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Part I: Contraception and Common Mental Health Conditions

Scope of Common Mental Health Conditions Among Reproductive- Aged Women

Depressive and anxiety disorders are among the leading causes of disability in the USA and worldwide [1–8]. In the USA, women are 55 % more likely to experience a depressive disorder during their lifetime compared to men [8]. Approximately 20 % of women ages 18 years and older will experience a depressive disorder in their lifetime; 8.6 % will experience one each year [8]. Anxiety disorders are also common,

with lifetime and 12-month prevalence rates estimated at 36 % and 23 %, respectively [8]. Depression and anxiety are frequently comorbid with one another and with other mental health disorders, including substance abuse and eating disorders. US nationally representative data show that of people with a depressive disorder in the past year, approximately 60 % also had an anxiety disorder and nearly 9 % had a substance use disorder [9]. Prevalence rates of depressive and anxiety disorders among new generations of adolescent and young women appear to be increasing in recent years [10–12].

Despite a clear need for women’s mental health care, mental health service utilization in the USA is low [13, 14]. Depression and anxiety disorders often go undetected and untreated among reproductive-aged women [15–21]. Sixty-three percent of adults who have depression do not talk to a professional in the first year of having the disorder [22]. In recent years, less than half of pregnant and nonpregnant US women with a major depressive episode received a mental health diagnosis or treatment [17, 19, 21]. A population-based study of over 70,000 nonpregnant women found that half of women meeting criteria for depression did not receive a diagnosis or treatment, even though more than 70 % had contact with a health provider in the last year [17]. Black and Hispanic women are even less likely to receive a mental health diagnosis and treatment than White women [17, 23, 24]. These same groups of women disproportionately experience high unintended pregnancy rates [25].

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Certain social circumstances such as poverty, unemployment, and having less education are associated with experiencing common mental health conditions [10, 26–28]. Other risk factors for depression and anxiety include having a personal or family history of a mental health disorder, having other chronic medical illnesses such as cancer, stroke, or HIV/AIDS, and having adverse life experiences, including physical and sexual violence or trauma [1–4]. Some of these same characteristics, such as having less education or experiencing physical and sexual violence, also increase women’s risk of contraceptive non- or misuse [29–31], suggesting similar groups of women are vulnerable to mental health disorders and unintended pregnancy. In the pages that follow, we discuss more direct evidence that connects mental health disorders, contraception, and unintended pregnancy.

Relationships Between Reproductive Health and Depression and Anxiety

Research has examined the interplay between depressive or anxiety disorders and reproductive health [32–49]. Some studies have found depression and anxiety are precursors to a variety of negative reproductive outcomes, including maternal and infant morbidity, obstetrical complications, preterm labor, stillbirth, and low birth weight [32, 34, 35]. In addition, women with depression and anxiety appear to be at greater risk of experiencing an unintended pregnancy, and those pregnancies may be more likely to end in induced abortion, compared to women without depression and anxiety [38–40, 42, 43]. Depression and anxiety before pregnancy also consistently predict depression and anxiety after pregnancy [41, 42, 44, 45]. On the other hand, studies have also found that reproductive health influences subsequent mental health outcomes. For instance, women who carry their unintended pregnancies to term are at risk for antepartum and postpartum depression [44–50]. Some groups of women, including poor, underinsured, undereducated, and minority women, disproportionately experience adverse mental *and* reproductive

health outcomes due to common risk factors, including limited health knowledge, access to medical resources, and social support [10–12, 17, 23, 25–28, 44, 48, 50, 51].

Effects of Contraception on Mental Health

While the causes of depression and anxiety are not fully understood, deficiencies in neurotransmitters (serotonin, norepinephrine, dopamine, GABA, and peptides) that impact mood have been implicated in clinical studies of depression and anxiety [1–4]. Genetic predisposition and psychosocial stressors appear to be important precursors to neurotransmitter deficiencies and contribute to these disorders [4]. Soon after the combined oral contraceptive pill (COC) was made available in 1960, researchers hypothesized that synthetic estrogens and progestins in COCs could potentially interact with mood-related neurotransmitters [52–55]. Articles published in the 1970s and 1980s suggested that the large steroid dosages in COCs (e.g., Enovid: 5 mg norethynodrel, 75 mcg mestranol) could interfere with serotonin, noradrenaline, tryptophan (an amino acid precursor to serotonin), and vitamin and endocrine metabolism [52–55]. Estrogen was thought to reduce noradrenaline and serotonin in the hypothalamus, resulting in pyridoxine deficiency [52, 53, 55]; progestins were thought to cause cerebral monoamine oxidase activity, triggering enzymatic breakdown of neurotransmitters [54].

However, given the significantly lower steroid dosages in modern hormonal contraceptives, these mechanistic theories appear to no longer be relevant. While few (if any) recent clinical trials have used brain imaging and hormonal bioassays to clarify these relationships, a notable newer body of scientific evidence suggests that the steroidal activity of modern methods does not have a clinically relevant physiological impact on women’s mood or mood-related neuroendocrine functioning [56–73]. In a comprehensive review, Robinson et al. analyzed seven studies examining COC pharmacological properties

and mood-related side effects [56]. The researchers found no evidence for an association between the intrinsic biochemical mechanisms of COCs and mood effects reported by COC users. In the Medical Eligibility Criteria for Contraceptive Use report published in 2010, the US Centers for Disease Control and Prevention concluded there are no contraindications to hormonal contraception for women with depression, basing their recommendation on evidence that does not support a causal relationship [57]. Prospective clinical placebo-controlled and population-based cohort studies have reported similar or even lower rates of depression or mood symptoms between women who use COCs and those who do not [58–65]. The best scientific evidence to date suggests that modern COC formulations do not cause depression or mood symptoms among the women that use them, and in fact, COCs may improve depression and mood symptoms for some women.

Clinical research studies have examined whether mental health symptoms increase among women initiating other hormonal contraceptive methods, including the depot medroxyprogesterone acetate (DMPA) contraceptive injectable (e.g., Depo-Provera, Pfizer Inc., New York NY, USA), transdermal patch (e.g., Ortho-Evra patch, Ortho-McNeil Pharmaceutical Inc., Raritan, NJ, USA), vaginal ring (e.g., NuvaRing, Merck, Whitehouse Station, NJ, USA), and long-acting reversible contraceptive methods (LARC) such as the subdermal implant (e.g., Implanon, Nexplanon), levonorgestrel-releasing intrauterine device (IUD, e.g., Mirena, Bayer Healthcare Pharmaceuticals, Wayne, NJ, USA), and copper-containing IUD (e.g., ParaGard, Teva, Israel) [56–73]. Collectively, these studies have found no adverse effects of these methods on depression, anxiety, or mood [56–73].

Effects of Mental Health on Contraceptive Use

Compared to the large literature investigating the mental health effects of contraception, less research has focused on the extent to which mental

health influences contraceptive behaviors. Even though, as detailed above, the literature does not support a causal relationship between contraception and negative mental health outcomes, perceived mood symptoms continue to be a primary reason why women report not using, misusing, or discontinuing hormonal contraceptives [74–77]. COC discontinuation rates from perceived mood symptoms have ranged from 14 to 21 % [74–77]. Some research has suggested that women with depression, anxiety, and related stress symptoms are more likely to perceive negative mood symptoms than those without those symptoms [77]. Yet, how depression and anxiety may influence perceived contraceptive side effects and use has not been well studied. It may be that neuroendocrine pathology amplifies physical symptomatology attributed to COCs. However, this hypothesis has not been studied.

Alternatively, cognitive processes related to “perceptions” of physical symptoms, rather than pathophysiological processes themselves, may be altered in COC users with mental health conditions. A study by Rubino-Watkins et al. found that COC users with psychological stress had higher self-reported negative cognitive patterns and emotions over time than stressed OC nonusers, and greater negative affect was attributed to more daily stressors among OC users versus nonusers [78]. Other researchers have found that higher levels of somatization (recurrent and frequently changing physical symptoms which cannot be explained by any known medical condition) and hypochondriasis (excessive worry about illness and the belief that one has an undiagnosed physical disease) are associated with higher rates of reported side effects among those using both active and placebo medications [79, 80]. Because depressed individuals are attuned to negative cues in their environment [81, 82], depressed women may internalize negative information about hormonal contraceptives (e.g., side effects and risks), which could preclude initiation or continuation. With anxiety, excessive worry could potentially contribute to irrational concerns about contraceptive safety or side effects, leading to misuse and discontinuation, though this has not been examined.

Depression and anxiety may also affect cognitive and behavioral processes related to use of contraception, including risk assessment, planning, and social learning, as well as perceptions of benefits and threats of contraception and perceived susceptibility to pregnancy [83–87]. Decreased motivation and desire for self-care, which may accompany depression [88, 89], could impact women's abilities to use certain methods, like daily COCs. Anxiety symptoms also have the potential to interfere with contraceptive decision-making processes [90], leading women to make suboptimal contraceptive choices.

To our knowledge, no research studies have investigated these hypotheses directly, but scientific evidence indirectly supports a link between mental health and family planning. Some recent studies have shown that women with elevated depressive, anxiety, and stress symptoms have higher rates of risky sexual behaviors (e.g., increased numbers of sexual partners, earlier sexual debut) and contraceptive nonuse, misuse, discontinuation, and use of less effective methods, compared to women without elevated mental health symptoms [18, 66, 73, 91–99]. These findings have been most widely noted for condoms and COCs but have also been demonstrated for the DMPA injectable, IUDs, and implants [66, 69, 73].

Some emerging research also suggests that depression and anxiety may affect contraceptive method selection and use differently depending upon the health setting or social context of the woman. Garbers et al. found that among 2,476 urban women presenting to a health department clinic, those who screened positive for depression had 45 % higher odds of selecting condoms (compared to more effective methods) and 39 % lower odds of selecting hormonal methods (compared to less effective methods) at their routine clinic visit compared to women without depressive symptoms [94]. Similar findings have been noted among clinical and population-based samples of nonpregnant women [18, 95–97]. On the other hand, a study of abortion patients initiating contraception immediately following their abortion found that those with higher mental distress symptoms before their abortion had increased odds of leaving their visit with more effective

methods including IUDs and implants compared to women without distress [99]. While reasons for these differences in associations between mental health and contraceptive method selection are not fully clear and may be partially attributed to different measurement approaches, it is possible that women with depression who have already experienced an unintended pregnancy are motivated to avoid a subsequent pregnancy due to their mental health concerns and stressful life circumstances. Research is warranted to clarify the role of mental health in women's contraceptive decision-making and behavior across different life circumstances and health care contexts.

Clinical Assessment: Mental Health and Contraception

Common mental health disorders frequently go undiagnosed among reproductive-aged women, and yet underlying symptoms and the disorders themselves can impact women's perceived and actual family planning needs [17, 18, 21, 94–97, 99]. A lack of detection and diagnosis of depression and anxiety among women points to the potential role that depression and anxiety screening and management may play in reproductive health contexts. In obstetrical settings, health providers may see women with postpartum depression who need assistance choosing a contraceptive method that is effective in preventing rapid repeat pregnancy and also safe for breastfeeding. Women presenting for abortion care may need education on contraceptive methods that will effectively prevent another unintended pregnancy, in addition to counseling on strategies and resources to cope with their stressful life experience. Women presenting for sexually transmitted infection (STI) treatment require counseling on dual method use and safe sex and may also need an evaluation of mental distress related to the STI diagnosis. These are just a few examples of clinical encounters in which family planning and mental health issues may interact. Symptoms of depression and anxiety can take many different forms, and signs may not be obvious to the provider or patient [100–105]. The following discussion

highlights aspects of the clinical encounter relevant to mental health and contraception.

First, depression and anxiety may impact patient-provider communication and interaction in important ways [100–105]. A careful review of the past medical history will identify any personal or family risk factors for new, recurring, or chronic mental health conditions. For undiagnosed conditions, disclosure of mental health symptoms may be difficult for patients due to perceived stigma, as well as women's lack of awareness and insight into their own mental health status [100–105]. Health providers should routinely engage their patients in a discussion about overall health, including psychological well-being, and its impact on sexual and reproductive health. Employing patience, empathy, and a nonjudgmental tone can help patients feel more comfortable discussing their mental health issues [100–105]. Directive, confrontational questions should be avoided. Mental health concerns can be introduced with a simple educational statement such as, "Did you know that a fifth of women will experience depression in their lifetimes? Because depression is so common, I like to check in with all my patients about their own mental health." This approach can alert patients to the provider's concern but also normalize the experience. Reflective listening, use of open-ended questions, and careful patient observation can help providers pick up subtle cues of an underlying mental health condition [100–105]. A clinical presentation of a sad voice, anxious expressions, or lethargic posture would raise suspicions of a mental health issue. Providers should also reflect on their own feelings, emotions, and mood during and after the clinical encounter and be attuned to transference (i.e., feeling down, sad, or upset after seeing a patient with depression or anxiety) [100, 101]. Finally, women with diagnosed or undiagnosed mental health conditions commonly present with multiple, vague complaints, nonspecific symptoms or pain-related syndromes. In women's health contexts, complaints may include nonspecific vulva, pelvic, vaginal, coital, or menstrual-related pain, headaches, or gastrointestinal disturbances [105]. Cues such as these should alert the provider to an

underlying mental health condition requiring further evaluation.

Second, use of standardized mental health screening instruments may be an effective, efficient method to screen patients for common mental health conditions and identify those who may need follow-up psychiatric care [106–113]. Commonly used, evidence-based depression and anxiety screens are presented in Tables 5.1 and 5.2. In busy clinical settings, use of an abbreviated tool, such as the Patient Health Questionnaire (PHQ), is ideal. Such screening instruments can be seamlessly included in electronic medical record charting and should be used routinely and systematically, for instance with all well-woman exams or new patients.

Third, clinical diagnosis of a mental health disorder is ideally made by a trained mental health care professional, such as a psychiatrist or clinical psychologist [4, 100–104, 106]. However, when standardized diagnostic criteria are followed, common mental health disorders like depression and anxiety may be diagnosed in non-specialty health care settings including family practice and reproductive health. While a structured psychiatric interview, such as the Composite International Diagnostic Interview or the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM), is the gold standard [4, 10–104, 106, 121], use of self-report instruments may be more feasible in settings where large volumes of patients are seen and time per patient is limited.

Differential diagnoses of reproductive-aged women presenting with new onset mental health symptoms should be evaluated [100, 102–105]. Chronic diseases such as hypothyroidism, diabetes mellitus, anemia, cancer, and multiple sclerosis, which are not uncommon among reproductive-aged women, can cause mood-related symptoms that may mimic depression or anxiety [100, 102–105]. Women with acute stress or grief may exhibit transient or chronic mood symptoms, as well as reproductive symptoms like irregular menses. Women with anorexia nervosa or bulimia nervosa may similarly experience co-occurring depression or anxiety and amenorrhea or irregular menses. Finally, medica-

Table 5.1 Screening instruments for depression

Measure name and citation	How/where to obtain measure	Description	Sample items
1. Center for Epidemiological Study of Depression Scale (CES-D) [109, 114]	Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. <i>Applied Psych Measur</i> 1977; 1(3):385–401	20-item measure, also 10-item available; rate items from 0 = rarely or none of the time to 3 = most or all of the time	During past week... 1. I was bothered by things that usually don't bother me 2. I felt that everything I did was an effort 3. I talked less than usual
2. The Primary Care Evaluation of Mental Disorders (Prime-MD) Depression subscale [111, 115]	Spitzer RL, Kroenke K, Williams JBW, and the Patient Health Questionnaire Primary Care Study Group. Validation and utility of a self-report version of PRIME-MD: The PHQ Primary Care Study. <i>JAMA</i> 1999; 282 (18): 1737–1744.	9-item measure; rate items from 0 = not at all to 3 = nearly every day; also available as a 2-item measure	Over the last 2 weeks how often have you... 1. Had little interest or pleasure in doing things 2. Been feeling down, depressed, or hopeless 3. Had trouble concentrating on things such as reading the newspaper or watching television
3. Beck Depression Inventory-Revised (also known as II) [116]	Available from Pearson for a fee	21 groups of statements and choose one of each group	Pick the one state of each group that best describes how you have been feeling during the past 2 weeks, including today Group 1 I do not feel sad I feel sad much of the time I am sad all the time I am so sad or unhappy that I can't stand it
4. Depression Anxiety Stress Scales (DASS)—depression subscale [117]	Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with The Beck Depression and Anxiety Inventories. <i>Behav Res Ther.</i> 1995;33(3): 335–343 Order scoring manual from: http://www2.psy.unsw.edu.au/Groups/Dass/order.htm	A 42-item measure, where 14 items measure depression, 14 measure anxiety, and 14 measure stress; a 2-item version is also available—7 items for each measure; 0 = not at all to 3 = very much or most of the time	How much has each statement applied to you over the past week? 1. I felt downhearted and blue 2. I felt that life was meaningless 3. I felt I was pretty worthless

Table 5.2 Screening instruments for anxiety

Measure name and citation	How/where to obtain measure	Description	Sample items
1. Beck Anxiety Inventory (BAI) [118, 119]	Available from Pearson for a fee	21 items rated from 0=not at all to 3=severely-it bothered me a lot	Rate how much bothered by each of the following: 1. Numbness or tingling 2. Terrified or afraid 3. Fear of losing control
2. The Primary Care Evaluation of Mental Disorders (Prime-MD) Anxiety subscale [115]	Spitzer RL, Kroenke K, Williams JBW, and the Patient Health Questionnaire Primary Care Study Group. Validation and utility of a self-report version of PRIME-MD: The PHQ Primary Care Study. JAMA 1999; 282 (18): 1737–1744	5 items with the first item being the main item and all the rest following from that rated as Yes or No	1. In the last 4 weeks, have you had an anxiety attack—suddenly feeling fear or panic? 2. Has this ever happened before? 3. Do these attacks bother you a lot or are you worried about having another attack?
3. Spielberger state and trait anxiety [120]	For a fee, available at: http://www.mindgarden.com/products/staisad.htm#ms	20 items for trait and 20 for state anxiety rated with 0=almost never to 3=almost always	State: Rate how true about self 1. I am tense 2. I am worried 3. I feel calm Trait: 1. I worry too much over something that really doesn't matter 2. I am content; I am a steady person
4. Depression Anxiety Stress Scales (DASS)—anxiety subscale [117]	Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with The Beck Depression and Anxiety Inventories. Behav Res Ther. 1995;33(3): 335–343 Order scoring manual from: http://www2.psy.unsw.edu.au/Groups/Dass/order.htm	A 42-item measure, where 14 items measure depression, 14 measure anxiety, and 14 measure stress; a 21-item version is also available—7 items for each measure	How much has each statement applied to you over the past week? 0=not at all to 3=very much or most of the time 1. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat) 2. I was aware of dryness of my mouth 3. I was worried about situations in which I might panic or make a fool of myself

tions such as beta blockers or calcium channel blockers, glucocorticoids, and GnRH analogues (e.g., Lupron) can cause mood changes [100, 102–105]. Therefore, reproductive health providers should be able to screen for depression and anxiety, differentiate subclinical symptomatology from a diagnosable disorder, rule out differential diagnoses, and provide or refer for further mental health evaluation and treatment when indicated.

Contraceptive Management for Women with Common Mental Health Conditions

Eligibility and Drug Interaction Considerations

Women with depression and anxiety are generally good candidates for all contraceptive methods. In most cases, contraceptive method selection should not be limited by the mental health diagnosis or treatment but rather should occur through shared decision-making between patient and provider based upon individual health circumstances, contraceptive preferences, and family planning needs. The CDC Medical Eligibility Criteria for Contraceptive Use lists depression as Category 1 for eligibility, stating that there are no restrictions for use of hormonal contraception for women with depression and related disorders [57]. Drug interactions between modern pharmacologic antidepressant agents and hormonal contraception are relatively rare. The most widely used antidepressants include selective serotonin reuptake inhibitors (SSRIs, such as fluoxetine, citalopram, escitalopram, and sertraline) and more recently serotonin norepinephrine reuptake inhibitors (SNRIs, such as venlafaxine and duloxetine) [100, 102–105]. The best available scientific evidence suggests SSRIs and SNRIs do not interact with hepatic metabolism of synthetic steroids in COCs [122–125]. Women on SSRIs and SNRIs should be offered the full range of contraceptive methods.

Older generation antidepressant agents such as tricyclics (TCAs, such as amitriptyline or nortriptyline) and monoamine oxidase inhibitors

(MAOIs, such as phenelzine and tranylcypromine), which are still used in treatment-refractory chronic depression, are highly interactive with other foods and drugs [100–105]. TCAs and MAOIs may interact with contraceptive steroid metabolism in the liver, potentially leading to decreased contraceptive efficacy; reduced hepatic metabolism can also lead to antidepressant side effects or toxicity [125]. In addition, while the scientific evidence is inconsistent, St. John's wort (*hypericum perforatum*), an alternative over-the-counter antidepressant therapy, may also induce the cytochrome P450 system and subsequently reduce contraceptive steroid availability, by 13–15 % one study found [126, 127]. Thus, women who require more intensive psychiatric treatment with TCAs, MAOIs, or those using St. John's wort are not ideal candidates for COCs or other systemic hormonal contraceptives. Other locally acting hormonal contraceptive methods, such as the levonorgestrel-releasing IUD, as well as nonhormonal methods like the copper-containing IUD, appear to be safe for women on TCAs, MAOIs, and St. John's wort [128] (see Chap. 20 for more details).

Many women with depression and anxiety are treated with non-pharmacologic therapies including cognitive behavioral therapy, interpersonal psychotherapy, and adjunct therapies like exercise, sleep, and healthy diet [100–105, 129–131]. These treatments should not interfere with contraception or preclude use of any methods. Providers can encourage women to participate in these treatment modalities since the principles and self-care techniques learned (e.g., problem-solving and coping skills) may also benefit women's reproductive health decision-making and behaviors.

Contraceptive Method Considerations

We present an overview of contraceptive method options and considerations for women with specific mental health issues in Table 5.3. In most cases, the full range of contraceptive methods is safe and suitable for women with depression and anxiety. Potential contraceptive adherence issues, however, may be an important factor for selection of the most appropriate method [132–138].

Table 5.3 Effective contraceptive method options for specific mental health considerations

Effective contraceptive method options	
	<p>Long-acting reversible contraceptives (LARC) (copper-containing intrauterine device (IUD), levonorgestrel IUD, subdermal implants)</p> <p>Progestin-only contraceptives (Depot medroxyprogesterone acetate injectable (DMPA), progestin-only pills (POP))</p> <p>Other combined hormonal contraceptives (vaginal ring, transdermal patch)</p>
Mental health considerations	Combined oral contraceptives (COCs)
1. Adherence concerns	<p>Not optimal; requires counseling and education on appropriate use and frequent assessment of daily adherence and missed pills; emergency contraceptive provision as backup</p> <p>Less ideal than LARC and DMPA because requires monthly (ring) or weekly (patch) replacement, but acceptable; counseling on appropriate use and regular assessment for adherence necessary; emergency contraceptive provision as backup</p>
2. Mood side effect concerns	<p>Acceptable; no evidence to support DMPA or POPs cause mood symptoms</p> <p>Acceptable; no evidence to support ring or patch causes mood symptoms; assess regularly for adherence issues</p>
3. Menstrual irregularity concerns	<p>Optimal option for menstrual control; may be optimal option for women who prefer to be in “regular” control of using contraception</p>
	<p>Dual use of condoms plus another more effective method should be routinely encouraged to prevent sexually transmitted infections; not an optimal option for primary contraceptive method in most cases due to higher typical use failure rates than other effective methods; adherence concerns considerable user effort, and necessary partner cooperation; acceptable when all other effective options are not feasible</p>

(continued)

Table 5.3 (continued)

Effective contraceptive method options	
	<p>Long-acting reversible contraceptives (LARC) (copper-containing intrauterine device (IUD), levonorgestrel IUD, subdermal implants)</p> <p>Acceptable</p> <p>Progestin-only contraceptives (Depot medroxyprogesterone acetate injectable (DMPA), progestin-only pills (POP))</p> <p>Acceptable</p> <p>Other combined hormonal contraceptives (vaginal ring, transdermal patch)</p> <p>CDC MEC category 3 for women <1 month postpartum due to VTE risk</p> <p>Combined oral contraceptives (COCs)</p> <p>CDC MEC category 3 for women <1 month postpartum due to VTE risk</p> <p>Condoms</p>
Mental health considerations	
4. Postpartum depression and breast feeding	<p>Acceptable</p> <p>Optimal option; has therapeutic benefit for perimenopausal symptoms; assess for contraindications to estrogen</p>
5. Perimenopausal depression	<p>Acceptable</p> <p>Acceptable; assess for contraindications to estrogen</p>
6. Premenstrual dysphoric disorder (PMDD)	<p>Acceptable</p> <p>Acceptable</p> <p>Drospirenone-containing COCs have FDA approval for PMDD</p>
7. Medical comorbidities including cardiovascular risks, age >35 years and a smoker, and other estrogen contraindications	<p>Acceptable</p> <p>DMPA acceptable; may monitor for weight gain, truncal fat deposit, and peripheral glucose intolerance</p> <p>CDC MEC categories 3–4; contraindicated due to increased risk of MI, stroke, and VTE</p> <p>CDC MEC categories 3–4; contraindicated due to increased risk of MI, stroke, and VTE</p>
8. Taking modern antidepressants including SSRIs or SNRIs	<p>Acceptable</p> <p>Acceptable</p>
9. Taking older generation antidepressants including TCAs, MAOIs, or St. John's wort	<p>IUDs acceptable; subdermal implant not recommended due to potential drug interactions</p> <p>DMPA acceptable; POPs not recommended due to potential drug interactions</p> <p>Not recommended due to potential drug interactions</p> <p>Not recommended due to potential drug interactions</p>

10. Taking mood stabilizers and/or antiepileptics	IUDs acceptable; subdermal implant not recommended due to potential drug interactions	DMPA acceptable; POPs not recommended due to potential drug interactions	Not recommended due to potential drug interactions	Not optimal due to potential drug interactions; monitor psychiatric drug levels, adjust dosages as necessary if other methods not feasible
11. Taking atypical antipsychotics	Acceptable	Acceptable	Acceptable	Acceptable; may have therapeutic benefit for hyperprolactinemia
12. Intimate partner violence	May be optimal option due to inconspicuous nature and infrequent health service visit requirements	DMPA optimal option due to inconspicuous nature but requires more frequent health service visits	Not optimal option for women with unsupportive partner due to conspicuous nature	Not optimal option for women with unsupportive partner due to conspicuous nature
13. Impaired decision-making capacity	Ethical considerations due to long-term nature and informed consent for medical procedures, although reversible	DMPA optimal option given less invasive highly effective and reversible	Not optimal since requires intact cognitive functioning	Not optimal since requires intact cognitive functioning

LARC long-acting reversible contraception, *IUD* intrauterine device, *DMPA* depot medroxyprogesterone acetate, *POPs* progestin-only pills, *COCs* combined oral contraceptives, *TCA*s tricyclic antidepressants, *MAOIs* monoamine oxidase inhibitors, *CDC/MEC* Center for Disease Control and Prevention Medical Eligibility Criteria for Contraceptive Use 2010, *VTE* venous thromboembolism, *SSRI* selective serotonin reuptake inhibitors, *SNRI* serotonin norepinephrine reuptake inhibitors

As mentioned earlier, women with depression and anxiety have more perceived contraceptive side effects and may misuse and discontinue methods at higher rates than women without these mental health conditions, with the greatest body of evidence available for user-dependent methods including condoms and COCs [18, 66, 73, 93–99]. Women with depression or anxiety may find it difficult to remember or find the energy to take a COC every day or may be too distracted, worried, or emotional to encourage their partner to apply a condom at every intercourse. LARC methods, including IUDs and the subdermal implant, require little user burden, have less worry and hassle, and offer the greatest contraceptive efficacy, making them ideal options for women with mental health conditions who wish to avoid an unintended pregnancy [128, 135, 136]. These “fit and forget” methods are also cost effective, which may be beneficial to women who have long-term financial concerns. On the other hand, not all women prefer long-acting methods. Women with depression or anxiety may prefer to be in regular control of using their method or may worry about menstrual irregularity. In this case, the vaginal ring, transdermal patch, or COCs are alternative options.

For providers who are initiating COCs or managing women with mental health conditions who have difficulty finding a satisfactory COC, several considerations may be useful. First, research has suggested that women’s experiences with perceived side effects are similar across different types of COCs [139], even though more than 90 different formulations are used by women in the USA alone [128, 136, 137, 140]. Thus, health providers can counsel their patients that most women do well with any COC. Second, a dose–response relationship with COCs and side effects was noted in the 1970s and 1980s, when contraceptive steroid dosages were significantly higher [128]. While modern formulations generally have low steroid dosages, providers may choose formulations with lower dosages (i.e., 20 mcg versus >20 mcg) in an attempt to minimize their patients’ risk of mood side effects [141]. On the other hand, lower dosage COCs are associated with other side effects like irregular

bleeding, as well as vulnerable efficacy levels with missed pills [128, 141]. Providers should help women balance concerns about side effects and adherence. Second, in regard to the type of progestin, second-generation levonorgestrel- and norgestrel-containing COCs are the most widely used and are not known to contribute to mental health symptoms [140, 142, 143]. Newer fourth-generation drospirenone-containing COCs (e.g., Yaz, 3 mg drospirenone and 20 mcg ethinyl estradiol) are approved by the Food and Drug Administration (FDA) for treatment of mood symptoms occurring with premenstrual dysphoric disorder (PMDD) and may also be an option for women with depression and anxiety disorders [128]. Third, women’s experiences with mood symptoms can be worse during certain periods of the menstrual cycle, for instance during ovulation or menses, due to variable circulating estrogen levels. Theoretically, monophasic formulations, which offer a steady dose (versus multiphasic formulations), could better stabilize hormone levels to minimize the risk of mood symptoms [144]. Women who report mood symptoms during their placebo weeks (i.e., estrogen withdrawal) may benefit from COCs with extended cycle regimens (e.g., 24/4) or continuous dosing (i.e., skipping inactive pills), which would reduce or eliminate the estrogen withdrawal period [128, 145]. While a dearth of scientific evidence exists to support these strategies, they may be clinically useful for COC management of women with mood concerns.

Additional contraceptive method considerations may be specific to the mental health disorder itself. For instance, postpartum and perimenopausal depression, which affect approximately 10–20 % of women, have similar diagnostic criteria to major depressive disorder except onset occurs following pregnancy or during perimenopause, respectively [4, 45–48]. Explicit conversations about contraception are needed during these periods since postpartum and perimenopausal women may not be aware of their risks for unintended pregnancy. Mental health treatment options for postpartum depression (psychotherapy and SSRIs are the first lines of defense) should not interfere with modern

contraceptive methods [33–39]. Postpartum women who are breastfeeding generally should not be initiated on estrogen-containing contraceptives due to possible reduction in breast milk production and VTE risk, and progestin-only methods including the levonorgestrel-releasing IUD, subdermal implant, DMPA injectable, or progestin-only pills can be used instead [57, 128]. Perimenopausal women may be ideal candidates for COCs, the patch, or ring, which can help stabilize hormonal fluctuations and control mood, menstrual, and hot flash symptoms while also preventing pregnancy [146–152]. Perimenopausal women should be evaluated for cardiovascular risks, tobacco use, and other contraindications to estrogen use prior to initiation and throughout treatment [57].

Education and Counseling

Education and counseling is a critical component of contraceptive initiation and management for women with mental health conditions [105, 125]. The scope of counseling needs among women with depression and anxiety may be broad and counseling should ultimately be tailored to individual patient's specific needs and circumstances. Several key education and counseling considerations may be universally applicable: (1) accurate contraceptive information emphasizing method effectiveness, (2) mental health assessment, and (3) ongoing discussions about intimate partner violence.

Research has shown that women's knowledge of contraception, including use, effectiveness, benefits, risks, and side effects of different contraceptive methods, is consistently low [153–160]. Women with mental health conditions may benefit from repeated and specific information on user-related method effectiveness rates. If a patient presenting for contraceptive initiation understands that her likelihood of becoming pregnant depends upon her ability to remember to take her pill every day and she is motivated to initiate or switch methods, then she may be more inclined to choose a highly effective method like an IUD that does not require daily diligence. Providers should encourage and support depressed women in taking action to select the

most appropriate contraceptive method. Providers should also assess for and counsel on concurrent treatment adherence issues among patients who are taking antidepressants and contraception [133, 134]. If a patient reports that she is missing dosages or has stopped taking her antidepressant, this may alert the provider to contraceptive misuse or discontinuation. Counseling should focus on ways to improve accuracy and consistency of medication use in the context of her daily life, such as setting a cell phone reminder or taking pills when she brushes her teeth before bedtime [128]. Contraceptive counseling should also dispel myths and misperceptions of side effects and reinforce the benefits of modern methods for pregnancy prevention and non-contraceptive effects (e.g., improved mood and acne, protection from ovarian and uterine cancer) [154, 160]. Finally, women with depression and anxiety should be counseled on sexual risk behaviors and condom use given an increased risk for sexually transmitted infections [89–93].

Women who present for contraception with underlying mental health conditions (newly detected or previously diagnosed) may benefit from education on the prevalence, signs, and symptoms, and treatment options for depression, anxiety, and related disorders [105, 147, 149]. Helping a patient to understand that her mental health is as important as her reproductive health and that the two are interrelated may facilitate honesty, trust, and communication. Evidence-based counseling techniques like motivational interviewing can be used to focus attention on specific behaviors that may need to change (e.g., frequent missed pills, condom nonuse), to evoke motivation for change by increasing confidence and readiness, and to plan practical steps to improve contraceptive behaviors [105, 147, 149, 155]. Providers should also assess for other dimensions of patients' lives that impact their mental and reproductive health, for example, financial considerations, social support, and coping resources. Having readily available education and resource materials for local social work counselors, psychology or psychiatric services, and insurance or medication

assistance programs can help patients address their mental health needs and potential life stressors which may be implicated in their mental health. Promoting mental health may ultimately promote positive family planning outcomes.

Contraceptive counseling should also include a discussion of intimate partner violence, which may be a contributing factor to depression and anxiety and which has serious implications for women's reproductive autonomy and health. More than one in three women are estimated to experience some form of intimate partner violence—either rape, physical violence, or stalking by a sexual partner—in their lifetime [161–164]. Rates of mood and anxiety disorders are higher among women who have experienced violence compared to those who have not [42]. Women in violent relationships may experience reproductive coercion, birth control sabotage, intentional exposure to sexually transmitted infections, unintended pregnancy, and lack of control over their pregnancy outcomes, access to health services, and use of contraception [31, 161]. While most research has focused on the mental health effects of intimate partner violence, women with mental health disorders may be particularly susceptible to being victims of intimate partner violence or reproductive coercion [163]. Routine screening for intimate partner violence with simple questions such as “Has your partner ever hit, slapped, kicked, bitten, pushed, choked, shoved or physically hurt you?” can identify patients who may have special contraceptive considerations [161, 162]. Providers can assist patients in selecting methods that maximize contraceptive control and minimize the likelihood of exacerbating partner resistance or violence. The DMPA injectable is an effective, inconspicuous contraceptive method that is controlled by the woman. IUDs or the subdermal implant may offer other subtle, highly effective options that require less frequent health service visits. Overall, the individual situation and specific mental health and intimate partner violence concerns should be taken into account during contraceptive decision-making and management.

Part II: Contraception and Other Serious Mental Illnesses

While psychotic disorders like schizophrenia, bipolar disorder, and borderline personality disorder are less common than depression and anxiety disorders [164, 165], these other serious mental illnesses (SMI) have important implications for women's reproductive health [165–170]. Women with other SMI may experience cognitive impairments, impulsivity, self-destructive behaviors, poor judgment, and co-occurring substance use that can affect family planning decision-making and contraceptive behaviors [125, 165–174]. Women with severe depression and anxiety may also exhibit similar symptoms. Women with SMI experience higher rates of non-adherence to contraceptives, unintended pregnancy, sexually transmitted infections, and nonconsensual and transactional sex than the general population of women [125, 166–181]. Unintended pregnancy for women with SMI, especially those taking teratogenic mood stabilizers, can have adverse physical, psychological, and social consequences for women and their offspring [166, 167, 169]. Thus, helping women with SMI prevent unintended pregnancy is a clinical priority. Health providers who care for with women with SMI may avoid contraceptive care due to insufficient knowledge and training, negative countertransference with regard to patients' sexuality, incorrect assumptions about sexual activity, perceptions of contraception as secondary to psychiatric care, and concerns about ethical issues [125, 170–173, 182–185]. In this section, we offer strategies for contraceptive counseling and management for women with SMI.

Contraceptive Counseling Considerations for Other Serious Mental Illnesses

Some research on schizophrenia and bipolar disorder has found that some women with psychotic disorders lack basic knowledge of sexuality and reproduction, have misperceptions about

contraception, and are concerned about access to contraceptive methods [125, 166–171, 175]. Thus, reproductive health education for women with SMI may need to be extensive. Contraceptive counseling should occur within a larger discussion of sexuality, reproductive health promotion, risk reduction and disease prevention, pregnancy intentions and readiness for pregnancy (emphasizing the value of stable social conditions and interpersonal relationships), and individual contraceptive expectations and preferences [125, 169]. Contraceptive information presented should be accurate, simple, clear, and provided at a time when patients are most receptive [125]. For instance, acutely psychotic patients are unlikely to have adequate attention and organization to assimilate contraceptive information [125, 171]. Counseling should be supplemented with simple written educational materials. Information on contraceptive methods should emphasize method-specific effectiveness rates, many of which are highly dependent upon correct use [128, 135, 154]. Effective use of some methods, like condoms, rely upon partner cooperation and support, and because women with SMI may have difficulties negotiating contraceptive use before or during sex, it is important for providers to engage partners in contraceptive counseling and education sessions when possible [170].

Contraceptive Method Considerations for Serious Mental Illness

The majority of women with SMI are eligible for the wide range of available contraceptive methods. In most cases, LARC methods, including the levonorgestrel-releasing and copper-containing IUDs and subdermal implant, should be considered as first line methods for women with SMI who wish to avoid an unintended pregnancy. LARC methods are highly effective, have few adherence issues, and do not contain estrogen, which eliminates cardiovascular risk concerns for women with chronic medical mor-

bidities like diabetes, obesity, breast cancer, or hypertension, and women over 35 years of age who smoke. These are all health conditions which may co-occur with SMI and are CDC MEC contraindications to combined hormonal method use [57, 128, 135, 136, 171, 176]. Other progestin-only methods, including the DMPA injectable and progestin-only pills (POPs), are alternative options for women who do not wish to use LARC methods but have contraindications to estrogen. Monitoring for weight gain, truncal fat deposit, and peripheral glucose intolerance in the case of DMPA, especially among women using neuroleptics, may be useful since these potential side effects are of concern in the context of other medical morbidities [186–188]. Additionally, POPs require a relatively strict daily regimen for effectiveness (must be taken within a 3 h time frame daily) and are associated with irregular bleeding profiles, especially with missed or late dosages [128]. Barrier methods like condoms and diaphragms should be considered lower priority options for primary contraception for women with SMI given the amount of user involvement that is necessary [128, 135, 136].

For women with SMI who are eligible for estrogen-containing contraceptives and who do not want or have access to LARC, combined hormonal methods, including the vaginal ring, transdermal patch, and COCs, are reasonable options [128, 135, 136]. The effectiveness of these methods relies heavily on correct use. Health providers should work with women with SMI to optimize contraceptive choice based on co-occurring medical conditions, individual preferences, and the likelihood of method success. In all cases, dual method use (i.e., condoms plus another effective contraceptive) should be encouraged for HIV/STI prevention and unintended pregnancy protection [166, 167, 171, 175, 177–182]. Finally, because sexual intercourse is often unplanned (among all women but especially among those with SMI), emergency contraception is a necessary back up and is safe [171].

Contraceptive and Drug Interaction Considerations for Serious Mental Illness

Hyperprolactinemia and suppression of the hypothalamic–pituitary–gonadal axis is commonly experienced among women with schizophrenia on atypical antipsychotics (risperidone>aripiprazole>ziprasidone), which can lead to menstrual irregularities, amenorrhoea, sexual dysfunction, infertility issues, and galactorrhoea [189, 190]. Women taking atypical antipsychotics may believe they are not at risk for pregnancy because of menstrual irregularities or they may believe that their antipsychotic medication offers contraceptive protection, both of which are not accurate [189, 190]. Women who continue taking atypical antipsychotics with hyperprolactinemia should receive estradiol supplementation for neuroendocrine regulation, and some research has shown that estrogen may modulate and improve the expression of psychotic symptoms [189–194]. Thus, COCs may offer therapeutic effects for women on older atypical antipsychotics. However, frequent assessment of COC adherence and counseling on condom use would be essential. Women taking newer antipsychotics are less likely to experience elevated prolactin, so use of COCs for therapeutic purposes is less of a concern [189, 190, 194].

Women with schizophrenia and bipolar disorder may be treated with mood stabilizers, including antiepileptic medications including lamotrigine, carbamazepine, and topiramate. Many of these medications can induce cytochrome P450 3A4 causing enhanced hepatic metabolism of contraceptive steroids and potentially decreased contraceptive efficacy [125, 171, 176, 187, 188, 195–201]. Contraceptive steroids can also decrease levels of antiepileptics, such as valproate and lamotrigine, rendering them less effective [201–204]. Antipsychotic medications, including clozapine and chlorpromazine, are also metabolized by the liver, and contraceptive steroids can cause a significant increase in antipsychotic medication levels resulting in severe side effects such as hypotension, sedation, and tremor [202–204]. Providers should monitor psychiatric

drug levels and adjust dosages as needed for hormonal contraceptive users [200–204] (see Chap. 8 for more information).

For women with SMI and drug interaction concerns, the local action of the IUDs, or the high dose of the DMPA injectable, offers effective alternative contraceptive options [128]. The injectable requires more effort on the part of the user (i.e., injections required every 3 months) compared to IUDs [128, 135]. Research that has compared these methods among women with SMI has found higher continuation rates for IUDs than for DMPA, with no differences in psychiatric complication and hospitalization rates between methods [176–185].

Ethical Considerations for Contraception in Serious Mental Illness

One of the most important and controversial but understudied topics in regard to contraception for women with SMI is how to best assess, promote, and protect women's reproductive autonomy. SMIs are often accompanied by deficits in reality testing that can negatively impact their decision-making capabilities. This may present an ethical dilemma for health providers who wish to help protect their patients from unintended pregnancy and avoid contraceptive coercion [172, 173]. Routine mental status exams of women with acute or chronic SMI symptoms are required during all phases of contraceptive care. Women should be able to consent to contraception—specifically, attend to, absorb, retain, and recall information disclosed in contraceptive counseling sessions, appreciate the information and its significance for their lives, evaluate the consequences, express both cognitive and evaluative understanding, and communicate a decision based upon that understanding [172, 173]. Thus, the first goal of contraceptive management among patients with chronic and variable impaired autonomy and reality testing is to restore decision-making capacities. In most cases, treatment of the underlying SMI can improve functioning, which will enhance

understanding of contraceptive information and the ability to apply it to family planning decision-making and behavior [172, 173]. Providers have an ethical responsibility to help patients with SMI understand the implications of unintended pregnancy and should assist in weighing the risks of pregnancy with individual reproductive values (which may be dynamic). As opposed to sterilization, LARC methods are highly effective and reversible [128]. However, these methods require provider-controlled insertion and removal procedures, which may present a dilemma for informed consent. Other long-acting methods like the DMPA injectable are less invasive but also effective and reversible [128]. When possible, spouses, partners, or family members should be engaged in contraceptive counseling and management for patients with SMI since they can provide insight into reproductive values and treatment preferences [170, 172, 173]. Providers should be aware of any undue pressure from family or signs of intimate partner violence, and patients should always be provided with ample opportunities to discuss contraception in private [172, 173].

Conclusion

Depression, anxiety, and related disorders are common among reproductive-aged women and have significant implications for women's risk of unintended pregnancy. While other serious mental illnesses like schizophrenia and bipolar disorders are less common, these conditions can have especially adverse consequences for the health and well-being of women and their offspring. There has been a lack of attention to mental health in family planning settings, and significant research gaps prevent an in-depth understanding of the most effective approaches for contraceptive management among women with mental health conditions. From the best available scientific evidence, however, we have offered several take-home messages.

First, modern contraceptives do not appear to *cause* clinically significant mood symptoms or mental health conditions. The impact of hormonal contraceptives on perceived mood

symptoms among women with preexisting mental health disorders warrants additional scientific investigation. Second, potential neuroendocrine, cognitive, and behavioral pathways may link mental health conditions with contraceptive decision-making and behaviors and place women at risk of unintended pregnancy. Additional research is needed to better understand these mechanisms. Third, contraceptive education and counseling is essential for women with mental health conditions who wish to avoid an unintended pregnancy. Special attention should be given to method effectiveness and adherence issues. Fourth, modern contraceptive methods are generally safe for women with mental health conditions and should be made available. Selection of an appropriate method should occur through shared decision-making. LARC methods offer strong options for women with mental health conditions since they are highly effective, are reversible, and have little user-burden. Fifth, while drug interactions with modern antidepressant and contraceptive therapies are rare, hormonal contraceptives and older antidepressant agents and some antipsychotics and mood stabilizers can interact. Similarly, chronic comorbid diseases, which commonly co-occur with mental health conditions and that may preclude estrogen use, should be taken into account. Finally, attention to ethical issues around reproductive autonomy and contraceptive decision-making, especially for women with SMI who have significant cognitive impairments, is essential. Treatment of the underlying mental health condition can restore cognitive functioning to improve contraceptive decision-making capacities.

Overall, while additional scientific research can improve our understanding of the role of mental health in contraception (and vice versa), health providers should prioritize contraceptive counseling and management for women with mental health conditions who wish to avoid unintended pregnancy. An integrated approach is needed to address interrelated mental and reproductive health issues, ultimately to improve the health and well-being of women, their families, and society [205].

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