Cross-sectional Study

Risk factors & perinatal outcomes of major depression during pregnancy: A population-based study during 2010–2020 in two major cities of Pakistan

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ARTICLE INFO

Keywords:
Epidemiology
Mental health
Obstetrics
Public health
Depression

ABSTRACT

Introduction: Ever since the world came into being different factors and circumstances contributed in a deteriorating fashion to mental health, and depression is the commonest of mental disturbance and incapability. We aimed to identify the risk factors for perinatal outcomes of maternal depression.

Methods: Data extracted was from two important cities of Pakistan i.e Islamabad and Karachi, and the numbers are 500,000 and 800,000 respectively. The timeline of the information was from 2010 to 2020 to signify a decade. Women with active pregnancy and depression were included. Chisquare analysis was run to predict which factors had a significant impact on depression. Odds ratio was separately run on the significant factors. Regression analysis was done to describe the relationships between independent variables and each other.

Results: The most preferred procedure of delivery was cesarean section in Islamabad and more than 500,000 in Karachi. Low-income women in Karachi had a mean depression score of 12.4 while men with the same socioeconomic class had a score of 23.4. 15.7 females in Islamabad reported medications taken during pregnancy & 34.9 females from major depression group. Mean of 87.9 individuals from Islamabad reported living with husband from no serious depression during pregnancy. In Population of Islamabad, Previous pregnancies and birth weight in comparison with depression is significant having p value 0.00. Maternal age, fetal sex & gestational age are also significant indicators of whether a woman is depressed or not. Apgar scores & violence in relation to depression are significant in Karachi Population having p values of 0.049 and 0.028.

Conclusion: Female health and neonatal care should be a serious concern, but unfortunately in spite of progression in the field of medicine the low income or third world countries don’t have sufficient awareness and due to that Pakistan still reports high maternal and neonatal mortality rates.

1. Introduction

Female health has been an area of concern through the centuries as they are the child bearer. Any lack or disinterest can be costly for both the mother and the child. With the progression and advancements in medical science better outcomes have been reported. On the other hand, females are prone to different risk factors associated with adverse effects.

Advanced maternal age, obesity, smoking and any other underlying medical condition predisposes the fetus to perinatal complications and worsens the outcomes [1]. The human race has just faced a tremendous crisis as COVID-19 is on the verge of resolving. Where it has taken our beloved ones and many valuable lives, depression also prevailed during these times [2].

Depression has been found to be associated with several hazardous outcomes like having a negative impact on breastfeeding practices [3], also found to be correlated with postpartum depression and suicidal ideation [4]. A meta-analysis reported an interconnection between...
depression and premature delivery and delay in breastfeeding initiation [5]. Mental health and psychological wellbeing are often implicated with gender, culture and income etc. Furthermore, gender preference also puts women under immense pressure in some cultures [6].

This study demands and drugs one’s attention towards the risk factors for perinatal outcomes due to maternal depression. There is very little literature available especially on low-income Asian countries. Most of the women suffer from different mental instability during pregnancy. It is also worth mentioning that this geographical region has a high burden of psychological disorder and associated dilemma and stigma creates hurdles towards seeking help and assistance [7].

2. Methods

To achieve our prime objective, we designed this study in which we reviewed the prospectively maintained institutional database to identify all the patients who were diagnosed with depression during pregnancy. We retrieved data from various Government Sector Hospitals. The information was representative of two major cities, the capital Islamabad and densely populated Karachi. Size of the lot was 500,000 and 800,000 respectively.

The samples obtained consisted of data from 2010 to 2020, symbolic of a decade. Disorganized data was gathered and arranged by using a uniform criterion. Only actively pregnant women with the confirmed diagnosis of depression were included, while non-pregnant, non-depressed, postpartum women and multiple births were not entertained as they carry greater risk for complications. The numbers were labelled with different headings encompassing, maternal age, mode of delivery, socioeconomic class, any drug taking history, admission to an NICU etc.

Our study is fully compliant with the STROCSS 2021 guidelines [8]. A complete STROCSS 2021 checklist has been provided as a supplementary file. UIN researchregistry8250 [9] identifies our study in Research Registry. Our research adheres to the principles outlined in the Helsinki Declaration.

To authenticate the aims and goals of the study and to further engrave the findings, results were compared with a reference group i.e., with no depression. The results were depicted using figures and tables. Moreover, means were calculated to further simplify the data. The study involved analyzing data on the history of depression prior to pregnancy, as well as those who had suffered from depression in the past. Chi-square analysis was run to predict which factors had a significant impact on depression. Odds ratio was separately run on the significant factors.

Regression analysis was done to describe the relationships between independent variables.

3. Results

The data retrieved from the data bases of Islamabad and Karachi; results were presented separately in order to depict information. In a well -developed capital city with low population and a loud bustling land with a population of around 30 million. Mean gestational age with major depression was 39.6 and 39.9 years in Islamabad and Karachi respectively, a year difference was observed between the gestational age and no major depression. Mean maternal age with depression was found to be 32.5 years, similar in both cities. Based on the number of pregnancies, there was an evident distinction and nulliparous women suffered more from major depression than the multiparous ones.

Relationship between Smoking habits and depression was investigated and though the numbers were higher in non-smokers, the ratio of among the non-depressive and depressive ones was higher in women smoking during the first trimester. Islamabad had a mean of 84.3 for Non-smoking status in no major depression during pregnancy versus 79.6 from the major depressed during pregnancy group. 15.7 females in Islamabad reported medications taken during pregnancy & 34.9 females from major depression group. Mean of 87.9 individuals from Islamabad reported living with husband from no serious depression during pregnancy whereas 12.1 reported living away from spouse. 65.3 females in Karachi reported living with spouse from no serious depression throughout pregnancy, as shown in Fig. 1.

In addition, Usage of drugs and living away from spouse were also two prominent factors. Taking socioeconomic status into account is a compulsory thing, the upper or settled class exhibited far more cases of depression, with lower class ending up being runner ups.

57.9 females in Islamabad fell into the major depression group, compared to 42.9% of the population who did not fall into this group. Low-income women in Karachi had a mean depression score of 12.4, while men with the same socioeconomic class had a score of 23.4. In Karachi, 67.9% of women in the major Depression group and 43.7% of those in the no Depression group had high socioeconomic status, as shown in Fig. 2. Conditions contributing to the elevated depression of both groups are shown in Fig. 3 & Neonatal factors of both groups are shown in Fig. 4.

The most preferred procedure of delivery was cesarean section in both cities with almost 350,000 in Islamabad and more than 500,000 in Karachi, though cesarean section was associated with major depression but the numbers were significantly higher in Karachi than Islamabad.

Multiple conditions contributed to the elevated depression like prior miscarriages, Anemia during pregnancy, placental abruption, fear of child birth, cesarean section and gestational diabetes all in a descending order. Cases from Karachi highlighted a strong association of placenta previa with depression.

Moreover, some neonatal factors had an added effect on depressive symptoms, some leading causes were major APGR score of less than 7, birth weight<2500g, congenital anomaly, preterm birth and early neonatal death. Furthermore, Results revealed a dip in the violent nature during pregnancy but the irritable and aggressive behavior was strongly associated with major depression.

Chi-squared analysis predicted that pregnancies, maternal age and fetal sex produced a p value of 0.00. In addition, to elaborate and concr ete the findings, we ran odds ratio separately on the significant factors. Risk factor was previous pregnancies and the outcome is depression. Results highlighted that 94.8% nulliparous women developed depression, odds ratio showing that there are 156, 159.2 times greater chance of nulliparous developing depression, and the cohort value with no previous pregnancies was 9.057, 9.17 in Islamabad and Karachi respectively. The odds ratio test showed the greater risk for depression among the mothers of age group 18–28, and values were similar as above for each respective city. When fetal sex was taken as a risk factor, no particular gender was found to be contributing more to depressive symptoms, odds value.

0.6,1.03 respectively. All values were taken at 95% confidence limits.

Furthermore, in order to predict and estimate the impact of different variables on our dependent variable i.e., depression, we ran a multiple regression analysis, only four popped out being significant, namely previous pregnancies, maternal age, birth weight and fetal sex. The results depicted that these independent variables did have a significant effect on depression F:

\[ (16,19959) = 48044.403, p < 0.001 \text{ for Islamabad}, F (17,28562) = 66078.338, p < 0.001 \text{ for Karachi}, \text{implying that these factors have a notable impact. Moreover, R-square values of 0.712 and 0.714 indicate a variance of 71.2% and 71.4% in depression in both cities. Additionally, these coefficients were assessed to predict their individual effects on the dependent variable.} \]

Our results show that in Population of Islamabad, Previous pregnancies and birth weight in comparison with depression is significant. Maternal age, fetal sex in comparison with depression is significant having p value 0.00. Smoking status in comparison with depression is significant having p value 0.012 whereas birth status in comparison with depression is significant having p value 0.008, as shown in Table 1.

Karachi Population showed that Previous pregnancies, birth weight, maternal age, fetal sex & gestational age in comparison with depression
is significant having p value 0.00. Smoking status in comparison with depression is significant in Karachi population having p value 0.032 whereas drugs taken during pregnancy has p value 0.000. Apgar scores & Violence in comparison with depression is significant in Karachi Population having p value 0.049 and 0.028, as shown in Table II.

4. Discussion

Medicine is an evolving discipline, with ongoing research round the clock. Female health and prenatal care are two major genres of concern especially in low-income countries with high burden of diseases and less health care facilities. Results highlighted that nulliparous and females without a partner suffered the most from depression as also displayed by the data from Europe reported by Emily et al. [10].

In addition, the association of mode of child and depression has not been established, but evidence shows that females undergoing cesarean section were at higher risk of postpartum depression [11]. Moreover, smoking status is a crucial aspect during pregnancy as it is a predisposing factor for different conditions, Ashley et al. study reflects the consort, as the women with greater habituation of smoking were more likely to present with depressive symptoms [12].

Furthermore, the world is divided into continents, races and socioeconomic class etc. The earning of a household is a key factor that establishes how much expenditure is affordable on health care. In Low and middle countries every, one out four or five postnatal mothers suffer from depression as documented by Abel et al. [13], contrary to this evidence in our study showed that the privileged class experienced more depression, the middle class suffered the least.

Multiple different conditions contributed to the depression among child bearing females, the most remarkable ones were prior miscarriages, placenta previa and abruption, anemia and gestational diabetes all in a descending order, Shu lan et al. supported and rooted the findings [14]. The story doesn’t end here, post-partum depression was taken into account and the common risk factors were any neonatal congenital anomaly, early neonatal death, preterm birth and low birth weight were common precipitating elements.

A study conducted in Egypt by Hanan et al. exhibited a strong relation among violence and depression which is in synchrony with our reported information [15]. In recent times, the COVID pandemic has changed the overall dynamics, and greater postpartum anxiety and depression were reported, the need to assess the situation exacerbated [16]. We researchers try to frame and apply an approach which covers and addresses all possible outcomes, aspects and implications. But factually, it’s a really far-reaching job to do so.
5. Conclusion

There are an enormous components and predisposing elements contributing to prenatal depression among females, and it is a serious point of concern as female and her child both face consequences. Awareness regarding pregnancy and pre and post-natal care, and blowing away the myths and dilemma associated with pregnancy may prove to be effective.

Table 1
Outcomes of Islamabad Population having Relationship with history of Depression Prior to Pregnancy.

| Variables                  | Standardized Coefficients Beta | Confidence Interval       | P- value |
|----------------------------|--------------------------------|---------------------------|----------|
| Previous pregnancy (PP)    | 0.381                          | 0.215-0.546               | 0.00     |
| Maternal Age (MA)          | 0.463                          | 0.297-0.628               | 0.00     |
| Birth Weight (BW)          | 0.014                          | 0.011-0.016               | 0.00     |
| Fetal Sex (FS)             | -0.015                         | -0.017--0.012             | 0.00     |
| Smoking Status             | -0.039                         | -0.044--0.005             | 0.012    |
| Birth Status               | -0.115                         | -0.126--0.019             | 0.008    |

DV = dependent variable (history of depression prior to pregnancy).

Table 2
Outcomes of Karachi Population having Relationship with history of Depression Prior to Pregnancy.

| Variables                  | Standardized Coefficients Beta | Confidence Interval       | P- value |
|----------------------------|--------------------------------|---------------------------|----------|
| Previous pregnancy (PP)    | 0.272                          | 0.128-0.416               | 0.00     |
| Maternal Age (MA)          | 0.301                          | 0.152-0.450               | 0.00     |
| Gestational Age            | 0.272                          | 0.128-0.416               | 0.00     |
| Birth Weight (BW)          | 0.016                          | 0.014-0.018               | 0.00     |
| Fetal Sex (FS)             | -0.014                         | -0.017--0.012             | 0.00     |
| Smoking Status             | -0.003                         | -0.003-0.000              | 0.032    |
| Drugs taken during pregnancy | 0.005                        | 0.001-0.004               | 0.00     |
| APGAR Scores               | -0.005                         | -0.005-0.000              | 0.049    |
| Violence                   | 0.006                          | 0.000-0.004               | 0.028    |

DV = dependent variable (history of depression prior to pregnancy).

Funding

No Funding has been received.

Ethical approval

Ethical review letter was obtained.

Sources of funding

Nill

Author contribution

Conceptualization: Hassan Mumtaz, Mohammad Hasan. Formal Analysis: Danisha Dhirani, Jaya Kumari. Writing – review and editing: Sunita Devi, Arslan Iqbal. Writing –original draft: Syed Muhammad Ismail, Iffat Iqbal.

Registration of research studies

1. Name of the registry: Research registry
2. Unique Identifying number or registration ID: researchregistry8255
Consent

The informed consent from the patients was obtained considering Helsinki’s Declaration.

Guarantor

Mohammad Hasan.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

Nill.

Acknowledgements

Resear-Ligent Limited UK.
https://www.linkedin.com/company/researligent/

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.104941.

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