Suicidal mothers

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Introduction

A World Health Organization report has named depression as the greatest disease burden for women worldwide. In particular, childbearing years are a time of increased vulnerability to the onset or recurrence of major depressive disorder, thus placing young women at risk of suffering from severe affective impairment during pregnancy. Indeed, antenatal depression is a significant public health problem. Information drawn from scientific literature underlines that, in developed countries, between 3% and 16% of pregnant women fulfill the diag-
nastic criteria for unipolar major depression. In specific populations, such as marginalized minority groups and unmarried teenagers, the rate of clinically relevant mood symptoms in pregnancy may be as high as 51%. In developing countries, the prevalence of antenatal depression is estimated at 33%.

It is well-known that antenatal depression adversely impacts on several obstetrical, fetal, and infantile outcomes. In fact, untreated maternal mood symptoms have been associated with an increase in the rate of pregnancy complications (such as pre-eclampsia, premature delivery, impaired feto-placental function, and low fetal growth) and perinatal problems. 9,10,11,12,13,14

Maternal depression also induces significant effects on neonatal physiology. Elevated cortisol and norepinephrine levels, lower dopamine levels, and greater relative right frontal EEG asymmetry have all been described in newborns of mothers suffering from depression during pregnancy. 15,16 Findings from a preliminary, recent study have also suggested that there is an elevated risk of lower birth weight among infants born to adolescent mothers who report depressive symptoms complicated by self-harm ideation and behavior compared to those born to adolescents who report depressive features without suicidal symptoms.

The detrimental impact of untreated maternal depression on the infant neurocognitive and psychological development is also well-known. Many untreated women continue to be depressed in the postnatal period and are at risk of impaired interaction with their infant at a time when the child is in a particularly sensitive developmental period, 18,19,20,21,22 and this may lead to poorer cognitive functioning and compromised social adaptation during childhood, adolescence, and young adulthood. 23,24,25

Prevalently, however, depression is characterized by a dramatic increase in the risk of suicide or serious suicide attempts, since more than 90% of suicide victims have a diagnosable mental illness and approximately 60% of all suicides occur in persons with mood disorders. 26

Suicide during pregnancy is included among the indirect causes of maternal death. The World Health Organization defines maternal deaths as all deaths occurring any time during pregnancy and up to 42 days after parturition. 27 Indirect causes of maternal deaths include all those conditions not directly related to obstetric cause but worsened by the pregnant status, such as complications due to cardiac disease and mental disorders. When all maternal deaths within one year after delivery are considered, suicide is one of the four leading causes of maternal deaths overall (together with thromboembolisms, obesity, and cardiac events). 28,29 For this reason, maternal mortality associated with psychiatric illness should remain a focus of high clinical interest in the developed countries. In these countries, in fact, the rate of maternal deaths due to other conditions, such as poor antenatal care and malnutrition, have progressively decreased during the last century. 20 Moreover, the epidemiological studies have been mainly focused on the increased risk of suicidal attempts during the puerperal period, since suicides account for up to 20% of postpartum deaths. 31

Hence, the primary aim of this study is to assess whether or not pregnancy may be considered a period highly susceptible to suicidal events. Other scopes of this review are: to recognize potential contributing factors to suicidal behaviors; to describe the repercussions of suicide attempts on maternal, fetal, and neonatal outcomes; to identify a typical profile of women at high risk of suicide during pregnancy, in order to establish effective strategies of prevention.

Methods

Medical literature information published in any language since 1950 was identified using MEDLINE/PubMed, Scopus, and Google Scholar databases. Additional references were identified from the reference lists of published articles. Search terms were: “pregnancy”, (antenatal) “depression”, “suicide”. Searches were last updated on 28 September 2010. Selected on the basis of their abstract or the full-text article when the abstract was unavailable, all articles assessing the suicidal risk during pregnancy and obstetrical outcome of pregnancies complicated by suicide attempts were acquired and analyzed, without methodological limitations. Forty-six articles met the wide inclusion criteria. The Author was the only reviewer who performed both data selection and extraction.

Results

Prevalence of suicidal ideation in pregnancy

In the Western world, recent epidemiological researches have demonstrated that suicidal ideation may be detectable in a percentage ranging from 13.1% to 33.0% of pregnant women. 22,23 Symptoms frequently associated with suicidal ideation include depressed mood, lack of concentration, anxiety, preoccupations, obsessive compulsive symptoms, tiredness, worry concerning bodily functions, and compulsion. 34

In developing countries, too, nearly 14% of pregnant women admit to thoughts of self-harm. 8 In these regions of the world, the occurrence of suicidal ideation during the gestational period is a relevant concern especially among adolescents, since it has been reported in up to 17% of young mothers. 35
A. How many mothers die by suicide?

Europe

A Danish register/case audit study based on data from the registers of the Danish Medical Health Board, death certificates, and hospital records covering the period 2002-2006 identified 26 cases of maternal death, leading to a maternal mortality ratio of 8.0/100,000 live births. No cases of death due to suicide were identified. Similar results derived from data extrapolated from three national Finnish health registers and two Swedish national registers.

Only five cases of suicidal deaths during pregnancy have been described in the United Kingdom report Why mothers die 2000-2002. In three of these cases, the women had been diagnosed with severe form of psychiatric disorders, such as major depression (two cases) or schizophrenia (one case).

North America

An epidemiological U.S. study performed on a large State of California database showed that the cumulative incidence of suicide attempts during pregnancy was four per 10,000 pregnancies. The contribution of several injuries to maternal mortality was assessed through a review of New York City medical examiner records of 2331 women 15-44 years of age who died of injuries during 1987-91. The largest proportion of injury-related deaths were homicides (63%), whereas suicide accounted for only 11 cases. To further determine the prevalence of suicide during pregnancy, the autopsy reports of all female residents of the same city, 10-44 years old, who committed suicide from 1990 to 1993 were assessed for pregnancy. The standardized mortality ratio for suicide during pregnancy was 0.33; that is, the number of suicides of pregnant women was only one-third of that expected.

A retrospective study of abortion and maternal deaths in Minnesota during the period 1950-1965 including data of suicides that occurred during the gestational period, identified 26 cases of maternal death, leading to a maternal mortality ratio of 8.0/100,000 live births. No cases of death due to suicide were identified. Similar results derived from data extrapolated from three national Finnish health registers and two Swedish national registers.

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Africa

B. Factors contributing to increase the suicidal risk in pregnancy are summarized in Table 1.

Developing countries

Suicide can be precipitated by an illegitimate pregnancy, especially in those societies where social sanctions and religious condemnation are particularly harsh. Moreover, in specific religious and cultural contexts, conceiving a female fetus, history of being beaten by the husband either during or before the current pregnancy,

| Table 1: Contributing factors to suicidal behaviors in pregnancy* |
|---------------------------------------------------------------|
| **Developing countries**                                      |
| Intimate partner violence, both physical and sexual           |
| Unmarried status                                              |
| Teen age #                                                   |
| Pregnancy outside marriage €                                  |
| Lack of effective familial and/or social government institution supports |
| Conception of a female fetus, especially in those traditional societies where a strong familial preference exists towards the birth of male infants |
| Poor mother-in-law support                                    |
| Street drug/alcohol abuse                                     |
| Unemployment                                                 |
| Induced abortion                                              |
| **Developed countries**                                       |
| Intimate partner violence, both physical and sexual           |
| Unmarried status                                              |
| Teen age #                                                   |
| Unplanned pregnancy                                          |
| Lack of effective familial and/or social government institution supports |
| Previous or present history of any psychiatric disorder       |
| Street drug/alcohol abuse                                     |
| Unemployment                                                 |
| Induced abortion                                              |

* These findings are not in a ranking numeric order
# Age ranges are not available
€ Pregnancy in unmarried women
and an unhelpful or unsupportive mother-in-law also show
a strict connection with antenatal depression and suicidal
behavior.68 Explanations for these associations appear to
be rooted in the culture of many developing countries. In
traditional societies, where the wife’s mother-in-law is the
matriarch who holds effective power and control and the
daughter-in-law is under her strict guidance and supervi-
sion, a strong familial preference exists towards the birth
of male infants.51

**Developed countries**

The rate of suicidal ideation in pregnancy is significant-
ly associated with psychiatric disorder and, especially,
with current major depressive episode and comorbid an-
xiety disorder and/or substance abuse.8,32 Psychosocial
factors which may also contribute to increase the rate of
maternal suicide attempts during pregnancy are teen age,
unplanned pregnancy, unmarried status or recent divorce,
unemployment, and difficult access to safe abortion ser-
vice.31,52 Moreover, hospital-based, cohort studies, and
literature reviews have suggested that intimate partner
violence, previous experience of sexual assault, interper-
sonal conflicts also represent specific factors associated
with an increased suicidal risk.33,35,53 Experiencing intimate
partner violence may increase the risk of suicidal beha-
vior by enhancing the risk of impulsive responses and
facilitating the onset of posttraumatic stress disorder, since
both situations are intrinsically associated with an in-
creased suicidal risk.56,57 In addition, both severe emotion-
al distress58 and overall suicidal risk is increased after
voluntary pregnancy termination. Indeed, the risk of sui-
cidal ideation and attempt is at least doubled in women
who experience abortion;59,60 though other studies51 re-
port that the suicide rate among women who have abor-
tions may be as much as six times higher than that of
women who have given birth in the prior year, and double
that of women who experience spontaneous abortion. Of
note, however, the strongest evidence-based confirmation
regarding the relationship between voluntary pregnancy
termination and an increase in the suicidal risk derives
from a review available from a journal issued by a catho-
lic association.62 A possible explanation of the increased
risk of suicidality after induced abortion is that this deci-
sion, for many women, rather than being a relief and/or
an answer to their problems, may be additional proof of
their worthlessness and may contribute to suicidality.63
indeed, it has been reported that a post-abortion suicide
attempt may be an impulsive act of despair.64

**C. Most frequently used methods for attempting suicide in
pregnancy.**

Almost invariably, pregnant women choose poison inges-
tion or drug overdose for their suicide attempts.65 Indeed,
a Thailand study demonstrated that poisoning is the com-
monest method of suicide, organophosphate pesticides
such as parathion being the poison of choice.66,67

In contrast, in Western countries several licit drugs, such as
benzodiazepines, are the most frequently used drugs
for attempting suicide.68 However, different medications,
including analgesics (most notably acetaminophen), vita-
mins or iron, antibiotics, antihistamines or decongestants
may be used in order to attempt suicide.69 Moreover, de-
spite the use of barbiturates being progressively de-
creased in both neurological and psychiatric practice, such
medications are still used by suicidal pregnant women.70

The period of pregnancy at highest risk of suicide at-
ttempts seems to be the second trimester.71

**D. Maternal and neonatal outcome after attempted suicide.**

Interesting information comes from studies focused on
investigating whether or not suicide attempts by drug
overdose may impair obstetric, fetal, and neonatal out-
comes. In answer to this question, women diagnosed with
drug intoxication during pregnancy were identified in the
Regional Hospital Discharge Registry of North Jutland
from 1977 to 1999 by linkage of diagnoses for abortion
and delivery with diagnoses for intoxication. Hospital
medical records were reviewed to obtain data on drug
use, dosage, and pregnancy outcome:72 of 122 women
studied, 17 experienced spontaneous abortion. Hence, in
general, a drug overdose shortly before or during preg-
nancy might have been associated with a doubled risk of
spontaneous abortion whereas, compared with the back-
ground population, there was no increased risk of conge-
nital abnormalities or prematurity. No increase in the struc-
tural teratogenic risk was demonstrated in pregnant wom-
en who attempted suicide by specifically ingesting very
large doses of different barbiturates.71 Cognitive status
and performances at behavioral scales of children ex-
posed to barbiturates throughout placenta also did not
indicate any developmental impairment.71

Recently, however, very large dose of specific benzo-
diazepines (such as nitrazepam) used for suicide attempts
during pregnancy was associated with increased rates of
congenital birth defects (which may be connected with the
disruption of protein metabolism in fetal mesenchyma).73
Moreover, a linked Vital Statistics-Patient Discharge State
of California database confirmed that suicide attempts
during pregnancy might be associated with significantly
higher rates of maternal and perinatal morbidity, and in
some cases, perinatal mortality.70 In fact, such women
showed an increase in the risk of premature labor, caesa-
orean delivery, and need for blood transfusion. Analysis of
neonatal outcomes also revealed increases in respiratory
distress syndrome and low birth weight.78
ternal death due to suicide may seriously compromise the future development of orphans. In fact, children who lose their own mother because of suicidal acts show a greater risk of hospitalization for all types of psychiatric disorders and suicide attempts than offspring of parents who have died of other causes.74

Discussion

Review data seem to suggest that prevalence of unipolar depression and suicidal ideation in pregnancy is relatively high,8,32,33,35 However, frequency of suicidal attempts and, especially, rate of death by suicidal acts are low in both developed and developing countries.36-49 Although rare, consequences of a suicidal attempt are likely to be devastating for the mother-infant pair.36,72-74

Moreover, local social and health organizations may consider such women unable to carry out sound maternal functions;75 hence, infants who survive maternal suicide attempts during pregnancy could be at increased risk of institutionalization. For these reasons, social and health organizations should make all possible efforts to identify women at high suicidal risk, in order to actuate specific programs focused on preventing tragic outcomes. Suicidal literature allows to identify the typical profile of women at high risk of suicide during pregnancy. Hence, the first step towards preventing suicidal events in pregnancy is to identify pregnant women who are at elevated risk factors.8 In developed counties, those women who have a current or past history of psychiatric disorder,50 are young, unmarried, have incurred an unplanned pregnancy which has terminated in abortion,51,52 are addicted to illicit drugs and/or alcohol, lack effective psychosocial support, have suffered from episodes of sexual or physical violence are particularly vulnerable.8,53-55

The second step of an effective prevention-plan - since between 4% and 8% of all women experience intimate partner violence during pregnancy76 - should consist of organizing specific social task-forces to implement and publicize (in both developing and developed countries and either in disadvantaged or privileged social context) specific programs which may facilitate women experiencing abusive relationships to withdraw from such perverse attachments.8 Such programs should also involve those women who have temporarily chosen to continue the affective bonding of a desire to ensure a “normal” family to their children. Obviously, these programs must include both practical support (e.g., safe accommodation, decent work for unemployed women, and facilitated access to gynecologic care and legal assistance) as well as psychological support, finalized to facilitate the choice of continuing gestation.77 Alternatively, in the case of an unwanted concep-

 tion, easy access to public abortion services should be available to those women who choose to interrupt pregnancy.8,52

The third step is to promote close cooperation between community psychiatric services, family physicians, hospital gynecological units, and local social services in order to provide the best available care for all women diagnosed with psychiatric disorders who have become mothers. Regrettably, however, up to 70% of patients with mental problems withdraw psychotropic medication during pregnancy and refuse psychiatric counseling;92 of note, care does not resume during the postpartum period.93 Thus, such women should be informed, at least during early pregnancy, that the risk of untreated mental disorder outweighs the risk for the fetus of exposure to most psychotropic medications.94 In fact, several classes of psychotropic seem devoid of significant structural teratogenic risks. Among antipsychotics, chlorpromazine is the drug which shows the highest number of studies suggesting its reproductive safety;95 whereas, among antidepressants, fluoxetine and sertraline should be preferred, since both (anecdotally) have been associated with slight increase in fetal malformations.96 It is also possible to safely start or continue some mood stabilizing agents, since the slight increase in the risk of oro-facial cleft suggested for lamotrigine2 has not been confirmed in recent studies.97 However, nearly all these medications (with the exception of lamotrigine) have been associated with an increased risk of perinatal complications if used in late pregnancy.98 Therefore, if clinicians deem indispensable the continuance of psychotropic medications during the last stage of the gestational period, they must firmly suggest that delivery happens in hospitals equipped with specialized neonatal intensive nursery units.99

However, the vast majority of maternal deaths due to suicide occur after parturition.31 Thus, social, psychological, and clinical support provided to such mothers should be continued for at least the first six months of puerperium. The prolonged support may reduce the risk of other tragic events, such as neonaticide (child homicide on the first 24 hours of life) and infanticide (child homicide within the first year of life), which could be brought by mothers who develop antenatal depression and continue to be depressed after parturition.100 The support resources should gradually be discontinued only when the personal and clinical situation of the mothers appears to be satisfactorily and definitively stabilized.

Conclusions

Although reviewed studies do not allow us to differentiate between factors associated with suicidal ideation and fac-
tors which may contribute to the occurrence of violent and definitive suicidal acts, available data clearly indicate a noteworthy discrepancy between the prevalence of suicidal ideation during pregnancy (relatively high) and the rate of death due to intentional self-harm (extremely low). This discrepancy seems to suggest that maternal death due to suicide may occur merely in the presence of several, concomitant triggers which involve different areas of the complex maternal universe such as compromised mental stability, weakness of the desire to experience maternity, unhealthy life-style, poor affective liaisons and family support, disadvantaged economic conditions, difficulty in adherence to rigid cultural and religious rules (especially in contexts which stigmatize any female non-orthodox behaviors), and a previous history of personal traumatic experiences (including intimate partner violence and induced abortion).

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