was a mailed and web-based self-report survey of Alberta physicians providing care to women of childbearing age. Mailed surveys are the most efficient way for reaching a wide geographic distribution of a population that is relatively homogeneous and consists of fairly well-educated people [134, 135]. Such surveys are especially helpful for understanding current situations, attitudes, and/or interests [134, 135]. The population of Alberta physicians was well specified, and the members were easily identified and contacted. Thus, the design of the study was the most feasible and economical for the broad description of PPD related physicians' knowledge and practice. Alternatives to a self-report study of physician practice could have been direct observation of practice or chart reviews. Neither of these methods was feasible because of geographic dispersion and resources needed for a large sample size. Invasiveness of physician time and patient privacy and reactivity would be additional barriers to direct observation. Chart reviews would have little likelihood of providing most of the needed information because of the possibility of incomplete documentation. These designs are more suited for more focused studies describing practice or evaluating practice interventions once practice patterns are well known. Given that there were no available data on practice patterns, a broad descriptive survey was the most reasonable starting point. It also provided an opportunity for exploratory analysis and hypothesis generation on a topic that had virtually no empirical base.

The survey used self-completed questionnaires. Alternative questionnaire administration methods were telephone or in-person interviews. Both of those methods provide an opportunity for the interviewer to explain should any confusion about the questions arise. These methods are helpful in collecting data from populations with low literacy and/or less technical knowledge. They often yield a higher proportion responding and less missing data [136]. However, implementation is costly and lengthy due to the need for trained interviewers, telephone charges, and traveling for in-person interviewing. Considering the size and geographic distribution of the study sample these methods would have been extremely expensive and, in view of the education level of the

sample, unnecessary. Compared to a mailed survey, in-person or telephone interviews require more of the respondents' time and thus their potential advantages maybe attenuated by decrements in participation. Moreover, mailed surveys provide the respondents the opportunity to complete the questionnaire at their convenience. In mailed survey studies, it is important to minimize respondents' burden as well as costs on the respondents to maximize the proportion responding [134].

Web based surveys have been found to reduce turn around time and may enhance survey item completion rates [137]. A web page for the study was designed and the questionnaire was posted there. The web page address was given to the study sample in the letter and they could respond online if they wished. The respondents were required to enter the unique alphanumeric identification number assigned to them in order to submit the questionnaire online.

A concern about self-reported practice is the extent to which reported practice represents real practice (validity). Due to the social desirability effect, the respondents might be more likely to report optimal practice [138]. The accuracy of self-report can be better in mailed surveys compared with face-to-face interviews because the tendency to give socially desirable responses is decreased [136]. Alternative designs involving direct observation or case recall methods can also be used to study physician practice behavior but can still be subject to the social desirability biases as well as reactivity. Such study designs were not considered appropriate or feasible for relatively early stage of research on PPD-related physician practice.

3.2 Target Population and Inclusion/Exclusion Criteria

All physicians in Alberta who were registered with the College of Physicians and Surgeons of Alberta (CPSA) in 2002, and whose practice included providing care to women of childbearing age were eligible to participate in the study. The CPSA's quarterly publication on physician resources in Alberta was used as the mailing list. This publication is a public document that has been used as a mailing list for other mail-out surveys [116]. Some physicians indicate in their records that their practice "excludes" or

"is restricted" to specific areas. This information was used as the inclusion/exclusion criteria. Physicians were excluded from the survey, who indicated that their practice;

- excluded obstetric/perinatal care; or,
- was restricted to one of palliative care, geriatrics, sports medicine, hospitalist practice, physical medicine and rehabilitation, occupational medicine, asthma, surgical assists, acupuncture, emergency medicine, addiction medicine, allergies, complementary therapies, chronic pain, or sleep disorders; or
- they were retired.

The questionnaire was sent to *all* physicians remaining in the list after exclusions. In an initial screening question, physicians were asked to complete the questionnaire *only* if they provided care to women of childbearing age during the previous year.

3.3 Ethics

The study was reviewed and approved by the Conjoint Health Research Ethics Board (CHREB) at the University of Calgary. Physicians who participated in the development stages of the survey questionnaire (item selection and pre-testing) were recruited through personal contacts of the investigator and members of the Supervisory Committee. Their consent to participate in that phase was implied by their voluntary cooperation with the process.

The addresses of the study population members were available to the public and no specific permission was required to contact them. This study did not present any harm to the participants. Consent to participate was implied by completion and return of the study questionnaire as per the CHREB approval. No respondent was linked with any reported specific response and no respondent will be identified in any publications. Completed questionnaires are to be kept for five years and then destroyed.

3.4 Operational Definitions

- Postpartum Depression (PPD) was defined according to the DSM-IV criteria for major depression (Table 2.3, Chapter Two).

- The Post-natal period (also called the Postpartum period) was defined as the first year after delivery.
- "Alberta Physicians" refers to physicians registered with the College of Physicians and Surgeons of Alberta in the year 2002.
- The study population includes Alberta physicians whose practice conforms to the inclusion/exclusion criteria.
- The sampling frame was the initial list of Alberta physicians from the College of Physicians and Surgeons of Alberta (CPSA).
- Physicians who returned a usable, completed questionnaire are referred to as Respondents.
- The Study Sample is comprised of all the Respondents.
- Current Practice refers to practice in the year prior to completing the survey.
- Screening methods means the use of any standardized instrument or clinical assessment intended to detect PPD or associated symptoms.

3.5 The Survey Instrument

The survey questionnaire was developed under the guidance of two Epidemiologists (one also a Psychiatrist), an Obstetrician, and a Family Physician (the members of the Supervisory Committee). An initial draft of the questionnaire was prepared after reviewing the relevant literature related to PPD, to physicians' practice, and to questionnaire formatting standards. Two other Psychiatrists were then interviewed to review the content of the initial draft. The draft questionnaire was then sent to two other Epidemiologists who provided written comments. After another set of revisions, the questionnaire was sent to another group of 12 physicians for pre-testing with a specific evaluation form that contained the following questions:

- Is any item or word confusing or ambiguous?
- Is the format of the questionnaire logical?
- Are any questions repetitive?
- Does the questionnaire capture items important for this topic?
- Is the order of the questions appropriate?

- Are the questions readable and understandable?
- Is there more than one interpretation of what any question is asking?
- How long does the survey take to complete?
- Is this time acceptable for physicians for this survey?
- General remarks about the questionnaire.

All pre-test respondents gave written feedback about the time taken to complete the questionnaire and their general remarks. Only five, however, provided written feedback for the remainder of the evaluation form. None gave negative feedback to any of these evaluation items. The time for questionnaire completion in the pre-test ranged from 3 to 15 minutes with an average of 10 minutes. The questions were then finalized and the final version of the questionnaire was formatted. The questionnaire (Appendix B) consisted of 26 items that solicited information about demographics, knowledge, practice, and respondents' opinions about PPD management. In addition, two questions were included at the beginning to ensure that only physicians whose practices met the inclusion criteria completed the questionnaires and to identify those wishing to receive mailed study results and PPD information at the end of the study. Table 3.1 gives the details of the content areas described and the items in the questionnaire that were related to each area.

Table 3.1: Content Areas and the Related Items in the Questionnaire

Content Area	**Knowledge Items**	**Practice Items**
PPD Prevalence among Patients		Q.9
Risk Factors	Q.3	
Recognition as Pathology	Q.8.F	
Differential Diagnosis	Q.8.G, I, M	
Sequelae	Q.8.A, B, K	
Screening		Q.4-7
Treatment	Q. 8.C	Q.10-15
Prophylaxis		Q.16
Demographics and Description of Practice	Q.1-2, Q.20-26	
Opinion	Q.8.D, E, H, J, L, N, Q.17-19, Additional Comments	

3.6 Study Variables

3.6.1 Independent Variables

Six Questions (Q.20 - 21 and Q.23 - Q.26) were included for collecting information on demographics including **age, gender, years in practice, practice location, school of graduation, and year of graduation**. Questions 1&2, 9, and 23 were included to collect information about details of respondents practice i.e. **specialty, patient volume, proportion of childbearing age women among patients,** and **estimated PPD prevalence among patients**. These ten variables were used as independent variables in analysis.

3.6.2 Dependent Variables

Knowledge and practice variables were used as dependent variables. Q.3 and eight of the fourteen items on Q.8 were included to gather data on knowledge. Twelve questions (Q.4-7, 9, 10-16) were included to gather data about current practice (Table 3.1). The knowledge items, based on their face validity, represented the content areas regarded as being indicative of knowledge in two areas: knowledge relevant to the respondents' ability to identify the women at elevated risk of developing PPD (hereafter called Risk Factor Recognition) and knowledge relevant to their ability to effectively manage PPD (hereafter called Management Knowledge).

3.6.2.1 Knowledge Variables

Question number 3 on Risk Factor Recognition contained a list of potential risk factors. Risk factors found to be associated with PPD in published studies or that were identified by the experts during questionnaire development were included in the list. The variable **Risk Factor Recognition** was derived from responses to Q.3 and was the simple sum of the number of risk factors identified by each respondent. This scoring was based on an assumption that all risk factors were of equal importance and required a similar level of knowledge to be identified. This scoring was somewhat arbitrary. One reason to use an arbitrary scoring was the lack of systematic evidence to quantify the increase in risk associated with the stated risk factors. Although there have been many studies that have evaluated risk factors for PPD, their diverse methodology makes it impossible to do a meta-analysis to quantify the risk associated with each relative to the others. Another

reason for arbitrary scoring was that, to keep the questionnaire short, the respondents were not given the choice to "grade" the risk factors on a scale. The respondents were equally likely to check off a stronger or a weaker factor if they thought it would elevate the risk to developing PPD irrespective of the perceived magnitude of increase in risk.

A third reason to use an arbitrary scoring system was that we operationalized the risk factors for the purpose of this study. For example, "low Socio Economic Status" (SES) was defined as "family income of less than 20,000 per annum". Similarly, "immigration status" has been found to be significantly associated with PPD. One of the included risk factors was "immigration to Canada within last two years" even though no Canadian study evaluating this risk factor was found. Some of the included risk factors were prone to measurement bias, e.g. history of psychiatric illness, history of anxiety during pregnancy, and history of stressful life experiences. Risk factors related to social support and breast-feeding difficulties were more subjective. In view of the above-mentioned reasons, the use of the crude number of risk factors identified was considered to be sufficient for the purpose to this study. It gave the likelihood of the respondents' ability to identify a woman who was at an elevated risk of developing PPD. In summary, it is acknowledged that this was only an exploratory study and the crude number of risk factors identified did not provide an ideal measure of risk factor knowledge.

To describe management knowledge, items were developed in four domains of knowledge, i.e. *Recognition as Pathology, Differential Diagnosis, Treatment,* and *Sequelae*. Q.8 contained fourteen statements (items), eight of which were related to the defined domains of management knowledge as noted in Table 3.1. (The remaining six items of Q.8 were included to get respondent's opinion, and are described elsewhere in this chapter.)

For these items, respondents provided their responses on a Likert scale with five answer choices; "agree", "somewhat agree", "neither agree nor disagree", "somewhat disagree", and "disagree". After examining the distributions of these answer choices for each level of the independent variables, the variable Management Knowledge was created as follows.

For all of the eight statements (Q.8.A,B,C,F,G,I,K, and M) each response to knowledge items was given a Category Score of one to five points with five points representing the most "correct" answer according to the best current knowledge in the literature. These statements were cast as either positive or negative. Appropriate reversals were made before scoring. A total score was then calculated for each respondent by adding the scores for that respondent across the eight statements (Q.8.A, B,C,F,G,I,K, and M). The assumption was made that choosing a particular option for one statement required a similar level of the respondent's knowledge as choosing the same option for any of the other items. It should be noted, however, as in the previous section, that this assumption was arbitrary given that the state of the science on PPD is not yet developed to the degree that weights could be applied which would reflect the importance of each domain of knowledge. This study was the first of its nature to explore the knowledge of Alberta physicians across various aspects of PPD. The total score provided a useful summary score for exploratory further analysis but it is a crude indicator of knowledge only. The total score for management knowledge for each respondent was used as a continuous variable for further analysis to explore relationships with demographics and practice variables.

3.6.2.2 Practice Variables

The twelve questions (Q.4-7, 9, 10-16) that were included to gather data about current practice were related to the following areas of practice; screening, treatment, and prophylaxis of PPD. Q.8.D,E,H,J,L,N, and Q.17-19 were used to seek respondents' opinions about barriers to better management of PPD and resources available/required. These items also solicited ideas for CME programs on PPD. Finally; an open-ended question was included to invite specific comments from the respondents on issues in management of PPD.

Two groups of practice variables were defined – Screening Variables and Management Variables.

Screening variables were as follows; **Screening Practice** was a categorical variable with three classes – not screening, screening those at elevated risk, and screening all postpartum women. Information about **Screening Methods** was collected by a

question with four answer choices, Self-report questionnaire, Clinical interview, Structured interviews using standardized instruments, and Observation/intuition. **Timing of Screening** also had four answer choices, 0-4 weeks after delivery, 5-8 weeks, 9-16 weeks, and more than 16 weeks. **Reasons for Not Screening** as listed in Q.7 contained six answer choices.

Management variables were as follows; **Management options** had four answer choices, Psychotherapy, Psychoeducation involving the patient's family, referral, and antidepressant pharmacotherapy. Further information on the use of **Antidepressant Pharmacotherapy** was collected for five groups of medicines, SSRIs, newer agents, trizolopyridines, TCAs, and MAOIs. **Preventive practice** was a binary variable that represented whether or not the respondent used prophylactic antidepressant. **Reasons for Referral** were collected for two options for referring PPD patients to other resources. Information about **Sources Referred to** was collected for three types of resources.

3.7 Survey Methods

The Tailored Design Method of Dillman [134] was used as the survey administration protocol. This method provides evidence-based guidelines for development of the questionnaire, content of the introductory letters, the survey-mail out schedule and a variety of techniques for maximizing response. The following strategies were chosen to maximize the proportion responding.

3.7.1 Multiple Contacts

Multiple contacts have been shown to be very effective in increasing survey response rates [134]. Three first class mail-outs were made in this study to encourage response among the physicians.

- The first package containing the questionnaire (Appendix B) with a cover letter (Appendix A), and a self-addressed stamped return envelope was mailed to the 2613 physicians on May 23, 2002. The introductory letter contained information about the study and a description of methods and instructions to complete the questionnaire. It highlighted the importance of the project and that of the response from the respondents.

- The second mail-out was a post card sent to the same 2613 physicians reminding them about the study (Appendix C). The post card was sent one week after the questionnaire package on May 30, 2002.
- The third mail-out consisted of the full questionnaire package including the survey questionnaire and a cover letter (Appendix D). This package was mailed on June 20, 2002, three weeks after the post card reminder, and was sent to the 1942 physicians who had not returned their package by that point. Dillman also recommends a fourth mail-out by registered mail, but this was considered too invasive for this study.

3.7.2 Return Envelopes with real stamps

It has also been shown [134] that use of real stamps on the return envelopes improves response by several percentage points. It represents a goodwill gesture and initiates a similar response from the participant. A contributing factor to this positive effect may be the difficulty of throwing away anything with monetary value. We used large and colorful stamps for all mailed correspondence including return envelopes and the post cards.

3.7.3 Personalization of Correspondence

Personalization of correspondence and putting original signatures on the cover letters are also recommended to increase the response rate [134]. Letters were addressed to the physicians by their names to "personalize" the correspondence. The content of the follow up letters was different from that of the initial contact. This "change of content" also inferred a more personal nature to the correspondence than letters with stereotypical content. The cover letters carried original signatures from two of the members of the study team. This emphasized the importance of the study.

3.7.4 Confidentiality

Other important survey strategies include providing an incentive to the potential participants and assuring confidentiality [134]. Complete anonymity, however, is usually recommended only for surveys when data obtained are considered to be of a sensitive nature e.g. associated with litigation, sexual behavior or drug use, which a respondent might be reluctant to divulge [134]. As this study was not concerned with such sensitive information, complete anonymity was not deemed necessary. Complete anonymity also

makes the reminder protocols more complex. The questionnaire had a study identification number to keep track of the questionnaires and returns. However, respondents were assured confidentiality, i.e. that individual responses would not be revealed outside the research team nor would individual respondents be identified in any publications.

3.7.5 Information package

The respondents were able to check a box on the questionnaire indicating that they would like to receive information on PPD. After the study was over, an information package with evidence based guidelines for the management of PPD and a summary of the study results were sent to those respondents who requested this information. This information package was intended to serve as an incentive to participate in the study (Appendix E).

3.7.6 Endorsement from Professional Associations

Endorsement from the following professional associations was obtained: the College of Family Physicians of Canada (Alberta Chapter), the University of Calgary Continuing Medical Education Office, the Society of Obstetricians and Gynecologists of Canada, and the Alberta Psychiatric Association. The endorsements were meant to lend credibility and legitimacy to the study and to underscore its importance.

3.8 Data Collection, Management, and Analysis

Responses were collected up to January 31, 2003. The data were entered in Intercooled Stata 7.0 [139]. Responses to all items were coded with numbers. Incomplete responses or incorrect entries were treated as missing data and were not included in the denominator for analysis of the respective items on the questionnaire. Numbers of responses with missing data per item were reported in Chapter 4. Thirty-five responses (5% of the usable responses) were randomly selected to check errors of data entry, which were found to be 0.9% for items in Q.8 and less than 0.5% for other dependent variables. No data entry errors were found for demographic variables for these responses.

First stage: Information was collected on 10 demographic and practice characteristic variables including age, gender, specialty, number of years in practice,

school of graduation, year of graduation, location of practice by region, patients seen per week, women of childbearing age among patients, and estimated prevalence of PPD among patients.

The results were initially presented descriptively with graphs and univariate summary statistics for the ten demographic/practice variables. Five of these were continuous, i.e. **Age, Year of Graduation, Years in Practice, Patient Volume, Estimated PPD Prevalence among Patients.** Five variables were categorical i.e. **Gender, Specialty, School of Graduation, Location of Practice,** and **Women of Childbearing Age among Patients.**

Continuous variables were described by giving ranges, means (or medians), and standard deviations. Frequencies and proportions were given for categorical variables. Some variables were recoded as necessary for presentation. For example, "geographic location" was described according to the 17 health regions of the Province of Alberta as enforced at the time the survey was conducted as well as based on the broader division of urban and rural practice. The rural urban boundaries were followed according to the Alberta Rural Physician Action Plan (Alberta-RPAP) that defines the rural communities as being outside of the Capital Regional Health Authority (CRHA) and Calgary Regional Health Authority (CHA) boundaries. For the purpose of Alberta-RPAP, the community size is not considered in designating a community to be rural because the practice in rural areas is different from the practice in metropolitan cities. The important differences are that rural practice tends to be more comprehensive and inclusive e.g. surgeries and anesthesia. It generally requires a broader skill base and involves more continuity of care [140]. Similarly, some categories of **School of Graduation** were collapsed to make larger groupings for simplicity of presentation.

Due to the skewness of the variable **Estimated PPD Prevalence among patients,** it was categorized into three groups, those estimating an average prevalence of less than 4%, those estimating an average prevalence of 4 to 16% and those estimating an average of over 16%. These cut points were taken from the Ontario Mother Infant Survey (TOMIS) that found prevalence of PPD from 4.3% to 15.9% in Ontario. Though they

related to the prevalence in the general population, not in the respondents' practices, they were the only recently published Canadian estimates relevant to this variable.

Because we did not have *a priori* hypotheses, most of the analyses were exploratory. In the initial bivariate analysis, relationships between the demographic and practice variables were explored by comparing the summary statistics for different subgroups and by producing scatterplots between continuous variables. Important patterns and findings were noted in order to further guide the analytic strategies. None of the group comparisons, at this stage, was tested for statistical significance due to the exploratory nature of analysis, and the desire to avoid multiple testing.

Age, Years Since Graduation, and Years in Practice appeared to be highly correlated. Thus, **Years in Practice** was selected as a proxy for the others and used as one of the primary explanatory variables in further analysis. **Gender** was found to be related to other independent variables (**Years in Practice, Patient Volume, Location of Practice, Specialty, Women of Childbearing Age among Patient, and School of Graduation)** and was identified as a potential confounding variable for the relationship between these and dependent variables.

Second Stage: This stage proceeded with description of the two categories of knowledge-related responses – those related to knowledge of risk factors and those related to knowledge of management. Each of these areas were described first as continuous total score variables across a set of defined response items. The **Risk Factor Recognition** total score was highly skewed necessitating further manipulation. Dichotomization was used for further analysis of the total risk factor score variable. On the other hand, the total score for **Management Knowledge Score** was reasonably normally distributed and was therefore used in its original distributional form.

Next, selected demographic/practice variables were used as explanatory variables in further analysis of knowledge variables. **Estimated PPD Prevalence,** although not a knowledge item per se, was conceptually not independent of "PPD Knowledge" (respondents with more knowledge would give more accurate estimates). Thus, it was not used as explanatory variable for knowledge.

For the variable **Gender,** the Fisher's exact test was used for the dichotomized **Risk Factor Recognition** variable. Student's t-tests were used to compare the means of **Management Knowledge** for males and females. These tests were statistically significant indicating that **Gender** was associated with both knowledge variables (**Risk Factor Recognition and Management Knowledge Score**). This variable had also already been found to be associated with the other explanatory variables (**Years in Practice, Patient Volume, Location of Practice, Specialty, Women of Childbearing Age among Patient, and School of Graduation).** Hence, it was considered as an important correlate of many aspects of practice and a potential confounder of the relationship of these variables and knowledge. Further analysis of both components of knowledge variables was therefore stratified by gender.

Because **Patient Volume** was highly skewed, it was categorized at its median. **Years in Practice** was categorized at its quartiles for cross tabulations with the dependent variables.

For **Management Knowledge Score,** boxplots were first generated for males and females separately. Second, a Student's t-test for means of independent samples **Management Knowledge Score** was calculated for **Gender.**

The practice variables were described by giving frequencies and proportions of respondents in each category. The practice variables were then examined for selected demographic/practice variables. The appropriate statistical tests, as above, were used for associations of selected demographic/practice variables and practice variables.

The responses to the opinion related items with multiple-choice answers were tabulated with frequencies and percents. Responses to the open-ended questions soliciting respondents' opinion were summarized and common themes and most frequently given opinions/suggestions reported.

CHAPTER FOUR: RESULTS

4.1 Sampling Frame and Proportion Responding

There were 5518 physicians (the sampling frame for the study) registered with the College of Physicians and Surgeons of Alberta (CPSA) as listed in the database. From that database, 2613 Alberta physicians were identified as eligible participants (potential target population) and the questionnaires were sent to them (Figure 4.1). A total of 1243 questionnaires were returned by the end of January 2003 (47.6% of the original 2613 mailout). Four hundred and eighty three returns indicated practice ineligibility and were excluded. The remaining 2130 physicians are hereafter called the target population. It is acknowledged, however, that this group may have included some ineligible units. Removal of the ineligible units was possible only for those who returned the questionnaire with an indication of non-eligibility. Forty-three physicians could not be contacted due to incorrect addresses and were retained in the denominator (target population) for the calculation of proportion responding, as their eligibility was indetermined. The 717 useable responses are hereafter referred to as the study sample.

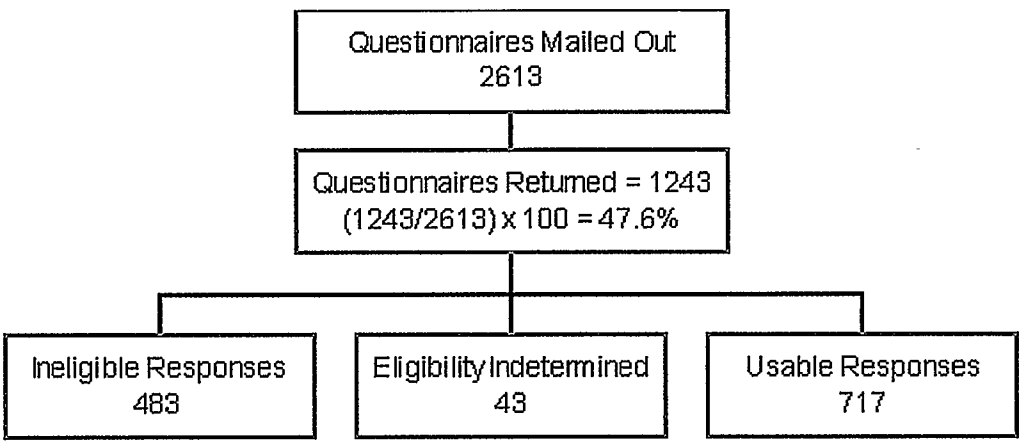


Figure 4.1 Response Details

The Proportion Responding (PR) was 33.7% as calculated by using the formula PR = (Usable responses/(Total number mailed – Ineligible responses)) x 100.

The CPSA database contained information about the gender and location of practice for the sampling frame and hence the target population. Thirteen hundred and forty three out of 2130 (64%) were males and 787 (36%) were females. Thirteen hundred and forty nine (63.3%) practiced in urban areas and 781 (36.7%) practiced in rural areas. Table 4.1 gives the proportion responding for categories of these two variables. The sample likely was not directly comparable to that group due to possible inclusion of some ineligible units in the latter and thus the estimates of PR were conservative estimates.

Table 4.1: Gender and Practice Location of the Target Population and the Sample

Variable	Target Population	Sample	Proportion Responding
Gender			
Males	1343	370	27.6
Females	787	347	45.1
Practice Location			
Urban	1349	448	33.2
Rural	781	269	35.4
Total	2130	717	33.7

Table 4.1 shows that the proportion of males responding was considerably lower than that of females. The proportion responding from urban and rural areas was similar. The age distribution of the sample and that of the sampling frame in the year 2003 is shown in Figures 4.2 A and 4.2 B respectively.

A – Study Sample n =717 **B – Sampling Frame n = 5518**

1=<30 2=30-34 3=35-39 4=40-44 5=45-49

6=50-54 7=55-59 8=60-64 9=65-69 10=>70

Fig. 4.2 Age distributions of the Study Sample (A) and all Sampling Frame (B)

Even though the age distribution of the study sample is not directly comparable to the aggregate age distribution of all the CPSA registrants due to selection of the sample on practice status, the age distribution of respondents was not dramatically different from the overall physician population, with the possible exception of a lower representation in the sample of physicians above age 65. There were 107 Obstetrician/Gynecologists in the target population, 34 (31.78%) of whom completed the questionnaire.

4.2 Respondent Characteristics – Univariate

Respondent characteristics included demographic and practice characteristics of the respondents and are described as continuous or categorical variables.

4.2.1 Continuous Respondent Characteristics - Univariate

Table 4.2 provides the summary statistics for the continuous variables – **Age, Years Since Graduation, Years in Practice, Patient Volume, and Estimated PPD Prevalence among Patients**. Respondents' age distribution is displayed in Figure 4.2 B. The distributions of the other continuous variables are shown in Figures 4.3 - 4.6.

Table 4.2 Respondent Characteristics – Continuous Variables

Variable	n	Minimum	Maximum	Mean	St. Dev.
Age	704	26	72	43.3	8.9
Years Since Grad.	699	1	47	17.5	9.4
Years in Practice	709	1	43	14.9	9.0
Patients Volume	686	1	600	125*	66.5
Estimated PPD Prevalence among Patients	686	0	62.5	7.5*	8.5

*Median

Respondents' ages (**Age**) ranged from 26 to 72 years, with a mean of 43.3 years. Information was collected on the year of graduation that ranged from 1955 to 2001 with 45 unique values. This information was used to derive a new variable **Years Since Graduation** from the year of graduation to the survey index year - 2002. The range of this new variable was one year to 47 years, with a mean of 17.5 years. The number of **Years in Practice** ranged from 1 to 43 years with a mean of 14.9 years. The number of

patients seen per week is indicated by the variable **Patient Volume** with a range of one to 600 patients seen per week. This variable was positively skewed with many outliers (Figure 4.5). Due to its non-normal distribution it was dichotomized at its median i.e. 125 patients per week and the new categories were low (125 patients per week or less) and high (more than 125 patients per week) patient volume.

Estimated PPD prevalence among patients in the respondent's practice as given by respondents ranged from 0 - 80 %. The average estimated prevalence was calculated for each respondent from the two values given by that respondent (Hereafter referred to as **Estimated PPD Prevalence among Patients).**

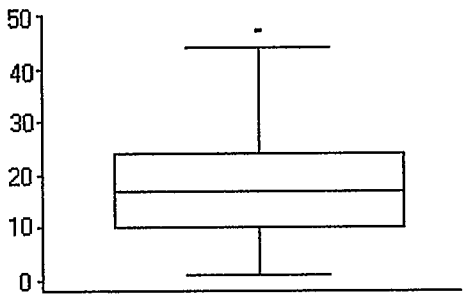


Figure 4.3 Years Since Graduation From the MD Program

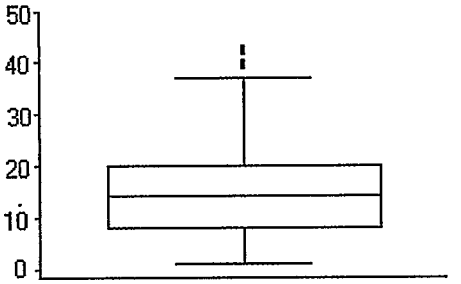


Figure 4.4 Number of years in Practice

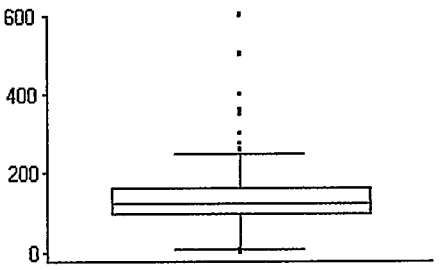


Figure 4.5 Patient Volume

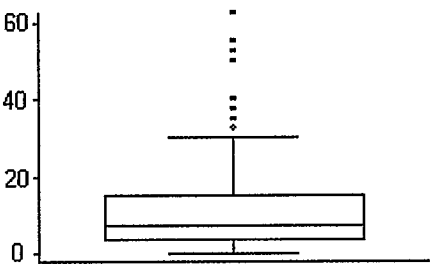


Figure 4.6 Estimated PPD Prevalence among Patients

The **Estimated PPD Prevalence among Patients** was also positively skewed (Figure 4.6). Thus it was categorized into three groups: those estimating an average prevalence of less than 4%, those estimating an average prevalence of 4 to 16 % and those estimating an average of over 16% (Table 4.3). These cut off points were selected based on the findings of another Canadian study [5]. **Years in Practice** was categorized into quartiles for further analysis. The categories thus formed were, 1-8 years, 9-14 years, 15-20 years, and more than 20 years in practice.

4.2.2 Categorical Respondent Characteristics - Univariate

Information was gathered for five categorical variables, of which **Gender, Specialty,** and **Women of Childbearing Age among Patients** had two, three, and four categories respectively. Two variables, **School of Graduation** and **Practice Location** were created by collapsing some classes of the original variables in the raw data. As previously noted, three more variables **(Estimated PPD Prevalence among Patients, Patient Volume,** and **Years in Practice)** were categorized from the continuous variables.

In the raw data, 15 Canadian medical schools and 50 international (non-Canadian) medical schools were reported as the **School of Graduation** (Table F.1 Appendix F). For further analysis, only the larger groupings - Canadian versus non-Canadian medical schools were used due to very small numbers in some classes (Table 4.3).

The cities/towns of practice given in the raw data were grouped into their respective Regional Health Authority (RHA) boundaries that were in effect at the time of the survey (Table F.2 Appendix F). The highest number of respondents belonged to region 4 (including Calgary) and region 10 (including Edmonton). For further analysis, only the larger groupings – urban versus rural areas were used as specified by the Alberta Rural Physician Action Plan [141] (Table 4.3).

Table 4.3 summarizes the frequencies and percents of the categorical variables, **Gender, Specialty, School of Graduation, Practice Location, Women of Childbearing Age among Patients,** and **Estimated PPD Prevalence among Patients.**

There was almost an equal distribution of males and females in the sample with 370 males (51.6%) and 347 females (48.4%). Medical Specialty was given by 701 respondents with 51% Family Practitioners, 5% Obstetricians/Gynecologists and the

remainder (44%) categorizing their practice as Family Practice with Obstetrics. Five hundred and twenty five (75.4%) respondents reported graduating from Canadian medical schools and 171 (24.6%) were graduates of non-Canadian schools. About one half of the respondents reported that 26-50% of their patients were women of childbearing age and about one third reported that they were practicing in rural areas.

Table 4.3: Respondent Characteristics – Categorical Variables

Variable	Number	Percent
Gender		
Males	370	51.6
Females	347	48.4
Specialty		
Family practice/general practice	359	51.2
Family practice with obstetrics patients	308	43.9
Obstetrics and gynecology	34	4.9
School of Graduation		
Canadian	525	75.4
Non-Canadian	171	24.6
Practice Location		
Urban	461	64.3
Rural	256	35.7
Women of Childbearing Age Among Patients		
<25 %	170	23.9
26 - 50%	345	48.6
51 - 75%	158	22.3
>75%	37	5.2
Estimated PPD Prevalence among Patients		
< 4%	199	29.0
5-16%	388	56.6
> 16 %	99	14.4

To summarize, the mean age of the respondents was 43.3 years with a range of 26 to 72 years. They had a mean of 14.9 years in practice that ranged from 1 to 43 years. An almost equal distribution of males and females was found with representation from all three specialties, urban/rural areas, and Canadian/non-Canadian graduates. They saw a median of 125 patients per week. One quarter of the respondents reported that more than 50% of their patients were women of childbearing age. The median PPD prevalence estimated by the whole sample among their patients was 7.5%.

4.3 Respondents Characteristics – Bivariate

4.3.1 Continuous Respondent Characteristics – Bivariate

Age, Years in Practice, Years Since Graduation, Patient Volume, and **Estimated PPD Prevalence among Patients** were compared in a scatterplot matrix. As expected **Age, Years in Practice,** and **Years Since Graduation** were highly correlated. No patterns of association were apparent for the other continuous variables (Figure 4.7).

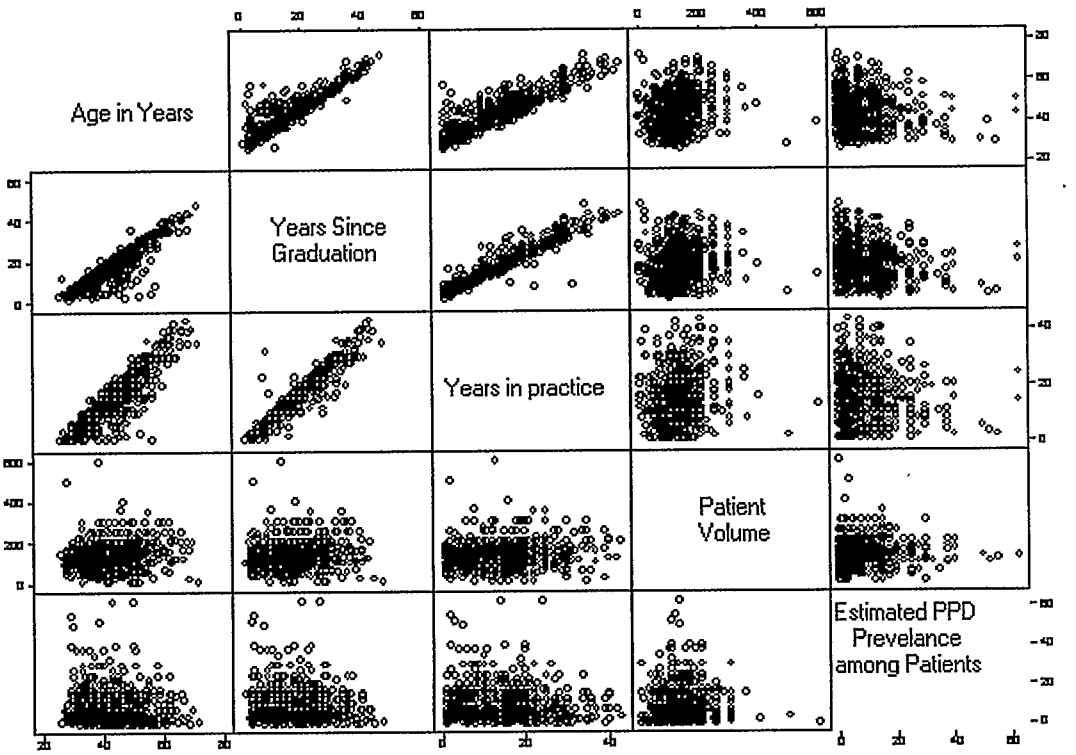


Figure 4.7: Scatterplot matrix Age, Years Since Graduation, Years in Practice, Patient Volume, and Estimated PPD Prevalence among Patients

4.3.2 Categorical Respondent Characteristics – Bivariate

Bivariate relationships among categorical variables are given in Tables 4.4 and Table 4.5. The responses with missing values for any one of the two variables being analyzed were excluded from that specific bivariate analysis.

Table 4.4: Bivariate Relationships – Gender, Specialty, and Practice Location

Variable	Specialty (n*=701) Number (%)			Practice Location (n=717) Number (%)	
	Family Practice	FP with Obs	Obs/Gyn	Urban	Rural
Gender					
Males	196 (54.1)	140 (38.7)	26 (7.2)	188 (50.8)	182 (49.2)
Females	163 (48.1)	168 (49.6)	8 (2.4)	273 (78.7)	74 (21.3)

*Respondents who did not furnish this information were not included in this analysis

A larger number of female respondents practiced in urban areas compared to rural while the urban-rural distribution for males was almost equal. Compared to male respondents, more females reported their practice as family practice with obstetrics.

Table 4.5: Bivariate Relationships – Gender, Practice Location, School of Graduation, and Women of Childbearing Age among Patients

Variable	School of Graduation (n*=696)		Women of Childbearing Age among Patients (n=710)			
	Canadian	Non Canadian	<25%	26-50%	51-75%	>75%
Gender						
Males	226 (63.8)	128 (36.2)	136(37.4)	181(49.5)	39(10.7)	9(2.5)
Females	299 (87.4)	43 (12.6)	33 (9.6)	164(47.7)	119(34.6)	28(8.1)
Practice Location						
Urban	382 (85.7)	64 (14.4)	99(21.8)	215(47.3)	111(24.4)	30(6.6)
Rural	143 (57.2)	107 (42.8)	71(27.8)	130(50.0)	47(18.4)	7(2.8)

Canadian graduates out-numbered non-Canadian graduates. This difference was greater for female respondents than males and urban respondents than rural. Female respondents and urban respondents tended to have more women of childbearing age among patients.

4.3.3 Continuous and Categorical Respondent Characteristics – Bivariate

Table 4.6 summarizes the means and standard deviations of **Age, Years in Practice, Patient Volume, and Estimated PPD Prevalence among Patients** for different categories of categorical variables, **Gender, Specialty, Practice Location, and School of Graduation.**

Table 4.6: Bivariate Relationships between Demographic and Practice Variables

Variable	Age in Years Mean (SD)	Years in Practice Mean (SD)	Patient Volume Median (IQR)	Estimated PPD Prevalence among Patients Median (IQR)
Gender				
Males	45.29 (9.3)	17.23 (9.2)	150 (120-200)	7.5 (3-12.5)
Females	41.24 (7.9)	12.50 (8.1)	100 (80-130)	7.5 (3.5-15)
Specialty				
Family Practice	44.04 (9.2)	15.90 (9.3)	125 (100-165)	7.5 (3-12.5)
FP with Obs	41.80 (8.2)	13.69 (8.3)	130 (100-175)	7.5 (5-15)
Obs/Gyn	48.56 (9.2)	16.06 (9.7)	120 (100-150)	5.5 (2-7.5)
Practice Location				
Urban	43.53 (9.1)	15.34 (8.5)	120 (90-150)	7.5 (3.5-15)
Rural	42.94 (8.5)	14.70 (9.2)	150 (110-200)	7.5 (3.5-12.5)
School of Graduation				
Canadian	42.23 (8.3)	13.63 (8.5)	120 (100-150)	7.5 (3.5-15)
Non Canadian	46.53 (10.0)	18.85 (9.3)	150 (120-200)	7.5 (2.5-12.5)

IQR = Inter-quartile Range

Compared to male respondents, female respondents reported lower mean age, fewer years in practice, lower patient volumes, and similar PPD prevalence among their patients. Obstetricians/Gynecologists reported lower estimated PPD prevalence. Non-Canadian graduates reported to have been in practice longer. They also reported to have had more patient visits per week, as did the rural respondents. The respondents who had higher proportions of their patients as women of childbearing age reported to have fewer patient visits per week and higher PPD prevalence estimates. No other differences were apparent in this initial review of the data. No statistical tests were used because of the exploratory nature of this stage of analysis.

Gender was related to many demographic and practice variables. Therefore, this variable was identified as a major potential confounder to be evaluated for its relationship with the dependent variables of knowledge and practice before further analyses.

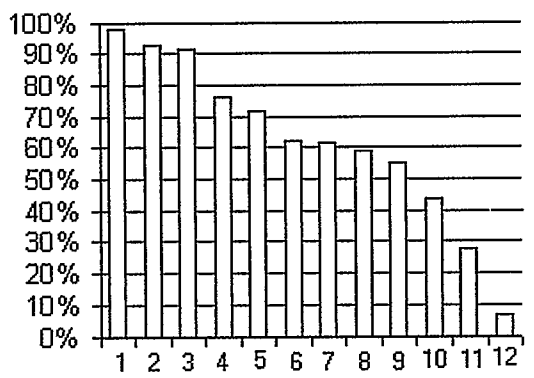
Only one (**Years in Practice**) of the three highly correlated variables (**Age, Years Since Graduation, Years in Practice**) was chosen for further analysis – it was considered to be a proxy for the other two in the analysis of dependent variables of knowledge and practice.

4.4 Knowledge of Postpartum Depression – Risk Factors and Management

Two variables represented two areas of knowledge about PPD. "Risk Factor Recognition" represented the area of knowledge that was related to respondents' ability to identify women who were at an elevated risk of developing PPD. "Management Knowledge" represented the area of knowledge related to respondents' ability to better manage women with PPD.

4.4.1 Risk Factors Recognition

Q.3 of the questionnaire included a list of potential risk factors and respondents checked the options from the list (Figure 4.8).



1. History of PPD after a previous birth (n=704)
2. History of psychiatric illness (n=667)
3. Little or no social support. (n=657)
4. Pregnancy was unplanned/unwanted. (n=544)
5. History of stressful life experiences. (n=512)
6. Breast feeding difficulties. (n=448)
7. History of anxiety during pregnancy. (n=444)
8. Family income of less than $20,000 per annum (n=425)
9. Difficult labor and delivery experience. n=397)
10. Immigrated to Canada within the past two years. (n=314)
11. Thirty years of age or older. (n=201)
12. Other (n=51)

Figure 4.8: Percent of Respondents Recognizing Each Risk Factor for PPD

A previous history of PPD, a history of psychiatric illness and lack of social support were the most commonly recognized risk factors for PPD. Fifty-one participants checked the "other" option, and 43 of them specified at least one additional risk factor. In order of frequency these were "family history of psychiatric illness" (n=11), "all women" (n=5), "being professional women" (n=5), "history of abuse or abusive relationship" (n=4), "marital problems" (n=4), "single mothers" (n=3), "with babies who have problems" (n=3), "young mothers" (n= 2), "primigravida" (n=2), "caesarean

section" (n=1) "history of pregnancy loss" (n=1), "substance abuse" (n=1), and "perfectionist women" (n=1).

A total score for risk factor recognition was calculated for each respondent, which was a simple sum of the number of risk factors he/she recognized. The total score was a continuous variable that ranged from 0 to 11. Figure 4.9 shows the distribution of the new variable **Risk Factor Recognition Score** thus created.

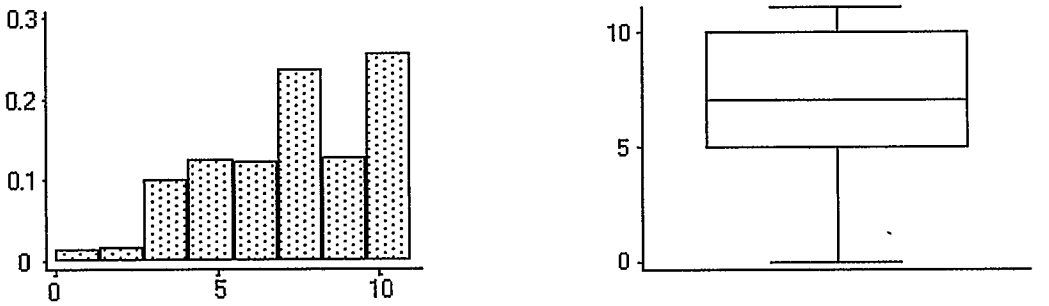


Figure 4.9: Total Risk Factor Recognition Score

The negative skew of this variable could be explained by a large number of respondents able to recognize most risk factors. The median number of risk factors recognized was seven. Due to concerns about its distribution, this variable was analyzed as a dichotomized variable. The two categories thus created were "below median" and "median and above", and were labeled as 'low' and 'high' risk factor recognition respectively. Sixty two percent of the sample scored in the high recognition category.

Risk factor recognition was then explored in relation to demographic and practice variables. The first variable to be examined was **Gender** due to its being related to other respondent characteristics. More female respondents (70.6%) than males (54.1%) recognized the median or more number of risk factors (Table 4.7). This difference was statistically significant ($p < 0.0001$) and also was also considered to be clinically significant. The percent difference was 16.5. The 95% confidence interval (9.5 – 23.5) for this difference was narrow compared to the point estimate indicating a fairly precise estimate.

Table 4.7: Risk Factor Recognition Score by Gender

Gender	High Risk Factor Recognition Score Number (%)	Percent Difference (95% CI)	P value
Males (n=370) **Females (n=347)**	200 (54.1) 245 (70.6)	16.5 (9.5 – 23.5)	<0.0001

Gender was found to be related to most of the demographic/practice variables as well as with **Risk Factor Recognition.** Therefore, all subsequent analysis of risk factor recognition was stratified by gender. High and low **Risk Factor Recognition** were cross-tabulated against the six categorized independent variables, **Specialty, Practice Location, Years in Practice, School of Graduation, Childbearing Age Women among Patients,** and **Patient Volume** (Table 4.8).

The cross-tabulations shown in Table 4.8 were meant to identify if respondents in any category of a variable were more or less likely to score high in **Risk Factor Recognition** compared to other categories of the same variable for either stratum of **Gender**. The comparisons with differences of larger magnitude were noted. It appeared that percents of respondents scoring in the high risk factor recognition category were considerably different for different categories of the following variables,

- **Specialty** for female respondents (the percent difference between subgroups was up to 18%, and at least 3.3% with 95% CI for the difference = - 6.5 - 13.1)
- **Years in Practice** for male respondents (the percent difference between subgroups was up to 16%, 95% CI for difference = 0 – 32 %)
- **Women of Childbearing Age among Patients** for male respondents (the percent difference between subgroups was up to 15% and at least 4.8% with 95% CI for the difference - 6.2 – 16%)
- **Women of Childbearing Age among Patients** for female respondents (the percent difference between subgroups was up to 24%and at least 6.9% with 95% CI for the difference = - 3.7 – 17.6%)

Table 4.8: Risk Factor Recognition Score for Respondent Characteristics by Gender

Variable	Males		Females	
	Number of Respondents in the Category	Respondents with High Risk Factor Recognition Number (%)	Number of Respondents in the Category	Respondents with High Risk Factor Recognition Number (%)
Specialty				
FP	196	101 (51.5)	163	113 (69.3)
FP with Obs	140	81 (57.9)	168	122 (72.6)
Obs & Gyne	26	14 (53.9)	8	7 (87.5)
Practice Location				
Urban	188	101 (53.7)	273	195 (71.4)
Rural	182	99 (54.4)	74	50 (67.6)
Years in Practice				
1-8 years	66	41 (62.1)	119	83 (69.8)
9-14 years	86	48 (55.8)	89	65 (73.0)
15-20 years	89	41 (46.1)	85	61 (71.8)
<20 years	123	69 (56.2)	52	35 (67.3)
School of Graduation				
Canadian	226	128 (56.6)	299	215 (71.9)
Non Canadian	128	64 (50.0)	43	26 (70.7)
Childbearing Age Women among Patients				
<25% women	137	77 (56.2)	33	18 (54.6)
26 – 50%	181	93 (51.4)	164	123 (75.0)
51-75%	39	23 (59.0)	119	81 (68.1)
>75%	9	6 (66.7)	28	22 (78.6)
Patient Volume				
125 or less	107	57 (53.3)	242	174 (71.9)
>125	241	135 (56.0)	92	65 (70.6)

The 95% CI for the above comparisons are wide indicating a lack of precision for these estimates. Other comparisons appeared to be similar with differences of <10% between subgroups. To avoid excessive testing, only the four identified relationships were tested for statistical significance and were not found significant (p values: Specialty

for females = .48, Years in Practice for males = .23, Women of Childbearing Age among Patients for males = .63 and for females = .08).

4.4.2 Management Knowledge

Q.8 contained fourteen statements, eight of which were related to Management Knowledge with response options structured on a Likert scale as agree, somewhat agree, neither agree nor disagree, somewhat disagree, and disagree (Table 4.9). The remaining six items were included to get respondent's opinions and are described in section 4.6.

Table 4.9: Responses to Each Management Knowledge Item by Response Category

Statement	Respondents in Each Category Number (%)					
	Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Disagree	Total
PPD seriously affects every aspect of a woman's life.	613 (85.9)	83 (11.6)	9 (1.3)	6 (0.8)	3 (0.4)	714
PPD has long lasting effects on the infant.	202 (28.4)	279 (39.2)	172 (24.2)	45 (6.3)	13 (1.8)	711
No effective treatment is available for PPD.	5 (0.7)	4 (0.6)	13 (1.8)	110 (15.4)	582 (81.5)	714
PPD is a normal consequence of childbirth.	3 (0.4)	27 (3.8)	59 (8.3)	145 (20.3)	479 (67.2)	713
PPD is associated with postpartum psychosis.	154 (21.7)	225 (31.7)	133 (18.8)	108 (15.2)	89 (12.6)	709
Women with PPD usually present with anxiety.	47 (6.6)	258 (36.3)	238 (33.5)	128 (18.0)	39 (5.5)	710
Serious risks are associated with not treating PPD promptly.	472 (66.4)	181 (25.5)	20 (2.8)	14 (2.0)	24 (3.4)	711
PPD is a unique disorder with peculiar differences from depression in general.	98 (13.8)	295 (41.4)	153 (21.5)	135 (19.0)	31 (4.4)	712

These items represented four domains of knowledge of PPD management, i.e. *Recognition as Pathology, Diagnosis, Treatment,* and *Sequelae* and were cast as positive

or negative. After appropriate reversals, each response was given a category score of one to five points with five representing the most "correct" answer according to the best evidence. Two types of **Management Knowledge Scores** were calculated, "overall scores" for the statements and "total scores" for the individual respondents.

"Overall scores" for the statements were the category scores weighted for the percents of respondents in that category and was calculated by summing the weighted scores across categories (Table 4.10). A higher overall score for any statement reflected that more respondents had answered that statement correctly.

Table 4.10: Overall Scores of Management Knowledge Items

Statement	% of Respondents in each Score Category (5 = Maximum Knowledge score, 1 = Minimum Knowledge score)					
	5	4	3	2	1	Overall Score
PPD seriously affects every aspect of a woman's life. *(Sequelae)*	85.9	11.6	1.3	0.8	0.4	481.5
No effective treatment is available for PPD. *(Treatment)*	81.5	15.4	1.8	0.6	0.7	476.5
PPD is a normal consequence of childbirth. *(Recognition as Pathology)*	67.2	20.3	8.3	3.8	0.4	450.1
Serious risks are associated with not treating PPD promptly. *(Sequelae)*	66.4	25.5	2.8	2.0	3.4	449.5
PPD has long lasting effects on the infant. *(Sequelae)*	28.4	39.2	24.2	6.3	1.8	386.1
PPD is a unique disorder with peculiar differences from depression in general. *(Diagnosis)*	13.8	41.4	21.5	19.0	4.4	341.2
Women with PPD usually present with anxiety. *(Diagnosis)*	6.6	36.3	33.5	18.0	5.5	320.6
PPD is associated with postpartum psychosis. *(Diagnosis)*	12.6	15.2	18.8	31.7	21.7	265.1

Table 4.10 shows that the overall scores for the statements that belonged to the *"Diagnosis"* domain were lower than the scores for the statements related to *"Recognition as Pathology"*, *"Treatment"*, and *"Sequelae"* domains.

Next, total scores for the individual respondents were calculated and differences among the respondents based on demographics and practice characteristics were examined. However, before calculating the total scores, histograms for the distributions of the response options were produced for males and females for each of statement (Figures F.1 to F.8, Appendix F). For most statements male respondents chose "neither agree nor disagree" more frequently than female respondents and a greater proportion of females responded correctly. These findings were consistent across statements.

For the same statements, separate histograms (not shown) for male and female respondents were created for different categories of six other categorized respondent characteristics, **Specialty, Practice Location, Years in Practice, School of Graduation, Location of Practice, Patient Volume,** and **Women of Childbearing age among Patients.** These histograms did not identify any differences in the response option distributions across these items between subgroups of the independent variables.

The response option distributions for these statements showed a consistent difference for categories of **Gender** and showed no difference for categories of other independent variables. Hence, a total **Management Knowledge Score** was calculated across the statements for each respondent by adding the scores for that respondent across the eight statements. The assumption was made that choosing a particular option for one statement required a similar level of respondents' awareness as choosing the same option for any of the other items. It should be noted, however, that this assumption was arbitrary given that the state of the science on PPD is not yet developed to the degree that weights could be applied which would reflect the importance of each item. This study was the first of its nature to explore the knowledge of Alberta physicians across various aspects of PPD. The total score provided a useful summary score for exploratory further analysis but it was a crude indicator to describe knowledge of PPD management.

The new variable **Management Knowledge Score** thus created was a normally distributed continuous variable with a mean of 31.7 (SD = 2.8) and a range of 24 to 40 (Figure 4.10). The possible score range for this variable was 8-40. Twenty-two responses with missing values in one or more statements were excluded from this analysis.

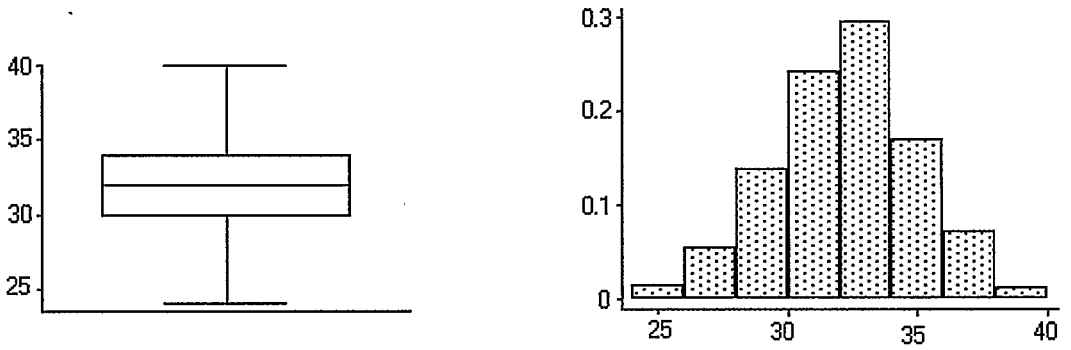


Figure 4.10: Histogram and Boxplot for Management Knowledge Scores (n=695)

Figure 4.11 shows distributions of **Management Knowledge Scores** by **Gender.** The mean **Management Knowledge Score** for male respondents was 31.3 (SD = 2.9) and for female respondents was 32.2 (SD = 2.6) with a difference of 0.9 between the means (95% CI for the difference in means for independent samples = 0.5 - 1.3). This difference is very small, and while statistically significant (two sided p-value for student's test < 0.0001), it probably does not represent a clinically significant difference in terms of practice.

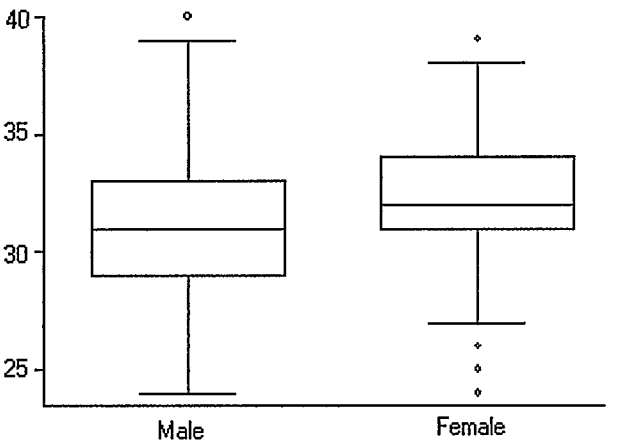


Figure 4.11: Management Knowledge Scores by Gender

As for **Risk Factor Recognition,** further analysis of **Management Knowledge Score** was stratified by **Gender.** Means and standard deviations for **Management**

Knowledge Score for each level of independent categorical variables by gender were calculated. The means of the groups showed difference of around one (Table 4.11). Considering this difference to be too small for clinical significance no further analysis or statistical tests were computed.

Table 4.11: Management Knowledge Score for Respondents by Gender

Variable	Males Mean (SD)	Females Mean (SD)
Specialty		
FP	31.5 (2.7)	32.2 (2.7)
FP with Obs	31.3 (3.0)	32.3 (2.5)
Obs/Gyn	30.1 (3.3)	31.0 (2.7)
Practice Location		
Urban	31.4 (2.8)	31.1 (2.6)
Rural	31.2 (3.0)	31.4 (2.6)
Years in Practice (Quartiles)		
1-8 years	31.1 (2.8)	31.9 (2.6)
9-14	31.4 (3.2)	32.4 (2.5)
15-20	31.0 (2.9)	32.3 (2.6)
>20	31.6 (2.8)	32.3 (2.9)
School of Graduation		
Canadian	31.2 (2.7)	32.1 (2.6)
Non-Canadian	31.5 (2.2)	32.4 (2.6)
Patient Volume		
125 or less	31.0 (3.0)	32.0 (2.6)
>125	31.5 (2.8)	32.5 (2.7)
Childbearing Age Women among Patients		
<25% women	31.8 (2.7)	32.1 (2.9)
26 – 50%	31.1 (3.0)	32.2 (2.7)
51-75%	31.0 (2.6)	32.3 (2.4)
>75%	30.1 (3.8)	32.1 (2.7)
Total	31.3 (2.9)	32.2 (2.6)

4.5 Current Practice

The measurement of current practice included questions eliciting reports from the sample of physicians on their screening and management practices, covering medication (including prophylaxis), psychotherapy and referral.

4.5.1 Current Screening Practice

Table 4.12 summarizes the information related to respondents' screening practices.

Table 4.12: Screening Practice (n=706*)

Screening Practice	Respondents Number (%)
Never Screen	117 (16.6)
Screen Those at Elevated Risk	182 (25.8)
Screen All Postpartum Patients	407 (56.7)

*The respondents who did not check any of the answer choices were not included (n = 11).

Five hundred and eighty nine (82.5%) respondents screened either all postpartum patients (n=407, 56.7%) or women at elevated risk (n=182, 25.8%). A total of 117 respondents (16.6%) reported that they never screened. Their responses, therefore, were not included in further analysis of screening methods and timing of screening.

Screening practice was then examined for **Gender** (Table 4.13) differences. More female respondents (68.7%) reported screening all of their postpartum patients compared to males (47.3%). This difference was found to be statistically significant (p value for Fisher's exact test < 0.0001).

Table 4.13: Screening Practice by Gender

Gender	Respondents Number (%)		
	Never Screen	Screen Those at Elevated Risk	Screen All Postpartum Patients
Males (n=364)	91 (25.0)	101 (27.8)	172 (47.3)
Females (n=342)	26 (7.6)	81 (23.7)	235 (68.7)

Further analysis of screening practices was stratified on **Gender.** Tables 4.14 and 4.15 show results of bivariate analysis for screening practices for selected respondent characteristics separately for males and females.

Table 4.14: Screening Practice by Respondent Characteristics – Males

Variables	Respondents Number (%)			
	Total	**Never Screen**	**Screen Those at Elevated Risk**	**Screen All Postpartum Patients**
Specialty				
FP	196	56 (28.6)	56 (28.6)	84 (42.9)*
FP with Obs	138	17 (12.3)	40 (29.0)	81 (58.7)
Obs/Gyn	24	13 (54.2)	5 (20.8)	6 (25.0)
Location of Practice				
Urban	184	47 (25.5)	52 (28.3)	85 (46.2)
Rural	180	46 (24.4)	49 (27.2)	87 (48.3)
Patients Volume				
<125 per week	105	33 (31.4)	25 (23.8)	47 (44.8)
125+ per week	239	52 (21.8)	68 (28.5)	119 (49.8)
Estimated PPD Prevalence				
< 4%	113	44 (38.9)	33 (29.2)	36 (31.9)*
4-16%	196	32 (16.3)	58 (29.6)	106 (54.1)
>16%	38	4 (10.5)	9 (23.7)	25 (65.8)

* P value for Fisher's exact test < 0.0001

Family Practitioners with obstetric practice reported to have screened all of their postnatal patients more frequently than other specialties regardless of **Gender.** For male respondents, this difference was at least 15.8% (95% CI for the difference 5.1 -- 26.6) with 58.7% of Family Practitioners with Obstetric Practice screening *all* their postpartum patients for PPD compared to 43% of Family Practitioners screening *all* such patients. For female respondents, this difference was 11.6% for the two groups specified (95% CI for the difference 1.2% -- 21.6%). A larger proportion of Obstetrics/Gynecologists reported never screening compared with other specialties.

Table 4.15: Screening Practice by Respondent Characteristics – Females

Variables	Respondents Number (%)			
	Total	**Never Screen**	**Screen Those at Elevated Risk**	**Screen All Postpartum Patients**
Specialty				
FP	160	18 (11.3)	41 (26.6)	101 (63.1)*
FP with Obs	166	5 (3.0)	37 (22.3)	124 (74.7)
Obs/Gyn	8	1 (12.5)	3 (37.5)	4 (50.0)
Location of Practice				
Urban	269	21 (7.8)	60 (22.3)	188 (69.9)
Rural	73	5 (6.9)	21 (28.8)	47 (64.4)
Patients Volume				
<125 per week	241	20 (8.3)	53 (22.0)	168 (69.7)
125+ per week	90	3 (3.3)	26 (28.9)	61 (67.8)
Estimated PPD Prevalence				
< 4%	84	13 (15.6)	23 (27.4)	48 (57.1)**
4-16%	188	8 (4.3)	45 (23.9)	135 (71.8)
>16%	59	3 (5.1)	10 (17.0)	46 (78.0)

* P value for Fisher's exact test = 0.012
** P value for Fisher's exact test = 0.009

Both male and female respondents who provided higher estimates of PPD prevalence in their practices reported screening *all* postnatal patients more often. For different categories of **Estimated PPD Prevalence among Patients,** this difference was at least 22% (95% CI for the difference 11.2% – 33.3%) for male respondents and at least 14.7% (95% CI for the difference 2.3% – 27%) for female respondents. Practice location and Patient Volume did not appear to be related to screening practice. To avoid excessive testing, Fisher's exact tests were computed only for the four specified comparisons and all were significant (Footnotes Table 4.14 and Table 4.15).

4.5.2 Methods and Timing of Screening

For screening methods, respondents were instructed to select from a list of possible PPD screening methods. They were also asked to specify the names of screening instruments they used as well as to identify any other screening method used which was not listed. The time of screening after delivery was also measured. Respondents who screened more than once were asked to provide multiple answers as applicable (Table 4.16). Those who reported that they did not screen were excluded from this analysis.

Table 4.16: Methods and Timing of Screening Among those who Screened (n=589)

Variables	Respondents Number (%)
Methods of Screening	
Self report Questionnaire	22 (3.1)
Clinical interview	508 (70.9)
Structured interview using standardized instruments	9 (1.3)
Intuition/experience	442 (61.7)
Timing of Screening	
0 - 4 weeks after delivery	415 (70.5)
5 - 8 weeks	483 (82.0)
9 - 16 weeks	214 (36.3)
More than 16 weeks	142 (24.1)

Clinical interview was the most frequently chosen method of screening (n = 508, 70.8%) followed by Intuition/Experience (n = 442, 61.7%). It is interesting to note that only 22 (3%) respondents used self report questionnaires for screening and only nine (1.3%) used structured interviews with standardized instruments for screening for PPD. In total, 30 respondents (4.2 % of the sample and 5.1% of those who screened) reported using a "self report questionnaire" and/or "structured interviews using standardized instruments". Twelve of them specified the following methods; the Edinburgh Postnatal Depression Scale (n=5), the Hamilton Depression Scale (n=4), the Beck Depression Inventory (n=2), and the Modified Burn's Depression Scale (n=1). Eighteen (2.51%)

respondents said that they used "other" screening methods. Nine of them specified these methods; reports from spouse/family (n=3), Health Unit Screening (n=2), a Depression Checklist (n=1), previous history (n=1), recommendations from recent CME articles (n=1), and a PPD questionnaire obtained from a parent development center (n=1).

The most common times of screening were 4-8 weeks (n=483, 82%), and 0-4 weeks (n=415, 70.5%) after delivery. Of the 589 respondents who screened, 575 (97.6%) reported to have screened at least once during either one of these periods. A relatively small number reported screening after 8 weeks (n=196, 34%). Screening method was further analyzed by respondent characteristics (Tables 4.17 and 4.18).

Table 4.17: Screening Methods by Demographic Characteristics

Variables	Respondents using the Screening Method Number (%)				
	Self report Questionnaire	**Clinical interview**	**Structured interview**	**Intuition/ experience**	**More than one option**
Gender					
Males (n=273)	10 (3.7)	228 (83.5)	2 (0.7)	191 (70.0)	153 (56.0)
Females (316)	11 (3.5)	276 (87.3)	7 (2.2)	247 (78.2)	214 (67.7)
Specialty					
FP (n=282)	9 (3.2)	231 (81.2)	1 (0.4)	207 (73.4)	163 (57.8)
FP with Obs (n=282)	11 (3.9)	251 (89.0)	7 (2.5)	210 (74.5)	186 (66.0)
Obs/Gyn (n=18)	0 (0.0)	15 (83.3)	1 (5.6)	15 (83.3)	12 (66.7)
Location of Practice					
Urban (n=385)	11 (2.9)	335 (87.0)	7 (1.8)	290 (75.3)	246 (63.9)
Rural (n=204)	10 (4.9)	169 (82.8)	2 (1.0)	148 (72.6)	121 (59.3)

In subgroup comparisons, female respondents reported using most of the screening methods more frequently than males. They also chose more than one option more often than males. Of the 30 respondents who reported using a self-report questionnaire and/or structured interviews using standardized instruments, 17 were females. Choice of screening methods appeared to be very similar for different specialties and for urban and rural respondents. These results, however, were not tested for statistical significance because of the exploratory nature of this stage of analysis.

Table 4.18: Timing of Screening by Demographic and Practice Variables

Variables	Respondents Number (%)			
	0 - 4 weeks after delivery	**5 - 8 weeks**	**9 - 16 weeks**	**More than 16 weeks**
Gender				
Males (n=273)	183 (67.0)	199 (72.9)	85 (31.1)	51 (18.7)
Females (n=316)	227 (71.8)	278 (88.0)	126 (39.9)	90 (28.5)
Specialty				
FP (n=282)	178 (63.1)	223 (79.1)	105 (37.2)	58 (20.6)
FP with Obs (n=282)	219 (77.7)	231 (81.9)	102 (36.2)	80 (28.4)
Obs/Gyn (n=18)	6 (33.3)	16 (88.9)	0 (0.0)	0 (0.0)
Location of Practice				
Urban (n=385)	266 (69.1)	316 (82.1)	150 (39.0)	96 (24.9)
Rural (n=204)	144 (70.6)	161 (78.9)	61 (29.9)	45 (22.1)

More respondents appeared to screen during 5-8 weeks after delivery followed by 0-4 weeks followed by 9-16 weeks. Relatively fewer respondents screened after sixteen weeks of delivery. This preference of screening timing was apparent for all respondents' subgroups except obstetrician/gynecologists who did not screen after eight weeks. In raw frequency comparisons, female respondents reported screening more often at all times. For all respondents' subgroups, clinical interview was the most commonly used method of screening for PPD followed by intuition/experience, self report questionnaire, and structured interview in this order. It was concluded that respondents' preferences for a particular method or timing of screening were not affected by gender, specialty, or practice location.

4.5.3 Reasons for not Screening

Respondents were instructed to choose from the list of reasons for not screening for PPD and also to specify any "other" reason (Table 4.19). Only the 128 respondents who said that they did not screen were included in this analysis.

Table 4.19: Reasons for Not Screening. (n=128)

Reason for Not Screening	Respondents	
	Number	%
Not aware of screening methods for PPD	55	43.0
PPD is not a significant problem in my practice	44	34.4
There are no clear guidelines for screening women for PPD	31	24.2
Screening for PPD is too time consuming	9	7.0
Screening for PPD does not provide useful information	1	0.8
Screening for PPD is not cost-effective	0	0.0
Other	30	23.4

Most respondents who did not screen indicated that they were not aware of screening methods (n = 55, 43%), that PPD was not a significant problem in their practice (n = 44, 34.4%), and that there were no clear guidelines for PPD screening (n = 31, 24%). No respondent said that screening was not cost-effective and only a minority said that it was time consuming (n = 9, 7%) or not useful (n = 1, 0.8%). Thirty respondents specified "other" reasons for not screening but only one reason other than the listed was given - this respondent said that he/she did not have a copy of a screening questionnaire.

4.5.4 Current Management Practices

An important issue in PPD management after diagnosing PPD is the breast-feeding status of the woman. Therefore, responses were collected separately according to the breast-feeding status of the patients (Table 4.20). Eighty respondents (11.2%) said that they had not diagnosed PPD in any breast-feeding patient and 56 (7.8%) said that they had not diagnosed PPD in non breast-feeding patient. These responses were therefore excluded from this analysis.

Table 4.20: Management of PPD for Breast-feeding and non Breast-feeding Women

Management Option	Respondent (n=637) Using the Management option for Breast-Feeding women		Respondent (n=661) Using the Management option for non Breast-Feeding women	
	Number (%)	95 % CI	Number (%)	95 % CI
Pharmacotherapy	519 (81.8)	78.24 – 84.4	609 (92.1)	89.81 – 94.0
Psychotherapy in the physician's office	276 (43.3)	39.44 – 47.3	289 (43.7)	39.90 – 47.6
Psychoeducation involving the Patient's family	240 (37.7)	33.90 – 41.6	232 (35.1)	31.46 – 38.9
Referral	387 (60.8)	56.84 – 64.6	365 (55.2)	51.34 – 59.1

Table 4.20 shows that more respondents used pharmacotherapy for non breast-feeding women than for breast-feeding women. More respondents also reported referring breast-feeding patients to other resources than non breast-feeding women. No differences were apparent for psychotherapy and psychoeducation involving the patient's family with respect to breast-feeding status. A total of 84% of respondents provided either psychotherapy or psychoeducation or referred to other resources if the patients were breast-feeding. 81% did so if the patients were not breast-feeding.

Management practices for those who reported to have diagnosed PPD in their patients were then compared by gender (Table 4.21). Compared to males, female respondents reported using pharmacotherapy, psychotherapy, and referral more often for both breast-feeding and non breast-feeding women. Fewer respondents from both genders reported use of pharmacotherapy if the woman was breast-feeding. In that case, both genders tended to refer more frequently. This difference in referral tendency was greater for male respondents who also reported to have provided psychoeducation involving the patient's family more frequently if the patient was breast-feeding.

Table 4.21: Management Practices by Gender

Management Option and type of Patient	Respondents Using the Option %		Percent Difference	95% CI for the Difference
	Females	Males		
Pharmacotherapy				
Br-Feeding	88.8	74.0	14.9	8.9 – 20.8
Not Br-Feeding	95.4	88.9	6.5	2.4 – 10.6
Psychotherapy				
Br-Feeding	46.6	40.0	6.6	1.1 – 14.3
Not Br-Feeding	47.9	39.6	8.2	0.7 – 15.8
Psychoeducation involving the patient's family				
Br-Feeding	37.0	38.4	- 1.5	- 9.0 – 6.2
Not Br-Feeding	36.9	33.3	3.6	3.7 – 10.8
Referral				
Br-Feeding	65.5	55.9	9.7	2.1 – 17.2
Not Br-Feeding	62.8	47.7	15.1	7.6 – 22.5

4.5.5 Pharmacotherapy

Information was collected about pharmacotherapies used for breast-feeding and non breast-feeding women separately. For breast-feeding women, classes of drugs rather than individual drug names were used to minimize respondent burden. For non breast-feeding women, questions were asked about both groups of antidepressant medicines and individual antidepressant medications. Responses for individual medicines for non breast-feeding women were therefore collapsed into their corresponding groups for comparison across groups (Table 4.22).

Table 4.22 shows a predominant use of SSRIs for both breast-feeding and non breast-feeding women with PPD. Only a few respondents reported using antidepressants other than SSRI's for breast-feeding women. None reported using MAOI's in breast-feeding women.

Table 4.22: Details of Pharmacotherapy by Type of Infant Feeding

Medicine	Respondents choosing the Option For Breast-Feeding Women (n=464)	Respondents choosing the Option For non Breast-feeding Women (n=661)
SSRI's	439 (94.6)	636 (96.2)
Newer Agents	56 (12.1)	559 (84.6)
Trizolopyridines	6 (1.3)	341 (51.6)
TCA's	41 (8.8)	216 (32.7)
MAOI's	0 (0.0)	61 (9.2)
Other	18 (3.9)	15 (2.3)

For non breast-feeding women, the most commonly used medicine was paroxetine (n=575, 87% of respondents who treated PPD in non breast-feeding women), followed by venlafaxine (n=540, 83 % of respondents who treated PPD in non breast-feeding women), followed by citalopram (n=540, 81.7 % of the respondents who treated PPD in non breast-feeding women).

Thirteen respondents (<1%) reported using a drug or other medication not listed in the questionnaire for non breast-feeding women and only 2 respondents (<1%) reported using a drug or other medication not listed for breast-feeding women. The medicines specified for non breast-feeding women were tryptophan (n=3), estrogen (n=3), Zyprexa (n=2), Risperdal (n=1), Ritalin (n=1), Gabapentin (n=1), Imovane (n=1), and, although not pharmacotherapy, one respondent listed Electroconvulsive Therapy (ECT). The choices given for breast-feeding women were Vitamin B6 and tryptophan, which were each reported by one respondent. One respondent said that he/she would recommend weaning the infant if PPD was severe and medication was necessary.

4.5.6 Psychotherapy

For breast-feeding women, 276 respondents (43.3% of those who treated PPD in breast-feeding women) reported providing psychotherapy in their office. For non breast-feeding women, 289 (43.7 % of those who treated PPD in non breast-feeding women)

reported that they provided psychotherapy in their office. Psychoeducation involving the patient's family was the reported method of PPD management by 240 respondents (37.7 %) for breast-feeding women and 232 respondents (35.1%) for non breast-feeding women. Four hundred and thirty two (60.3%) of the respondents referred to at least one resource other than a psychiatrist. Altogether, 290 respondents specified the methods of psychotherapy provided. The most commonly given psychotherapy was supportive therapy. Other types as given by the respondents were cognitive; counseling; identifying the cause of stress; discussion and evaluation; insight counseling; behavioral therapy; and narrative.

4.5.7 Prophylaxis

One hundred and eighty three respondents (26.1 % of the total sample) reported use of antidepressant prophylaxis to prevent the development of PPD. However, no further information was collected about prophylaxis because of the length of the questionnaire and associated concern about response burden.

4.5.8 Other Resources Used

Respondents provided information about other resources they had used to refer their patients who had or might have had PPD. They also provided reasons for such referrals. All respondents were included in the analysis of reasons for referral so that feedback from physicians who referred their patients with suspected PPD (without a confirmed diagnosis) was also included (Table 4.23).

Table 4.23: Reasons for Referral to Other Resources (n=717)

	Respondents Referring to the Sources Number (%)
Reason For Referral	
For Opinion	471 (65.7)
For Transfer of Care	242 (33.8)
Did not Refer	160 (22.3)

Most of the respondents reported referring their patients to a specialist for an opinion. One hundred and sixty (22.3%) respondents said that they did not refer. These respondents were excluded from the analysis of resources used for referral (Table 4.24).

Table 4.24: Other Resources Used for Referral of PPD Patients (n=557)

	Respondents Referring to the Sources Number (%)
Resources Referred to	
Psychiatrist	412 (74.0)
Psychologist	304 (54.6)
Community Support Group	301 (54.0)
Other	56 (10.0)

The most common specialists to whom referrals were made were psychiatrists. Respondents were also given the option to report resources other than those listed. Fifty-six respondents specified the following resources: "Alberta Mental Health Services"; "Children's Cottage"; "Shared Mental Health Care"; "Community Mental Health Centers"; "Community/Public Health Nurse"; "Public Health"; "Best Babies program"; "Counseling Services"; "Mental Health worker"; and "Psychiatric Outpatient Team". Four obstetricians also reported that they referred their patients to family physicians for follow-up of the concern.

Raw frequency comparisons of referral practices showed that a larger percentage of female respondents (71%) referred for opinion than male respondents (61%). Thirty four percent from each gender referred their PPD patients for transfer of care. All of the Obstetricians and Gynecologists referred their PPD patients to other resources for either transfer of care (97%) or for an opinion (29%) or for both purposes (29%). Ninety four percent referred to Psychiatrists. Fewer Family Practitioners (63%) referred for opinion than Family Practitioners with Obstetric practice (74%). Equal percentages of these two groups referred for transfer of care (31% each). More of the urban respondents (38%) referred for transfer of care than rural respondents (27%).

4.6 Respondent Opinion

At the end of the questionnaire, respondents were invited to offer their opinions about the scope of practice and continuing medical education needs in relation to PPD. They were also asked to comment on the extent to which there was room for improvement in PPD management and to identify the barriers to achieving the best possible practice in PPD management.

4.6.1 Respondents' Opinion about Scope of Practice and Continuing Medical Education (CME)

Respondents' opinions about scope of practice and CME were collected by statements on a Likert scale with five answer choices: agree, somewhat agree, neither agree nor disagree, somewhat disagree, and disagree (Table 4.25) and by multiple-choice questions (Table 4.26). Responses from the Likert scale questions were dichotomized into agree and somewhat agree versus the other three choices and analyzed by selected variables.

Table 4.25: Respondents' Opinion about Scope of Practice and Continuing Medical Education (CME)

Statement	Respondents in Each Category Number (%)					
	Agree	Somewhat Agree	Neither Agree Nor Disagree	Somewhat Disagree	Disagree	Total
Treatment of PPD is not within the scope of Family Practice.	7 (1.0)	10 (1.4)	14 (2.0)	105 (14.7)	578 (81.0)	714
Treatment of PPD is not within the scope of Obstetrics.	19 (2.7)	35 (4.9)	60 (8.4)	171 (24.1)	426 (59.9)	711
PPD is a preventable condition.	43 (6.1)	171 (24.1)	221 (31.1)	198 (27.9)	77 (10.9)	710
Most episodes of PPD resolve spontaneously, without treatment.	17 (2.4)	131 (18.4)	119 (16.7)	284 (39.9)	161 (22.6)	712
Community resources are not available for women with PPD.	52 (7.3)	171 (24.1)	108 (15.2)	226 (31.8)	154 (21.7)	711
There is a need for specific programs on PPD from CME	287 (40.4)	284 (40)	96 (13.5)	19 (2.7)	24 (3.4)	710

Only seventeen (2.4%) respondents agreed/somewhat agreed with the statement "Treatment of PPD is not within the scope of Family Practice". Slightly more (n=54, 7.6%) did so with the statement "Treatment of PPD is not within the scope of Obstetrics". Eight of these respondents were Obstetrician/Gynecologists (24% of this specialty). For the statement "Most episodes of PPD resolve spontaneously without treatment", the male respondents agreed/somewhat agreed more often than female respondents (28.8 % versus 12.4 %). More Obstetrician/Gynecologists (39.4%) agreed/somewhat agreed with this statement compared to Family Practitioners (22%) or Family Practitioners with Obstetric practice (17.9%). Thirty percent of the respondents from each gender agreed/somewhat agreed with the statement "PPD is a preventable condition". Responses from different specialties were also similar for this statement (FP = 31%, FP with Obs = 29%, Obstetricians/Gynecologists = 26.5%).

Respondents from rural areas (37.4%) more often agreed/somewhat agreed with the statement "Community resources are not available for women with PPD" compared to respondents with urban areas (28%).

Five hundred and seventy one (80.4%) respondents agreed/somewhat agreed with the statement "There is a need for specific programs on PPD from Continuing Medical Education". Physicians were asked that if they had the opportunity to participate in an educational program on PPD for physicians, what format would be preferred for such a program. A list of options was provided and the respondents were allowed to check only one. "An interactive workshop" (n=275, 38.4%) and "a lecture based course" (n=258, 36%) were the most commonly chosen options. The respondents were also, given the choice to specify any "other" option not listed in the choices. Eighteen respondents chose this option but only two new modes were suggested. Those were "regional conferences" (n=1) and "tele/video conferences" (n=2). This information is summarized in Table 4.26.

Table 4.26: Opinion about CME Programs

Program option	Physicians choosing the option	
	Number	%
An interactive workshop	275	38.4
A lecture based course	258	36.0
Written material for self study	76	10.6
Distance learning (e.g. internet based courses)	48	6.7
Peer group training	15	2.1
Other	18	2.5

4.6.2 Barriers to Best Practice and Ways to Improve

Table 4.27 summarizes the respondents' opinions about barriers to improved management of PPD.

Table 4.27: Barriers to Achieving the Best Management: Respondents, Opinions

Barriers to achieving the best practice in the management of PPD.	Respondents Number (%)
Work load for primary care providers	496 (69.2)
Long waiting times for psychiatrist consultation	495 (69.0)
Patients not accessing resources due to social stigma associated with mental health problems	431 (60.1)
Lack of information about PPD for primary care providers	377 (52.6)
Lack of community resources to help women with PPD	353 (49.2)
Lack of awareness about PPD among primary care providers	324 (45.2)
High costs of treatment	250 (34.9)
Other	47 (6.6)

It is interesting to note that all of the reasons were endorsed by a considerable number of respondents. Healthcare system factors were the most frequently chosen options. These included "work load for primary care providers" and "long waiting times for psychiatrist consultation", each of which was chosen by about 70% of the respondents. "Patients not accessing resources due to social stigma" was also given by a majority (60.1%) of respondents. Forty-seven respondents gave "other" barriers to best

practice. The most commonly given barriers were, "patients' unawareness of PPD as a disease" and "non-compliance to medication while breast-feeding". Other identified barriers included "many caregivers and lack of integration amongst them", "patients too busy to get the treatment", "patients not aware that help is available", and "Primary Care Providers not addressing the problem before the birth of the baby".

Question 19 of the survey questionnaire was a two-step question that invited opinions from the respondents about improvement of PPD management. Six hundred and fifty six respondents (91.5%) said that management could be improved whereas nineteen (2.7%) said that it could not be improved. The remaining 42 respondents (5.9%) did not answer this item. Five hundred and twenty nine (73.8 %) respondents offered their suggestions for improvement. From the comments that the physicians provided, common themes for improvement were summarized. Many respondents stated that awareness and education about PPD amongst physicians, their patients, patient's families, and society in general should be improved. Some of the suggestions to accomplish this task were Internet based education, CME programs and public awareness campaigns. Respondents suggested that physicians should be trained to better recognize the signs of PPD and the treatment and screening methods should also be improved. It was stated that physicians are reluctant to give antidepressant medication to breast-feeding women due to the lack of knowledge about adverse effects. One suggestion was to have standardized post-natal tests provided by government to screen for PPD. Many respondents thought that mental health problems carried a stigma for patients, and that intervention to decrease stigma such as Internet based education and public awareness campaigns should be undertaken. One suggestion was to make awareness of PPD part of pre-natal education. Some respondents thought that more support for patients suffering from PPD should be available. This should include more community-based support, routine follow-ups and easier access to psychiatrists. They also noted that physicians should have more access to referral resources for such as support groups.

CHAPTER FIVE: DISCUSSION

5.1 Major Study Findings

A majority of responding Alberta physicians who provide care to childbearing age women screened for PPD but few used standardized screening methods. Most respondents reported using PPD treatment options that are in accordance with current guidelines for PPD treatment, even though their reported practice occurred before a specific guideline publication. Female physicians had more exposure to women of childbearing age, recognized more risk factors for PPD development, scored higher on PPD knowledge items, and reported a more proactive approach to screening and treatment of PPD. Overall, knowledge related to diagnosis of PPD was lower than knowledge related to recognition of PPD as pathology and its treatment and sequelae. Most respondents recognized the need for improvement in PPD management and provided relevant suggestions.

5.2 Potential Role of Major Biases

5.2.1 Selection Bias

Selection bias is defined as "error due to systematic differences in characteristics between those who take part in a study and those who do not" [142]. An important source of selection bias in self-report surveys is a low proportion responding. Low response creates the possibility that non-respondents differ from respondents with respect to the variables of interest. One way to study the possible impact of this bias is to examine any attributes that are available for the sampling frame in comparison with the sample. In the current study, the distributions for age appeared similar for the respondents in comparison with the sampling frame/target population. The proportion responding was similar for practice location but differed on the basis of gender whereby more female physicians responded compared to males. It is acknowledged that these comparisons are not sufficient to measure the direction or magnitude of selection bias. Physicians with more knowledge, more interest, and a practice that was more relevant were probably more likely to respond. We can probably safely assume that those with

more interest would also be more knowledgeable and the actual state of affairs among *all* physicians is less likely to be as favorable. Physicians who did not respond might have less knowledge, experience, less confidence in their practice but also may have been ineligible according to the study criteria. This situation might have resulted in over-representation of optimal practices. The inferences made from the results may be applied to the respondents and to select physician populations with similar practice and demographic characteristics, but not necessarily to the total physician population.

Selection bias becomes a threat to the internal validity of a study if selection of individuals depends on exposure and outcome under study. Specifically, if the individuals having both the attributes of exposure (i.e. the independent variables such as demographic characteristics) and outcome (i.e. the dependent variables such as knowledge) are more likely to participate then the association between the exposure and the outcome will be overestimated. In this study, for example, if females who were able to recognize more risk factors for PPD were also more likely to participate then the association between being female and having a high risk factor recognition score would have been overestimated. However, there was no way to really know the magnitude or direction of this bias given the study design.

5.2.2 Misclassification Bias

Misclassification is "the erroneous classification of an individual, a value, or an attribute into a category other than that to which it should be assigned". The resulting bias is called misclassification bias. This type of bias is also sometimes referred to as "information bias" or "measurement bias". Misclassification can occur with the same frequency in all study groups (non-differential misclassification) or may differ between study groups (differential misclassification) [142]. Non-differential misclassification bias results in an attenuation of the true associations between the independent and dependent variables (which can be shown mathematically).

In the current study, because practice was measured using self-report, an over-reporting of optimal practice might have occurred due to the social desirability effect. Social desirability has been defined as a distortion of responses in a socially desirably direction [138]. There are no data suggesting that accuracy of self-report for physicians

is related to demographic characteristics. In the current study, too, it was not expected that any of the subgroups were more or less likely to be prone to social desirability effect. In this case, an overall better state of affairs might have resulted among respondents than the actual practice. However, it was more likely that this misclassification had occurred with the same frequency in all subgroups. Hence, because the bias in this case would be non-differential, it would have a direction toward the null. Misclassification bias produced by social desirability was not of much concern for the data related to knowledge items or opinion. The respondents were expected to respond to the knowledge items to the best of their knowledge and to provide their truthful opinions.

Another mechanism by which measurement bias is introduced into retrospective data collection is recall bias. The respondents were asked to estimate their practice for previous one year. It is possible that they recalled their actions taken for their patients who visited them more often. In all likelihood, the impact of this mechanism would be the same for different subgroups resulting, again, in non-differential misclassification bias.

Other mechanisms for introducing misclassification bias into a study are errors in measurement such as incomplete responses, and data entry errors. In the current study, the variables' categories and methods of measurement were clearly defined before analysis. Subjective measurement error that might be possible in interviewer-based surveys did not apply to this study. Hence, systematic errors in measuring the variables of interest were unlikely. Questionnaire items were thoroughly pre-tested and designed according to best practice for questionnaire construction to achieve optimal comprehension and minimize ambiguity. Numbers of responses completed for various items are reported in the tables given in Chapter 4. Completeness of responses for most items indicated that measurement error due to poor comprehension was minimized, but no information on actual interpretation was collected, so there is no certainty in this conclusion. Data entry errors were few and were in all likelihood random in nature. Thus, it is hoped that misclassification bias due to data collection or entry errors was minimal.

5.2.3 Confounding Bias

Confounding is a type of bias which results when " the apparent effect of the exposure of interest is distorted because the effect of an extraneous factor is mistaken for

or mixed with the actual exposure effect" [142]. In order for a factor to be a confounder, that factor must be related to outcome, it must be associated with the exposure (i.e. independent variables) under study and it cannot be an intermediate step in the causal chain between the exposure and the outcome [142]. A variety of methods are used to adjust or control for confounding at the design and at the analysis stages of a study. At the design stage, confounding can be controlled using randomization, restriction and matching. In the current study, participation was restricted by applying the exclusion criteria. Stratification and regression modeling are methods used to control confounding at the analysis stage. In this study, the gender of the respondents was found to be associated with many other demographic factors as well as with scores on risk factors and knowledge items and screening practice. Hence, a stratified analysis was used for males and females separately for associations of other respondent characteristics and outcome variables related to knowledge items and screening practice.

5.3 Random Error and Statistical Power

Random error is "the portion of variation in a measurement that has no apparent connection to any other measurement or variable, generally regarded as due to chance" [142]. Sampling error is the part of the total estimation error of a parameter caused by the random nature of the sample [142]. One way to minimize sampling error and, hence, to increase precision is to increase the sample size. Estimates obtained in studies with large sample sizes are more likely to resemble the underlying characteristics of the target population. The current study was conducted on the whole target population of Alberta physicians and sampling error was thus not a matter of concern. For all statistical tests, the conventional significance level of $p<0.05$ was used. That meant that the probability of finding a result as extreme as or more extreme than the observed result was less than five percent. One downside of large sample sizes, however, is that the likelihood of finding small, non-clinically meaningful differences to be statistically significant. The likely clinical meaningfulness of all differences was kept in mind during all analyses.

The variance associated with parameters of interest is used to generate confidence intervals. Hence, the width of the confidence intervals (CI) provides information about

the precision associated with the estimate. The narrowness of the 95% CI for most parameters in this study suggests that the estimates obtained were reasonably precise.

Of particular concern in studies where non-significant results are obtained is the possibility of Type II error. Type II or beta error is "the error of failing to reject a false null hypothesis, i.e. declaring that a difference does not exist when in fact it does" [143]. The probability of a Type II error is related to the power of a test (beta =1 – power) [143]. However, given the large sample size employed, this study had adequate power to detect an association if such an association existed. For example, for comparisons of knowledge scores, it was calculated that the study had more than 90% power to detect a 10% difference in mean knowledge score of respondents' groups at the alpha level of 0.05. For the issues addressed in this study, a difference of less than 10% was assumed to be of little clinical significance if any.

5.4 Discussion of Specific Study Findings

5.4.1 Proportion Responding

The reported proportion responding for physicians' surveys conducted in different parts of world and over time varies considerably [131-133]. Although the proportion responding was low for the current study, it was comparable to other recent physicians' survey in Alberta that found response rates of around 35% [144, 145]. However, in one physicians' study conducted by Davies et al. that included Alberta physicians, the proportion responding was as high as 77% [146]. The proportion responding for that study dropped in second and third surveys over the subsequent three years. One reason for the decreasing proportion responding in that study could be an increasing survey burden for physicians over the years. This phenomenon might also have played a role in low proportion responding in the current study. Moreover, the response difference in the current study and that of Davies et al. could also be explained by the differences in methods. Those researchers contacted all potential participants or their practice hospitals by phone to ascertain eligibility before sending out the questionnaires. For the current study, however, the information in the CPSA database was considered sufficient for the application of exclusion criteria. This resulted in inclusion of some ineligible units since

483 returns indicating ineligible practices were received. It is likely that many more who did not return the questionnaire were also ineligible. The calculation of the proportion responding was therefore very conservative in this study.

The finding that more females responded might be a reflection of type of practice or personal interest in the practice area. Female physicians might be more sensitive to women's mental health problems, perhaps because they identify with them. Moreover, as we found, they also had more female patients in their practices.

Fewer physicians over the age of 65 years responded, maybe due to retirement at this age or the possibility that older physicians might not be practicing perinatal care. The proportion responding for urban and rural physicians did not appear to be different.

5.4.2 Knowledge about PPD

Physicians' knowledge and practice related to PPD is a relatively ignored aspect of research. Although, authors in this area have consistently pointed out that PPD is under detected and under treated in community practice, little systematic data are available in this area. Few studies describing some aspect of knowledge and/or practice of physicians' related to PPD were found in literature. Although, some of the current study's findings have some comparability, it should be noted that none of those studies was conducted in Canada. In addition, their methodology, questionnaires, and medical specialty of the populations were also different from the current study. Hence, generalizability of their results to Alberta physicians is limited.

One objective of the current study was to describe physicians' knowledge related to risk factors of PPD. It was found that some risk factors were recognized by more physicians compared to other risk factors. This differential awareness of risk factors was reasonable given it reflected the literature, which has not solidly delineated all the risk factors. For example, the risk factor "Little or no social support" was recognized by 657 respondents (92%). This factor has been found to be associated with PPD in studies conducted in Canada, Australia, and Europe [5, 48, 52]. In comparison, "Immigrated to Canada within the past two years" was recognized by only 314 (44%) respondents. No Canadian study was found for this factor although immigration status or being foreign born was found to be associated with PPD in studies conducted in Jerusalem, Israel, and

Geneva [8, 38, 44]. In Canada, although not specific to depression, it has been suggested that immigrant women have special mental health needs due to a higher incidence and intensity of risk factors and reduced access to mitigating factors [147].

Our finding that female physicians recognized more risk factors is consistent with the results of an American study conducted by Lepper and colleagues that found that their female respondent Obstetricians/Gynecologists scored high on the two scales of PPD knowledge measured by that study [132]. The two scales measured were antecedents of PPD and impact of PPD (comparable to the current study's domains of Risk Factor Recognition, and Sequelae of PPD). The explanation for this finding given by Lepper et al. seems pragmatic that female physicians probably identify with female patients and hence, are more aware of psychosocial issues related to women's health. Another reason might be the composition of practice, wherein female respondents reported to have relatively higher proportions of women of childbearing age among their patients. This finding may also be explained by their personal experience with/or investment in issues of childbearing.

Lepper et al. found that young Obstetricians were more aware of the knowledge items studied. The authors suggested that the changing climate of medical training and improved education in physicians' communication skills might have been the reason for this difference. The current study did not examine "age" as a correlate of knowledge scores. Instead, "years in practice" represented the concept of time spent with patients. This factor was not found related to scores on knowledge items in stratified analysis, which was adjusted for confounding by gender. One reason of the difference in this finding might be that Lepper et al. did not examine the confounding effect of age and sex and suggested that future research should remedy this effect [132].

The finding that time in practice was not related to knowledge item scores or practices indicates that knowledge and practice are probably more related to the current practice conditions than the length of respondents' clinical experience. The factors influencing the state of current affairs might have included CME courses and other updates in the area of PPD resulting from increased interest and concern about this disorder in the scientific and practice community in recent years.

Due to the heterogeneous nature of information available in the literature, the relative importance of each risk factor could not be determined and consequently the knowledge level of each respondent could not be accurately gauged. Nevertheless, physicians who recognized more risk factors were expected to identify women with these characteristics to be at an elevated risk of developing PPD. Conceivably these physicians would also be more careful when following up these women.

The overall item scores related to diagnosis were lower than those related to recognition of PPD as a pathology, treatment, and sequelae of PPD. Even though the items were constructed to represent important subject matter according to the latest research, they were not weighted for importance in each domain. Hence, a lower score did not necessarily mean a weaker knowledge base in this area. Rather it presents an indication of differential strength in the knowledge base related to different areas of knowledge. This finding presents an opportunity for hypothesis generation for further studies. Nevertheless, it is conceivable that a possible lack of physicians' knowledge related to PPD diagnosis is contributing to under-detection and, hence, under-treatment of this disorder in Alberta. This possible state of affairs, to some extent, also explains the finding of TOMIS [5] that many women with PPD were neither diagnosed nor were given any kind of treatment.

5.4.3 Current Practice

The sample had representation from all subgroups based on demographic factors but differences in practice characteristics were noted among respondents. More non-Canadian graduates practiced in rural areas possibly reflecting the difference in requirements to practice medicine in certain designated areas of Alberta. The College of Physicians and Surgeons of Alberta (CPSA) is responsible for the licensure to practice Medicine in Alberta and maintains a register for all Alberta physicians. Applicants to this registration can apply to one of the five different parts, each of which has its own requirements. All parts except for Part 5 require licentiate of Medical Council of Canada (LMCC). The LMCC is not required for registration on Part 5, which is provisional registration permitting practice for up to 30 months in communities that are designated by the Alberta Minister of Health as having an emergency need for medical services [148].

Non-Canadian medical graduates are probably more likely to avail this provisional registration as it may let them start working earlier than would otherwise be possible.

More of the Family practitioners with Obstetric practice reported their location in rural areas indicating a need in rural areas for these specialists to cover for obstetric services. Finally, as discussed before, female respondents differed from males on many aspects.

We had interesting results for the **Patient Volume** variable. Respondents reported seeing as few as one patient per week to as many as 600 patients per week. This is an indication that respondents' hours of work and time spent with patients greatly varied; this could be because of the diverse practice settings, medical specialties and a possible difference in the level of service being provided. The median for this variable was 125, which was very plausible for a physician working 40 hours per week and spending 15-20 minutes per patient. The median number of patients seen per week for Olson's study was also 125 [131].

Respondents gave a range of estimated PPD prevalence in their respective patient populations. The majority of respondents estimated PPD prevalence in the 0-15% range but estimates as high as 80% were also given. The individual range lengths given by each respondent also varied considerably. It is interesting to note that regardless of gender, respondents who reported screening all their postpartum patients for PPD gave higher estimates of PPD prevalence. This might be a result of a difference in screening practices or in their level of awareness that guided them to screen all postpartum patients in the first place. Another explanation might be that the PPD prevalence in the underlying population is different. A population-based PPD prevalence study in Alberta would be helpful in illuminating this issue.

Most respondents (98%) who screened did it at least once in the first eight weeks of delivery. This is the most common time for an episode of PPD to precipitate. Clinicians should be aware, however, that PPD can occur in the several months' period following delivery [41] and vigilance should be exercised throughout this period to avoid missing any cases of PPD. Only a quarter of respondents reported screening after 16 weeks of delivery. The respondents who continued screening for several months

postpartum reported a slightly higher PPD prevalence among their patients. This is an important finding that might be indicative of late onset PPD cases. Two thirds of these respondents were females, suggesting closer and longer follow up by women physicians.

The most unexpected result pertained to the respondents' use of screening methods. Although over 80% of the sample reported screening for PPD either all of their postpartum patients or those at higher risk, only four percent used standardized instruments systematically. Use of self-report questionnaires was very low even though at least one validated and quick screening tool exists (the EPDS). Most of the respondents used clinical interview or relied on experience/intuition. This finding agrees with the Olson's study that found that only four percent of pediatricians in their study used formal diagnostic criteria and none used standard screening questionnaires. Only 48% of their respondents did additional assessments [131].

While clinical interview is an effective method of diagnosis for depression, wide variation in interviewing techniques is likely. It is possible that in busy clinical schedules many cases of PPD are missed especially because these patients might not have the typical presentation of depression. Most often, after delivery, the newborn becomes the focus of attention for the mother and the physicians and most visits to the clinicians are related to him/her during this time. At the same time, many postpartum women do not recognize their symptoms of depression and/or attribute them to normal consequences of delivery. These women are less likely to report any difficulties with their health. In such cases the physicians' role and the use of effective screening methods becomes important.

Use of short self-report questionnaires for PPD screening is reported to be acceptable by patients [15] and it is recommended that all women should be screened for PPD in the postnatal period and the EPDS (although not a diagnostic tool) is recommended as part of a screening program for PPD [82]. Screening with non-specific tools could have negative consequences such as over-diagnosing and/or unnecessary utilization of resources including physician's visits. It has been suggested that if screening programs for PPD are implemented, health professionals should be adequately trained to administer such programs [82]. This suggestion is reasonable because, as discussed in Chapter Two, the screening tools are not perfectly specific and an over-

estimation of PPD occurrence should be monitored by the provision of trained health professionals. Outcomes research evaluating the effects of screening by physicians is scant. Although, at least one research team evaluated patient outcomes of a screening program implemented in the practice of health visitors, they did not provide data in support of their finding of better detection and treatment of PPD resulting from the screening program [81]. Perhaps, there is a need for interventions in the form of screening programs by physicians and for follow up research on patient outcomes.

In this study, the respondents' specialty was found to be associated with screening practice. The point estimate for the proportion of respondents screening all postpartum women was higher for physicians who characterized their practice as "Family Practice with Obstetrics" compared to other specialties. These physicians seem to be more thorough about the psychosocial issues peculiar to childbirth possibly due to being connected to both the disciplines of Family Practice and Obstetrics.

One of the most common reasons given by respondents for not screening for PPD was the absence of Clinical Practice Guidelines (CPG) for PPD. No published CPG were available in the literature at the time this study was initiated. An evidence-based guideline produced by the Scottish Intercollegiate Guidelines Network became available in the year 2002. Thus, we were able to include a summary of the guideline in our post-study mail-out of results to all respondents who expressed a desire for results. Although no evidence is found in the literature to show that simple distribution of guidelines produce large changes in practice, availability of the new guideline may have assisted some physicians. There is a need for further research to follow up on the effects of the new guidelines in current practice.

Another common reason for not screening was lack of awareness of screening methods. One respondent commented that he/she did not have copies of screening questionnaires. Addressing this issue is one possible way to reduce at least one barrier to the better management of PPD. An additional reason for not screening was the perception that PPD was not a problem in the respective physician's practice. There is a possibility that these respondents might not be aware of the prevalence and consequences of PPD.

The latest evidence based guideline recommends that PPD should be treated promptly [82]. However, it is not established that a particular treatment option has superiority to others. The best evidence available is in favor of a pharmacotherapy combined with psychotherapy especially that involves the family [82]. Most of the respondents in the current study reported either the use of these options or a referral to other specialists presumably for the same options. This indicates that once they diagnosed PPD, they did initiate treatment. This finding is in contrast to what Olson et al. found in the 2002 study of American Pediatricians. In the current study, 81-92% of respondents reported using pharmocotherapy, whereby only 2% of Olson's respondents used medication to treat maternal depression and/or PPD. The reported referral practices also differed. More of the current study's respondents referred (about 60%) compared to Olson's (about 30%). This difference probably reflects the different specialties of the two study populations as well as differences in the healthcare systems.

For both breast-feeding and non breast-feeding women, the most commonly reported management option was pharmacotherapy. More respondents reported using pharmacotherapy for non breast-feeding women than for breast-feeding women reflecting their concern over the safety of these medications for the nursling. This practice was also in line with the latest Clinical Practice Guidelines that recommend to establish a clear indication of drug treatment for breast-feeding women in the absence of acceptable and effective alternatives and to assess the benefit/risk ratio of the illness and treatment [82]. Respondents tended to refer more breast-feeding women to other resources probably for the same reason – their concern over the safety of the nursing baby. Psychotherapies are unlikely to affect the baby and hence, reported practices for psychotherapy or psychoeducation were similar for breast-feeding and non breast-feeding women.

A detailed discussion of PPD pharmacotherapy is given in Chapter Two. To summarize, SSRI's are the recommended first line agents to be followed by addition of or switching to other agents depending on patient response. The results that most respondents used SSRI's followed by other agents conform to the guidelines. Regarding MAOI's, concerns are noted in literature about their safety and side effects [71]. In

accordance, the current study found very few uses of MAOI's in non-breast-feeding women and none in breast-feeding women.

Evidence is scant for the use of medicines given as "other options" by respondents. According to the latest guideline, use of hormonal therapy is not advised as routine management of patients with PPD [82]. Although the survey question was about PPD treatments "usually given by respondent", it is possible that these respondents mentioned the less frequently used therapies as well. It is important to evaluate the use of these medicines and to provide evidence-based guidelines to physicians.

Evidence exists in favour of psychotherapies, (including counselling, cognitive behavioural therapy, interpersonal therapy), social support, and family focused interventions in reducing depressive symptoms during postnatal period. The latest guideline also recommends psychosocial interventions, especially those that work with family members [82]. Forty three percent of the respondents reported providing psychotherapies themselves, 74% reported to have referred to psychiatrists, and about two thirds referred to at least one resource other than a psychiatrist. These results suggest that most respondents considered psychotherapies as important management options.

More respondents referred their PPD patients to psychiatrists (74%) than other resources (psychologists and community support groups, 54% each). At the same time, it is notable that most respondents recognized that long waiting times for psychiatrists' consultation was one of the barriers in better management of PPD. In this situation, more liberal use of psychologists, community support groups, or other resources may be beneficial. We did not gather data about availability of such resources in the community. It might be useful if information about such resources is organized and provided to the physicians.

All of the Obstetrics/Gynecologists reported referring their PPD patients to other resources either for transfer of care (97%) or for an opinion (29%) or for both purposes (29%). One pragmatic reason for this practice is that they might not have sufficient time to follow up on these patients. Otherwise, they may perceive that this disorder usually requires specialist supervision. The result that most obstetricians/gynecologists (94%) referred to psychiatrists also supports this idea. Fewer respondents from other specialties

referred for transfer of care (31% each of family practitioners and family practitioners with obstetric practice) showing a difference in practice attitudes compared to obstetrics/gynecologists. The result that more female respondents referred for an opinion suggests a more proactive approach to PPD management by female physicians.

More of these respondents referred their patients to other resources if the patients were breast-feeding (61%) compared to if they were not (55%). The CPG for PPD [82] recommends specialist supervision for a certain group of patients (with bipolar affective disorder on mood stabilizers) if they are breast-feeding. We did not collect information on these details and our results represent the overall practice of respondents. These results give an indication that more referrals were made to specialists if the women were breast-feeding than if they were not. Further research might focus on the specific cases of PPD for which the referrals are made and the specific resources referred to.

Prophylaxis for PPD is an area of research that is in its infancy. Few studies are found in literature that explored this aspect of PPD management [110, 112, 149, 150]. They differed a lot in their methods and choice of prophylactic regimens. Many had methodological flaws. Finally, the results across studies were not consistent. It is clear, however, that no effective and proven prophylactic protocol/treatment has been established or available to be used in clinical practice at this time. The responses to the statement "PPD is a preventable disease" were more evenly distributed on the Likert scale than were the responses to other statements. This probably reflected the level of uncertainty on this topic and/or the content of physician training. In this situation, the finding that one fourth of the respondents reported use of prophylactic antidepressants is an important one. Probably there is room for further research in the area of prophylactic practices of the physicians as well as for the effectiveness of such practices.

5.4.4 Opinion

One objective of the study was to solicit opinion from the respondents about continuing education needs related to PPD management. It was very encouraging that more than 80% of the respondents (n = 571) endorsed such a need, indicating openness to new learning. CME offices may find it compelling to respond to the stated need of this group of physicians. It is interesting to note that Olson et al. got similar opinions form

their respondents even though the differences in study populations and locations are notable. Sixty four percent of their respondents realized a shortfall in training for diagnosis and screening of PPD, which indicates awareness about this disorder in the broader physician community. In the light of our findings, it would be beneficial to design and launch CME programs with content conforming to the specific needs of physicians. Interactive workshops or lecture-based courses might be considered for this purpose, as these were the most commonly chosen options by the respondents (n=275, 38% and n=258, 36% respectively). It will be helpful if the content of these programs includes diagnosis and screening methods in detail. It is expected that improving overall knowledge of physicians about PPD will improve the overall management practices and outcomes for this disorder. It is realized that it takes time for a change to be implemented and for the results to be apparent.

This study reported some of the barriers to better management of PPD as given by the respondents. Workload for primary care providers and long waiting times for psychiatric consultation were the most frequently given barriers (each given by 70% of the respondents). Olson et al. did not gather data about waiting times for Psychiatrist consultation but their result for physicians' workload was very similar to the current study. Seventy percent of their respondents said that insufficient time for adequate history and education/counseling was an important barrier to better management of PPD [131]. Two of the other most commonly chosen barriers that were related to lack of awareness and information about PPD, were also similar in the current study and that of Olson et al. Improved utilization of psychologists, community support groups, and other resources might be helpful to deal with this issue in the short term as long as shortages in numbers of psychiatrists continue. However, better training of family practitioners to manage these patients themselves may alleviate some of the perceived need for referral.

A substantial number (n=250, 35%) of respondents endorsed the view that high costs of treatment were a barrier to improved PPD management. Mental health disorders have a huge financial impact globally. Even though healthcare in Alberta is government subsidized, the patients still need to at least partially pay for prescription medicines, the services of private psychologists and other treatments that are not completely covered by

Alberta Health. There is a need for further study of economic and financial aspects of PPD so that progress can be made towards low cost solutions. Any attempt to reduce treatment costs and/or improve financial access would be helpful.

Respondents thought that negative perceptions of PPD among the public was one of the barriers for better management of PPD. They suggested Internet based education and other campaigns to enhance public awareness about PPD. More research into the effectiveness of such public education programs is warranted.

Many of the current study's respondents perceived that PPD was in the scope of family practice and obstetrics. Eighty four percent of the respondents believed that PPD was in the scope of Obstetrics and 95% believed that it was in the scope of Family Practice. Fifty seven percent of pediatricians surveyed by Olson reported that they felt that recognizing maternal depression was a part of their responsibility [131]. This difference could have arisen from the different specialties of the study populations whereby Pediatricians might be more likely to believe that their practice scope was limited to children.

To summarize, the results suggest that reported treatment practices were in reasonable compliance with current guidelines. However, there is room for improvement, especially in screening/diagnostic practices and for integration of available resources. These findings are in line with the US Surgeon General's (1999) report that recommended increasing the capacity of primary health care providers to recognize mental health disorders as well as their knowledge about referral sources [57]. This report pointed out that the salient problem with mental health disorders is no longer with the effectiveness of treatment but with getting people into treatment. In the case of PPD, recognizing the presence of the disorder is the first challenge in the process of getting patients treated. These patients often do not realize that they have a pathological condition [86]. Their predominant symptoms are usually anxiety and guilt focusing on failure at motherhood instead of depressed mood, which is the typical symptom of Depression (Chapter Two). It is unlikely for these patients to present with the complaint "I think I have postpartum depression". In this situation, it becomes critical for the

physician to have a systematic approach to identifying PPD when it occurs and, even before that, to identifying a woman at risk of PPD.

5.5 Strengths and Limitations of the Study

The major significance of this study is that it provides much needed baseline information on a very important practice problem. Furthermore, it gathers the opinions of physicians that are the most involved in the remedial process of PPD. This knowledge can prove to be invaluable in the betterment of mental health for the residents of Alberta.

A key limitation of this study and all self-completed surveys is the validity of self-report. The information obtained may have lacked the accuracy of objective measurement and may have over-represented optimal practice due to the social desirability effect. However, this issue applies to those variables concerned with actual practice behavior and not with knowledge or with demographics or respondents' opinions. Due to the cross-sectional nature of the survey, no causal inferences could be made between demographic characteristics of the physicians and their practice and knowledge from the results. Moreover, trends over time could not be assessed. However, this study provided a baseline for future studies in this area.

Another issue was the proportion responding, which was less than what had been expected at the start of study. One reason for the low response was that we used the information in the CPSA database for our exclusion criteria and excluded only those physicians who clearly fulfilled these criteria. This led to inclusion of many physicians whose practice did not conform to our inclusion criteria. More of the ineligible physicians probably never returned the questionnaire because of a lack of interest and relevance. The way we calculated the response rate was thus very conservative. Had we had up-to-date information on the practice eligibility of the physicians, we could have reduced our denominator and achieved a higher proportion responding. Length of the questionnaire was kept to a minimum but it still took about 10-15 minutes to complete. This might have adversely affected the proportion responding in some of the busier clinics.

The total number of responses and the numbers in different subgroups were sufficient to make meaningful comparisons. Most information was collected by multiple-choice questions so there was minimal individual variability in answer choices.

5.6 Recommendations

Clinicians can play a key role in identification of PPD due to their close contact with new mothers and families of infants and it will be very helpful to provide them training according to their educational needs. Continuing Medical Education (CME) programs can assist this process especially if they are more targeted and integrated with other local initiatives aimed at improving patient care. Some studies have reported positive effects of physicians' training and/or educational programs on physicians' approach to major depression [127, 128] and better patient outcomes [127, 130]. Gunn et al. found positive effects of increasing knowledge and skill to improve both physical and emotional health (in detecting PPD) after an educational program [151]. However, one other study found that the positive effects of education programs were short lived and of less benefit for patients with chronic and/or severe depression [130]. These findings indicate that more frequent physicians' training/education programs related to this disorder should be organized.

This study brought light to some points in the current management of PPD that can be improved. Firstly, it is recommended that information about the availability of support organizations be compiled and made more available to physicians, as this is likely to lead to a better utilization of resources. There is also a need for public awareness campaigns to reduce stigma such that people will be more willing to seek help. Further research on the subject of PPD is also recommended since there is little or no information available on, perceptions among the public about PPD, the costs to society and the effectiveness of screening programs.

5.7 Conclusions

PPD has a complex etiology and a multi-level impact as well as a wide range of management solutions. For most new mothers, primary care physicians are the first line

contact within the health care system. Improving their PPD knowledge and practice is a key step toward improved management of PPD and ultimately improved patient outcomes. In the light of our findings, it is concluded that for at least this group of respondents practice was reasonably good but with some room for improvement. It should be noted, however, that this self-reported practice was not verified as actual practice, and that a self-selected group who may have had more optimal practice responded. Thus, any conclusions drawn are probably more optimistic than reality. This study did not identify specific groups to be targeted for improvement endeavors. Despite the fact that more female physicians recognized more risk factors and also seemed to be more knowledgeable and proactive about PPD across the board the differences were not sufficient to suggest gender specific education; nor would such an approach be reasonable. Overall, there were no radical deficiencies in specific areas of knowledge or practice, which might suggest targeted CME programs. However, CME programs with subject matter related to methods of diagnosis and screening would help improve the management of PPD. Interventions with patients, the healthcare system more broadly, and society are also suggested by the findings.

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APPENDIX A: Cover Letter - First Mailout

May 23, 2002

id.:_____

Dr. _____

_____

_____

Dear Dr. _____,

Postpartum depression (PPD) affects an alarming proportion of new mothers and can adversely affect their well-being as well as place their infant at risk. The scientific knowledge about the treatment of PPD is incomplete and as a result it may present practice challenges for physicians.

We are a group of physicians/researchers from the Faculty of Medicine at the University of Calgary interested in identifying current practices as well as practice needs of physicians related to PPD. Our ultimate aim is to prevent the adverse consequences PPD may have on families. We are conducting a study that has been endorsed by the Alberta Family Practice Research Network (AFPRN), a research initiative of the Alberta Chapter, College of Family Physicians of Canada, the Society of Obstetricians and Gynecologists of Canada, the Alberta Psychiatric Association, and the University of Calgary Continuing Medical Education office.

Enclosed is a questionnaire on PPD practice and practice needs for Alberta clinicians whose practice includes Family Medicine and/or Obstetrics. We are interested in knowing *your experience* with the diagnosis and treatment of PPD. The questionnaire has been tested to take about 10-15 minutes. It can be returned in the stamped self-addressed return envelope OR can be completed on-line at http://www.fp.ucalgary.ca/biwasil. Please enter your Study Identification Number (id) before submitting your response online. The number is given on the right upper corner of this letter.

Your responses are completely confidential. The identification number on the questionnaire is for mailing purposes only so that we may check your name off the mailing list when your questionnaire is returned. Your name will not be associated with your response in the study database, and all results of the study will be presented in aggregate. Study results will be sent to all respondents along with a brief summary of current best evidence for the management of PPD unless you indicate otherwise on the questionnaire.

If you have any questions or comments about the study or PPD in general, please do not hesitate to contact any of the members of the study team listed below. Your views will make a valuable contribution to the development of Clinical Practice Guidelines and planning CME programs, and ultimately to reducing the suffering and consequences of PPD for women and their families.

Thank you for the generous contribution of your time and opinion.

Sincerely,

Dr. Bushra I. Wasil, MBBS
Dept. of Community Health Sciences,
University of Calgary
Principal Investigator, Alberta PPD Study

Dr. Carol E. Adair, MSc. PhD
Adjunct Assist. Prof. Depts. of Community Health Sciences and Psychiatry, University of Calgary
Academic Supervisor, Alberta PPD Study

Dr. Maeve O'Beirne, Assist. Prof., Depts. of Family Medicine and Community Health Science, U of C

Dr. Scott B. Patten, Assoc. Prof. Depts. of Community Health Sciences and Psychiatry, U of C

Dr. Stephen L. Wood, Clinical Assist. Prof. Depts. of Obstetrics & Gynaecology and Community Health Sciences, U of C.

APPENDIX B: Survey Questionnaire

Alberta Postpartum Depression Study Questionnaire

Department of Community Health Sciences

The University of Calgary

Funded by: The Alberta Children's Hospital Foundation

This survey is intended for physicians who, within the last twelve months, spent some portion of their time providing care to women of childbearing age.

Did you provide such care within the last twelve months?
No (Please stop here and return the questionnaire in the enclosed envelope.)

Yes (Please complete the questionnaire and return it in the enclosed envelope.)

A summary of the study results and an information package with evidence based guidelines for the management of postpartum depression (PPD) will be available for all respondents upon study completion.
Would you like to receive this information package?

No

Yes

1. In the past twelve months in a typical week, approximately how many patients in total did you see either in your office or at another location?

_____

2. Of all the patients that you saw in the last 12 months, please estimate the proportion that were women of childbearing age?

- ❑ Less than 25% of my patients
- ❑ 26% - 50%
- ❑ 51% - 75%
- ❑ More than 75%

3. Which women do you consider to be at an elevated risk of developing postpartum depression (PPD)? (*Check ALL that apply*)

Postpartum women …

- ❑ who have a family income of less than $20,000 per annum.
- ❑ who are of thirty years of age or older.
- ❑ with a history of stressful life experiences.
- ❑ who have a history of psychiatric illness.
- ❑ with a history of PPD after a previous birth.
- ❑ with a history of anxiety during pregnancy.
- ❑ who have immigrated to Canada within the past two years.
- ❑ with little or no social support.
- ❑ who have breast feeding difficulties.
- ❑ whose pregnancy was unplanned or unwanted.
- ❑ with a difficult labor and delivery experience.
- ❑ Other *(please specify)* _____

4. Do you screen your postnatal patients for PPD?

- ❑ No, never *(skip to Q.7)*
- ❑ Yes, those at elevated risk of PPD

- ❑ Yes, all postpartum patients

5. What screening methods do you use? (*Check ALL that apply*)

- ❑ Self-report questionnaire *(please specify)* _____
- ❑ Clinical interview
- ❑ Structured interviews using standardized instruments *(please specify)*_____
- ❑ Observation/intuition/experience
- ❑ Other *(please specify)* _____

6. How many weeks after delivery do you usually screen for PPD?

(If you screen multiple times, please check ALL that apply)

0 - 4 weeks after delivery

- ❑ 5 - 8 weeks
- ❑ 9 - 16 weeks
- ❑ More than 16 weeks

(Please skip to Q.8)

7. If you do not screen women for PPD, what factors influenced this decision? (*Check ALL that apply*)

- ❑ I am not aware of screening methods for PPD.
- ❑ Screening for PPD does not provide useful information.
- ❑ Screening for PPD is not cost-effective.
- ❑ Screening for PPD is too time consuming.
- ❑ There are no clear guidelines for screening women for PPD.
- ❑ PPD is not a significant problem in my practice.
- ❑ Other *(please specify)*_____

8. To what extent do you agree or disagree with each of the following statements?

	Statement	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree
A	PPD seriously affects every aspect of a woman's life.	O	O	O	O	O
B	PPD has long lasting effects on the	O	O	O	O	O
C	No effective treatment is available for	O	O	O	O	O
D	Most episodes of PPD resolve spontaneously, without	O	O	O	O	O
E	Treatment of PPD is not within the	O	O	O	O	O
F	PPD is a normal consequence of childbirth.	O	O	O	O	O
G	PPD is associated with postpartum	O	O	O	O	O
H	PPD is a preventable condition.	O	O	O	O	O
I	Women with PPD usually present with anxiety.	O	O	O	O	O
J	Treatment of PPD is not within the	O	O	O	O	O
K	Serious risks are associated with not treating PPD promptly.	O	O	O	O	O
L	Community resources are not available	O	O	O	O	O
M	PPD is a unique disorder with peculiar differences from	O	O	O	O	O
N	There is a need for specific programs on	O	O	O	O	O

9. During the previous twelve months, what proportion of postpartum women among your patients had PPD? *(Please give an estimated range)*

From _____% To_____%

10. What do you *usually* recommend when you diagnose PPD in a woman who is <u>not breast-feeding</u>? (*Check ALL that apply*)

❑ I have not yet diagnosed PPD in women who are not breast feeding. *(Skip to Q. 12)*

- ❑ Psychotherapy in my office *(please specify the type)* _____
- ❑ Psychoeducation involving the patient's family
- ❑ Referral to specialists/other resources
- ❑ Antidepressant pharmacotherapy

11. If you felt that antidepressant pharmacotherapy was indicated for PPD in a woman who is <u>not breast-feeding,</u> which of the following antidepressants would you prescribe as first or second line treatment or would not use? (*Check ALL that apply*). *(Selection of 1st line treatment is based on individual characteristics e.g. past history or family history of use. Second line treatment is given when 1st line treatment has failed or to augment 1st line treatment.)*

Treatment	**1st line**	**2nd line**	**Would Not Use**
Selective Serotonin Reuptake Inhibitors (SSRI's)	O	O	O
Fluoxetine – Prozac	O	O	O
Sertraline – Zoloft	O	O	O
Paroxetine – Paxil	O	O	O
Citalopram – Celexa	O	O	O
Fluvoxmaine – Luvox	O	O	O
Newer agents	O	O	O
Venlafaxine – Effexor	O	O	O
Mirtazapine – Remeron	O	O	O
Bupropion – Wellbutrin	O	O	O
Trizolopyridines	O	O	O
Nefazodone – Serzone	O	O	O
Trazodone – Desyrel	O	O	O
Tricyclic/hetrocyclic antidepressants (e.g. Imipramine, Desipramine, Amitryptyline, Nortryptyline)	O	O	O
Mono-amine Oxidase Inhibitors (MAOI's) (e.g. Moclobemide – Manerix, Phenelzine – Nardil)	O	O	O
Other *(please specify)* _____	O	O	O

12. What do you *usually* recommend when you diagnose PPD in a woman who wants to continue breast-feeding? (*Check ALL that apply*)

- ❑ I have not yet diagnosed PPD in a woman who is breast-feeding. *(Skip to Q.14)*
- ❑ Same as Q.10 &11 *(skip to Q.14)*
- ❑ Psychotherapy in my office *(please specify the type)* _____
- ❑ Psychoeducation involving the patient's family
- ❑ Referral to specialists/other resources
- ❑ Antidepressant pharmacotherapy

13. Which of the following groups of antidepressants would you choose if you felt that antidepressant pharmacotherapy is needed to treat PPD in a woman who wants to continue breast-feeding? (*Check ALL that apply.*)

- ❑ Selective Serotonin Reuptake Inhibitors (SSRI's)
- ❑ Newer agents
- ❑ Trizolopyridines
- ❑ Tricyclic/hetrocyclic antidepressants
- ❑ Mono-amine Oxidase Inhibitors
- ❑ Other *(please specify)* _____

14. Have you ever referred women who have or might have PPD to other resources/specialists? (*Check ALL that apply.*)

- ❑ No *(skip to Q. 16*
- ❑ Yes, for an opinion
- ❑ Yes, for transfer of care for postpartum depression

15. To which type of specialist(s) did you refer? *(Check ALL that apply)*

- ❑ Psychiatrist
- ❑ Psychologist
- ❑ Community support group
- ❑ Other resources *(please specify)* _____

16. Have you ever prescribed antidepressant prophylaxis to prevent the development of PPD?

- ❑ No
- ❑ Yes

17. If you had the opportunity to participate in an educational program on PPD for physicians, what format would you prefer for such a program? *(Please check ONE only)*

- ❑ A lecture based course
- ❑ An interactive workshop
- ❑ Written material for self study
- ❑ Peer group training
- ❑ Distance learning (e.g. internet based courses)
- ❑ Other *(please specify)* _____

18. Please identify any barriers to achieving the best practice in the management of PPD. *(Check ALL that apply)*

- ❑ Lack of awareness about PPD among primary care providers
- ❑ Lack of information about PPD for primary care providers
- ❑ Work load for primary care providers
- ❑ Long waiting times for psychiatrist consultation
- ❑ Lack of community resources to help women with PPD
- ❑ Patients not accessing resources due to social stigma associated with mental health problems
- ❑ High costs of treatment
- ❑ **Other *(please specify)*** _____

Do you think that the management of PPD can be improved?

- ❑ No
- ❑ Yes, please state how. _____

_____

The following seven questions are general questions about your demographics, practice, and training. This information will be used in aggregate to describe the practice of all respondents. Individual responses will not be distinguished and no identifying information will appear in any reports/results.

19. Age in years _____

20. Gender

❑ Male

❑ Female

21. Specialty

❑ Family practice/general practice

❑ Family practice with obstetrics/gynecology patients

❑ Obstetrics and gynecology

23. Number of years in practice (excluding the years spent in training)

_____

24. School of graduation (MD program) _____

25. Year of graduation (MD program) _____

26. City/town of current practice _____

Additional Comments

_____

Feel free to contact the investigators listed on the cover letter with comments or questions regarding this questionnaire or issues surrounding PPD. Please return this questionnaire in the stamped self-addressed envelope provided.

Thank you very much for your time!

APPENDIX C: Cover Letter for Post Card Reminder – Second Mailout

May 30, 2002

Dear Dr.

Last week, we mailed you a questionnaire about your current practice related to postpartum depression. If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, we encourage you to complete and return it as soon as possible. Your response is very important in achieving study results that accurately represent current practice. If by chance you did not receive the questionnaire, please call me at (403) 220-7368 or (403) 202-2074 or e-mail to me at **biwasil@ucalgary.ca** and I will forward another one to you. You can also access and complete the questionnaire online at **www.fp.ucalgary.ca/biwasil**. Please enter your study identification number shown with your name on the reverse of this card before submitting your response online.

Thank you once again for your time,

Dr. Bushra Iram Wasil, MBBS

Dept. of Community Health Sciences, U of C

Principal Investigator, Alberta Postpartum Depression Study

APPENDIX D: Cover Letter – Third Mailout

June 20, 2002

id.:_____

Dr. _____

_____

Dear Dr. _____,

On behalf of the Alberta Postpartum Depression Study team, I am sending you this note of follow up to our original letter of invitation for your participation in the APPDS.

The response rate for the PPD physician's survey is very close to what we aimed to achieve but we still would like to increase it further for greater validity of results. We noted that to date we have not received your completed response. In order to ultimately improve the management of PPD and to decrease the health consequences associated with it for mothers and their infants, each response is very important to this study.

We would love to see your completed survey in our mailbox. A new questionnaire is enclosed with a return stamped envelope for your convenience. You can also access and reply to the questionnaire online on the following address, www.fp.ucalgary.ca/biwasil. Please enter your study identification number given on the right upper corner of this letter before submitting your response online. Your help is greatly appreciated and we thank you for your time.

Sincerely,

Dr. Bushra I Wasil, MBBS
Principal Investigator, Alberta PPD Study
Department of Community Health Sciences
University of Calgary

APPENDIX E: Results Summary and Guidelines

Dear Doctor,

Thank you for your interest in our study on the Current Knowledge and Practice of Post Partum Depression (PPD). We really appreciate your valuable input. Below please find a summary of our findings, as well as a summary of the latest Clinical Practice Guidelines for PPD. These Guidelines were released in June 2003 by the National Guideline Clearinghouse (NGC) and have been adapted from that source. Please feel free to contact us by e-mail at biwasil@ucalgary.ca for more information or a detailed version of the study results.

Summary of Practice Guidelines for PPD

Diagnosis, Screening, and Prevention

- All women should be assessed during the antenatal period for a history of depression, puerperal psychosis, or any other psychopathology.All women should be screened in the postnatal period. No specific timing recommendation was made in this guideline but other research suggests that the ideal screening time is at the 6 week visit after delivery. The Edinburgh Postnatal Depression Scale (EPDS) (although not a diagnostic tool) is recommended *as part of* a screening programme for postnatal depression. Diagnosis of postnatal depression requires clinical evaluation.

Management

- Pre or postnatal depression should be managed in the same way as depression at any other time with the additional considerations regarding antidepressant use in pregnancy and during lactation.. Psychosocial interventions, espcially those that involve the patient's family should be considered when deciding on treatment options for a mother diagnosed with postnatal depression.
- The option to admit mother and baby together to a specialist unit should be available. Mothers and babies should not routinely be admitted to general psychiatric wards.

Prescribing Issues in Pregnancy and Lactation

- Tricyclic antidepressants and Selective Serotonine Reuptake Inhibitors should be continued in early pregnancy.

- If Lithium is clinically indicated for severe bipolar disorder, it should be continued during pregnancy with careful serum level monitoring. Detailed fetal ultrasound scanning should be offered.
- All women on antiepileptic drugs as mood stabilisers should be prescribed a daily dose of 5 milligrams (mg) folic acid from preconception until the end of the first trimester. However, Valproate (valproic acid) should be avoided as a mood stabiliser in pregnancy.
- Neonates exposed to psychotropic medication during pregnancy should be monitored for withdrawal syndromes following delivery.
- Women on paroxetinge, sertraline, fluxetine, and TCA's (except doxepin) should continue breast feeding, provided the infant is healthy and its progress monitored.
- Mothers on lithium should be encouraged to avoid breast feeding. If a decision is made to give lithium, close monitoring of the infant, including serum lithium levels, should be provided.
- Benzodiazepines should be avoided in the first trimester of pregnancy and new prescriptions for benzodiazepines should be avoided in mothers who are breast feeding.

A more detailed version of these Clinical Practice Guidelines can be accessed at http://www.sign.ac.uk/guidelines/fulltext/60/index.html

Summary of Results

Current Practice and Knowledge of Postpartum Depression: Alberta Physicians' Survey

A total of 717 usable responses were received. The respondents represented the physicians across the province with the final sample consisting of 64.3% urban and 35.7% rural physicians. 51.6% of the sample were men and 48.4% were women. The mean age of respondents was 43.3 (SD 8.9) years. 27.5% of respondents reported that more than half of their practice was made up of women of childbearing age. Respondents reported the prevalence of PPD in their practices to range from 0 – 62% (median of 7.5%).

Knowledge about PPD:

Domains of knowledge about PPD included its natural course, prevention, screening, diagnosis, management, sequelae and available resources. A total score over 11 items on these topics and a total number of identified risk factors were derived for responses which were most congruent with what is known about PPD in the current scientific literature.

- Total knowledge scores were 41.8 (SD 3.6) across the whole sample.
- Knowledge scores were significantly higher for female respondents (42.6, SD 3.3) compared to the male respondents (41, SD 3.7).
- Knowledge of risk factors was quite good with a mean score of 7.4 (SD 2.6) for the whole sample. Scores of risk factors were significantly higher for female respondents (8 ± 2.5) compared to males (6.9 ± 2.6) and for urban respondents (7.6 ± 2.6) compared to rural (7.1 ± 2.7).
- 62% of respondents were able to identify more than 60% of the risk factors listed. Female respondents were more likely to identify more than 60% of the risk factors compared to males (70.6% versus 54.1%).
- Respondents' age, years in practice, specialty, school of graduation, and year of graduation were not associated with either knowledge score.

Practice:

- 56.76% of the respondents screened all of their postpartum patients for PPD, 25.38 % screened only those at elevated risk, and 17.85% did not screen.

- Among the 128 reporting that they did not screen, the most common reasons were given as "*not aware of screening methods*" (43%), "*PPD is not a significant problem in my practice*" (34.4%), and "*there are no clear guidelines for screening women for PPD*" (24%).
- 81.5% of the respondents recommended pharmacotherapy for PPD in patients who were breast-feeding compared to 92.1% who recommended pharmacotherapy for those not breast-feeding.
- Of the 637 respondents who managed PPD in breast-feeding women, 43.3% reported providing psychotherapy to these women in their office, 43.7% of the 661 who managed PPD in non-breastfeeding women provided psychotherapy to these women.
- Of all the respondents, 77.7% referred their patients with PPD to either psychiatrists, psychologists, or community support groups for either an opinion, or transfer of care or both.
- The practices of prescribing pharmacotherapy were quite in line with the current clinical practice guidelines. 92. 22% of the 661 respondents who gave pharmacotherapy to non breast feeding women with PPD chose SSRI's as either their first or second choice. Paroxetine was the most frequently prescribed drug (87%), followed by Venlafaxine (83%) and Citalopram (82%). The MAOI's were selected by only 9.23% of respondents, 95% of whom selected them only as a second line choice.
- Of the 637 respondents who prescribed pharmacotherapy for breast feeding women, 68.9% selected SSRI's, 8.79% chose newer agents (Venlafaxine, Mirtazapine, Bupropion), 6.44% selected TCA's/hetrocyclic, 0.94% selected Trizolopyridines, and none selected MAOI's.

Respondent Opinion about PPD Management:

- 656 respondents (91.5 %) said that the management of PPD could be improved.
- The most common barriers to achieving better management were workload (given by 69.2% of the respondents) and long waiting times for psychiatrist consultation (69%). Other important barriers were patients not accessing resources due to social stigma associated with mental health problems (60%), lack of information about PPD

(52.6%), lack of community resources to help women with PPD (50%), and lack of awareness about PPD among primary care providers (45%).

- More than 80% of the respondents said that there was a need for specific programs on PPD from Continuing Medical Education. The two most preferred options for such programs were an interactive workshop (given by 38.35% of respondents) and a lecture based course (given by 36%). This information will be shared with CME offices at the Universities of Calgary and Alberta.

APPENDIX F: Supporting Tables and Graphs

Table F.1: School of Graduation (n=696)

School of Graduation	Number	Percent
University of Alberta	280	40.2
University of Calgary	134	19.3
University of Saskatchewan	30	4.3
University of British Columbia	17	2.4
University of Toronto	11	1.6
Dalhousie University, Nova Scotia	8	1.1
McGill University	8	1.1
Queens University	7	1.0
University of Manitoba	7	1.0
University of Western Ontario	7	1.0
University of Ottawa	6	0.9
Memorial University Newfoundland	5	0.7
McMaster University	3	0.4
University of Winnipeg	1	0.1
University of Montreal	1	0.1
International Medical Graduates	171	24.6

The non-Canadian medical schools were collapsed into one category for simplicity of presentation.

Table F.2: Location of Practice by Region

Regional Health Authority (RHA)	Respondents	
	Number	Percent
1	36	5.0
2	21	2.9
3	15	2.1
4	256	35.7
5	11	1.5
6	47	6.6
7	12	1.7
8	22	3.07
9	9	1.26
10	218	30.4
11	10	1.4
12	23	3.2
13	15	2.1
14	7	1.0
15	7	1.0
16	6	0.8
17	2	0.3
Total	717	100.0

Figures F.1 – F.8

For Figures F.1 to F.8:
1=Agree, 2=Somewhat Agree, 3=Neither Agree Nor Disagree, 5=Disagree
Gender 1 = male, Gender 2 = female

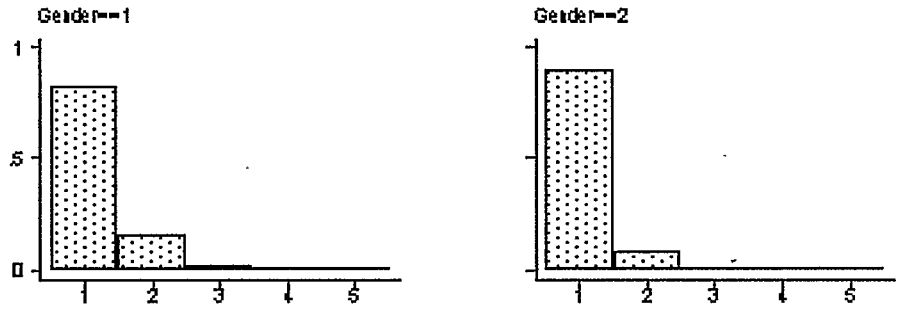

Figure F.1: PPD seriously affects every aspect of a women's life

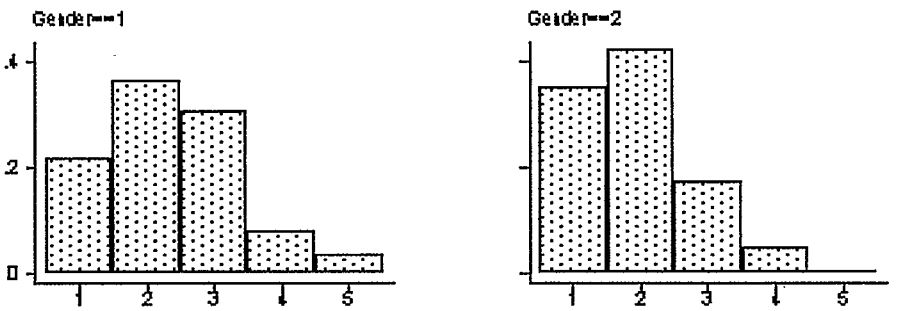

Figure F.2: PPD has long lasting effects on the infant

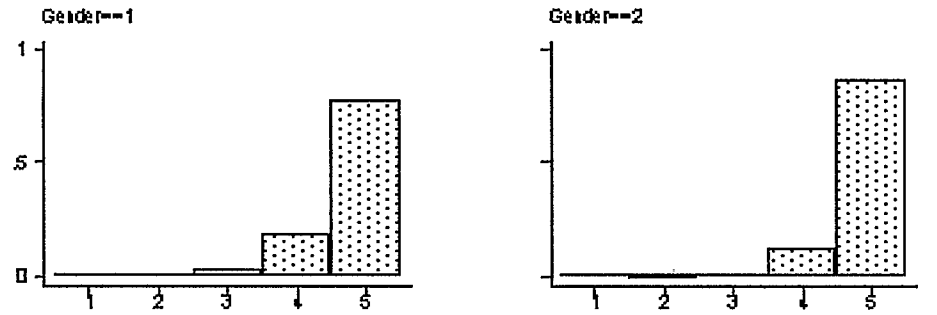

Figure F.3: No effective treatment is available for PPD

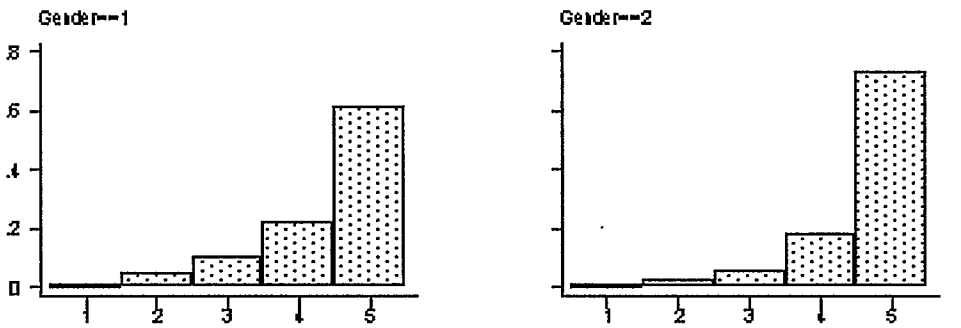

Figure F.4: PPD is a normal consequence of childbirth

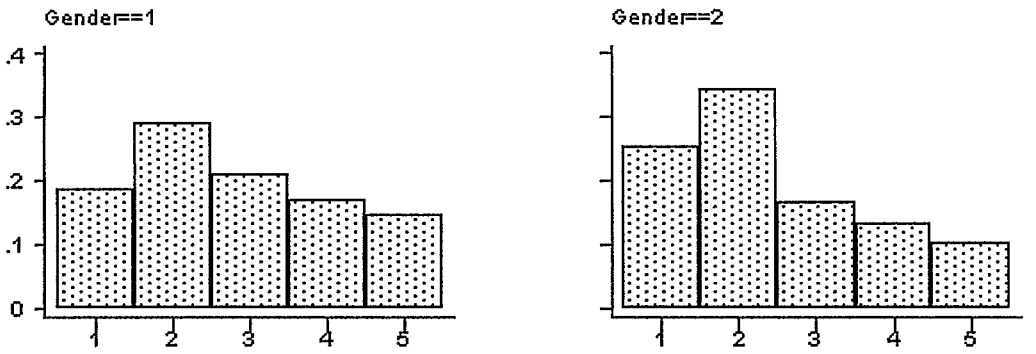

Figure F.5: PPD is associated with postpartum psychosis

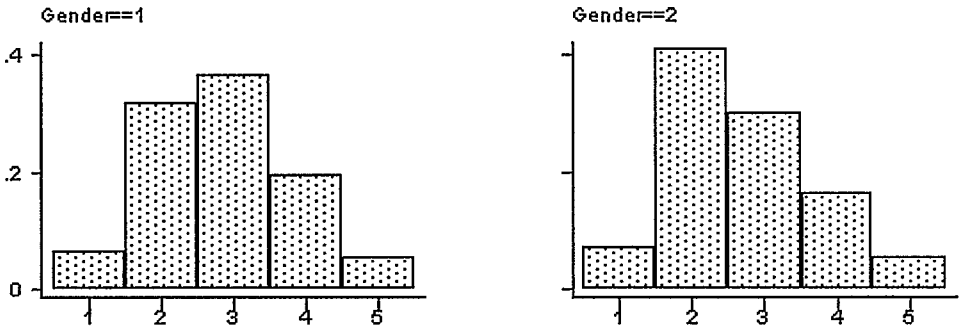

Figure F.6: Women with PPD usually present with anxiety

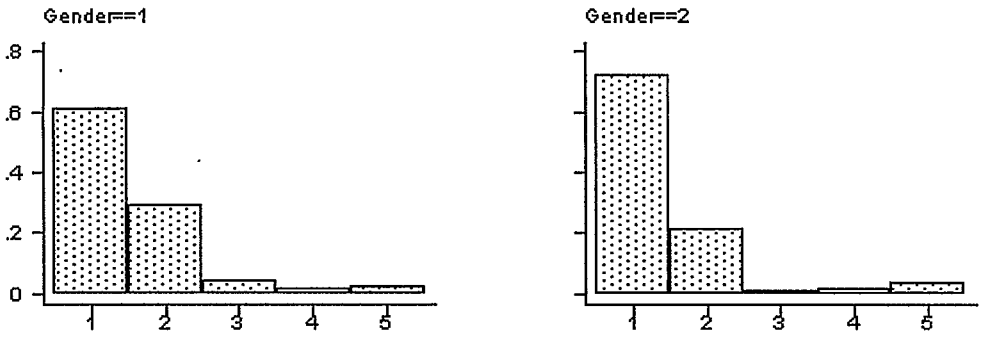

Figure F.7: Serious risks are associated with not treating PPD promptly

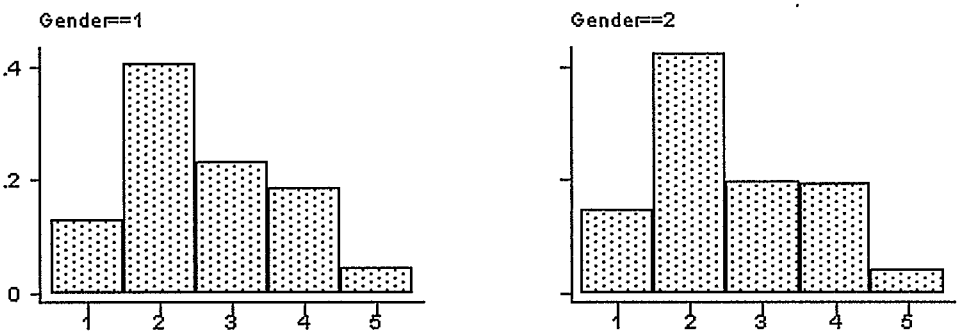

Figure F.8: PPD is a unique disorder