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Health related Behaviour Changes in Pregnant Women during Covid 19 pandemic

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Abstract
Background: Pregnancy associated anxiety and depression is very well known for its prevalence. Pandemic like Covid 19 all the more is additive to the levels of anxiety and depression during pregnancy, specially for mothers who are concerned about feto-maternal wellbeing. This study makes an effort to analyze the health related behavior changes and psychological impact of pregnant women after Covid 19 outbreak. **Methodology:** Cross sectional, questionnaire based study conducted on Pregnant ladies visiting labor room and Outpatients department, RIMS, RANCHI from April 2020 to September 2020. **Results:** Most patients were primigravida and turned up only in third trimester. Pregnancy complications like heart disease, GDM, jaundice, PIH were present in 28% of participants. 48% participants had no family income during pandemic. 92% women wore masks, 80% practiced social distancing, 72% practiced frequent handwashing,72% practiced frequent handwashing during pandemic, 80% had no regular antenatal checkup. Almost 64% participants showed mild to moderate anxiety, 34% had moderate depression and 40 % had moderate stress.4% had severe anxiety, 2% had severe depression and 12% had severe stress. Usage of mask was inversely related to GAD7 scores, but had no correlation with EPDS scores. Rest parameters like frequent handwashing, social distancing, stressful behavior, not going out and frequent handwashing were directly related to GAD 7 and EPDS score. **Conclusion:** Mental health and preventive behavior of respondents could be attributed to socio demographic, social, situational, economic status, family conditions and perception of severity of Covid19.
Keywords: anxiety, depression, pandemic, pregnancy, covid19

Introduction
The Covid 19 pandemic broke out in Wuhan, Hubei Province in China as per study by Nishiura H et al[1]. According to study by Wu Y et al[2] , pregnant women assessed after the declaration of coronavirus disease 2019 epidemic had significantly higher rates of depressive symptoms than women assessed before the epidemic declaration. These women were also more likely to have thoughts of self-harm. The depressive rates were positively associated with the number of newly confirmed cases of coronavirus disease 2019, suspected infections, and deaths per day. As per Liu X et al[3] the outbreak aggravated prenatal anxiety and the associated factors could be targets for psychological care.

According to Durankus F et al[4], there is limited data regarding the psychological effects of outbreaks. Current research and clinical routines focus on the treatment and prevention of COVID-19.

The first warnings as regards dealing with the psychological well-being of pregnant women came from Iran, another highly affected country in study by Mirzadeh et al[5] who pointed out the different aspects of pregnancy during the COVID-19 pandemic and underlined the necessity of psychological support for pregnant women during this crisis .

According to ACOG committee opinion no. 559[6] depression is a common complication of pregnancy and the postpartum period. As per WHO report[7] about 10% of pregnant women worldwide and 13% of women who have just given birth experiencing a mental disorder, primarily depression.

As per study by Fisher J et al[8], Common Perinatal Mental Disorders (CPMDs) are more prevalent in low- and lower-middle-income countries; i.e. 15.6% of women in low and lower-middle-income countries experienced a mental disorder during pregnancy and 19.8% experienced a mental disorder after childbirth.

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Pregnant women during times of epidemic tend to be more concerned about themselves and condition of their baby, which adds all the more to their poor mental health which is well portrayed in studies by Lee DT et al and Ng J et al[9-10]. Similarly in one Canadian study by Davenport MH et al[11] identifies a substantial increase in the likelihood of maternal depression and anxiety during the COVID-19 pandemic and highlights the strong need for heightened assessment and treatment of maternal mental health.

The aim of the present study is to analyze the health related behavior changes and psychological impact of pregnant women after Covid 19 outbreak at our tertiary center, Rajendra Institute of Health Sciences, Ranchi, Jharkhand, which caters to health services for the entire state.

Materials & Methods
Study Design
Cross sectional study

Study Place
Pregnant ladies visiting labor room and Outpatients department, RIMS, RANCHI

Study Duration
April 2020 to September 2020.

Sampling Method
It is estimated that about 10-35% of women around the world including India suffer from depression and anxiety during pregnancy and postpartum period. So an average prevalence has been taken in this study to be approximately 22.5%(p)
Sample size=z^2*p*q/e^2
Where z=1.96 taking 95% confidence interval
p=0.225
q=1-p= 1-0.225=0.775
e=margin of error= =0.0835
hence sample size=n= 1.96*1.96*0.225*0.775/0.08*0.08= 105

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At the beginning of our study we were not sure that we would get respondents upto our sample size, but to our surprise we got overwhelming response. About 250 respondents participated in our study during this study period which included outbreak, peak and plateau phase of first wave of Covid 19.Hence we have included a surplus of sample size to study the varied changes in health related behavior during different phases of first wave of Covid 19.

Inclusion Criteria
1. All pregnant women coming to outpatients department for antenatal checkup at RIMS.
2. All pregnant women coming to labor room for safe confinement

Exclusion Criteria
1. Patients with obstetrical emergencies like obstructed labor, eclampsia, rupture uterus, antepartum or postpartum hemorrhage, rupture uterus requiring immediate management.

2. Patients who did not provide consent for this study.

Participants were handed a questionnaire mentioning age, education, monthly household income status, pre-pregnancy body mass index(BMI), gestational age ,gravidity, parity and pregnancy complications. Pandemic specific questions like perception of likelihood of infection, knowledge about COVID-19,knowledge about maternal and child protection, health related behavior changes like preventive behavior changes like preventive behaviors, prenatal check-up behaviors and help seeking behavior. The Generalized Anxiety Disorder Scale (GAD-7) used to measure anxiety symptoms of pregnant women. Each item is scored from 0 to 3, with a total score of 0-21 points. The cut off for mild, moderate and severe anxiety were 5, 10 and 15 respectively [12]. Edinburg Postnatal Depression Scale (EPDS)[13] was used to measure antenatal depressive symptoms of pregnant women. It consists of 10 items, with a total score of 0-30.

Results

A total of 250 questionnaires were collected who met the inclusion and exclusion criteria.

1. Characteristics of pregnant women

Characteristics	Frequency	Percentage
1.education		
a.illiterate	70	28%
b.primary school	80	32%
c.intermediate	60	24%
d.graduate and above	30	12%
2.occupation		
a.housewife	200	80%
b.government	5	2%
c.private	25	10%
d.business	20	8%
3.religion		
a.hindu	100	40%
b.muslim	40	16%
c.christian	100	40%
d.others	10	4%
4.residence		
a.urban	160	64%
b.rural	90	36%
5.ethnicity		
a.tribal	160	64%
b.non tribal	90	36%
6.income before pandemic		
<5000/mth	100	40%
5000-10000/mth	80	32%
10000-15000/mth	40	16%
>15000/mth	30	12%
7.income during pandemic		
a.no income	120	48%
b.<5000/mth	40	16%
c.5000-10000/mth	60	24%
d.10000-15000/mth	20	8%
e.>15000/mth	10	4%
8.gestational age		
a.1st trimester	30	12%
b.2nd trimester	50	20%
c.3rd trimester	170	68%
9.gravidity history		
a.primi	160	64%
b.>2	90	36%
10.parity		
a.primiparous	160	64%
b.multiparous	90	36%
11.pregnancy complications		
a.present	70	28%
b.absent	180	72%

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Most participants were educated upto primary school. Most of them were housewives, mostly either hindu or muslim, residing in urban location and tribals. Most patients were primigravida and turned up only in third trimester .Pregnancy complications like heart disease, GDM, jaundice, PIH were present in 28% of participants. 48% participants had no family income during pandemic.

2. Health related behavior changes of pregnant women during pandemic

Behavior	Number	Percentage
1.wearing mask outside home		
a.yes	230	92%
b.no	20	8%
2.social distancing from people with cough/cold		
a.yes	200	80%
b.no	50	20%
3.frequent hand washing		
a.yes	180	72%
b.no	70	28%
4.average daily handwashing with soap/sanitizer use		
a.before pandemic outbreak	50	20%
b. after pandemic outbreak	180	72%
5.antenatal checkup		
a.regular/on time	50	20%
b.irregular/not on time	200	80%
6.help seeking behavior during panic/anxiety		
a.health care worker	20	8%
b.family	50	20%
c.social media	30	12%
d.psychologist	0	0%
e.none	150	60%

92% women wore masks, 80% practiced social distancing, 72% practiced frequent handwashing, 72% practiced frequent handwashing during pandemic, 80% had no regular antenatal checkup, most participants had no go to person in situation of anxiety.

3. Psychological status of pregnant women

Items	Frequency	Percentage
1.anxiety		
a.mild	80	32%
b.moderate	80	32%
c.severe	10	4%
d.none	80	32%
2.depression		
a.mild	60	24%
b.moderate	85	34%
c.severe	5	2%
d.none	100	40%
3.stress		
a.mild	70	28%
b.moderate	100	40%
c.severe	30	12%
d.none	50	20%

Almost 64% participants showed mild to moderate anxiety, 34% had moderate depression and 40 % had moderate stress.4% had severe anxiety, 2% had severe depression and 12% had severe stress.

4. Association between patient characteristic variable, behaviour characteristics and psychological status

Patient characteristics	Anxiety	Depression	Stress
1.education			
a.illiterate	5%	10%	15%
b.primary school	10%	15%	20%
c.intermediate	10%	30%	45%
d.graduate and above	80%	60%	90%
2.religion			
a.hindu	55%	30%	35%
b.muslim	25%	66%	45%
c.christian	35%	20%	25%
d.others	35%	35%	55%
3.residence			
a.urban	65%	80%	60%
b.rural	35%	20%	40%
4.ethnicity			
a.tribal	20%	30%	25%
b. non tribal	80%	70%	75%
5.occupation			

a.housewife	45%	70%	50%
b.government	60%	30%	70%
c.private	30%	45%	90%
d.business	35%	55%	80%
6.family income during pandemic			
a.no income	90%	70%	86%
b.<5000/mth	70%	60%	80%
c.5000-10000/mth	65%	65%	85%
d.10000-15000/mth	65%	55%	75%
e.15000/mth	65%	45%	75%
7.gestational age			
a.1st trimester	90%	90%	85%
b.2nd trimester	85%	75%	70%
c.3rd trimester	65%	85%	90%
8.gravidity			
a.primi	90%	95%	95%
b.>2	80%	85%	85%
9.pregnancy complications			
a.present	90%	95%	95%
b.absent	70%	65%	65%
10.help seeking behavior			
a.health care worker	20%	10%	10%
b.family	85%	85%	90%
c.friend	65%	70%	75%
d.social media	35%	30%	25%
e.psychologist	0		
11.prenatal check up			
a.none	85%	60%	80%
b.irregular	80%	65%	85%
c.regular	30%	90%	95%
12.perception about covid 19			
a.yes	85%	85%	90%
b.no	40%	30%	20%
13.perception about maternal and child care during pandemic			
a.yes	85%	90%	95%
b.no	25%	35%	30%

Participants who were graduates had maximum anxiety, depression and stress. Hindu partici pants had maximum anxiety, muslim participants had maximum depression. Urban andnon tribals population were more anxious, depressed and stressed. Anxiety was maximum in government employees, depression in housewives, stress in private job participants. Anxiety, depression and stress was inversely proportional to monthly family income. Primigravida, participants from first trimester and those with pregnancy related complications had maximum anxiety, depression and stress. Most women preferred to seek help from family when distressed. Those who had perception about Covid19, maternal and child care were more anxious, depressed and stressed. Women who had regular ANC and frequent visits to health facility were most anxious, depressed and stressed.

5. Correlation of behavior change with GAD7 AND EPDS scores

scale	Wearing mask	Frequent handwashing/sanitizer use	Social distancing	Stressful behavior	Confined to home	Frequent bathing
a.GAD7						
1.<5	90%	65%	68%	30%	20%	55%
2.5-10	85%	70%	85%	65%	55%	50%
3.10-15	35%	88%	88%	75%	65%	70%
4.>15	25%	90%	90%	88%	85%	70%
b.EPDS						
1.<10	88%	80%	75%	40%	35%	45%
2.10-20	60%	65%	75%	60%	70%	65%
3.20-30	80%	85%	80%	88%	75%	65%
4.>30	70%	88%	85%	90%	80%	85%

Usage of mask was inversely related to GAD7 scores, but had no correlation with EPDS scores. Rest parameters like frequent handwashing, social distancing, stressful behavior, not going out and frequent handwashing were directly related to GAD 7 and EPDS score.

Discussion

The current study was conducted during first wave of Covid 19 Pandemic when awareness of preventive strategies against this new pandemic were in its grass root level. Studies in respiratory epidemics like Severe acute respiratory syndrome(SARS) and middle east respiratory epidemics (MERS) have found that pregnancy was associated with adverse feto-maternal complications[14-15].

As per study by Lau JTF et al respondents were found wearing face mask in public venues (73.8%), increasing the frequency of handwashing (86.7%)) and behaviors that protect others (e.g., wearing face masks when experiencing influenza-like illness (ILI, 92.4%), immediately seeking medical consultation (94.2%)[16]. In our study where 92% women wore masks, 80% practiced social distancing, 72% practiced frequent handwashing at the outbreak of

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pandemic.[table2]. This changed behavior of respondents could be attributed to the country wide awareness program by government and private bodies.

In a study by Mo PK et al emotional representations were associated with lower likelihood of wearing face mask and hand washing[17]. Respondents of our study who were graduates had maximum anxiety (80%), depression (60%) and stress(90%)[table *4*] Respondents with higher level of education and working professionals were more depressed, anxious , stressed and reported always wearing mask, frequently washed hand, maintained social distancing,

In a study by Qian M et al the prevalence rates of moderate or severe anxiety were 32.7% among Wuhan participants and 20.4% among Shanghai participants .This was somewhat in accordance with the results of our study where 32% respondents had moderate and 4% severe anxiety][18].

In a study by Ying Zhao et al[19] positive association was found between low education level and depression which was not in accordance where negative association was found between level of education and depression as respondents might be more active in seeking for information about Covid19 and adopt preventive measures.

 As per study by Tao SY et al[20] urban area, high level of education level, high level of knowledge about diseases, female gender and older age were protective factors for good hand hygiene; of these, area was found to be associated most strongly with handwashing behavior. This is somewhat in accordance with our study.

Primigravida, respondents from first trimester and those with pregnancy related complications had maximum anxiety, depression and stress[table4]. Multigravida (even with pregnancy complications) had less anxiety, depression and stress. This present study shows that old age and higher parity was associated with lower risk of depression and anxiety which is in contrast to other studies, but lower frequency of wearing face mask.

Hindu participants had maximum anxiety (55%), Muslim participants had maximum depression (66%). Urban and non tribal population were more anxious, depressed and stressed. Among demographic factors, urban respondents, mostly non tribal faced strict lockdown, knew someone or the other being Covid 19 positive, hospitalized or being quarantined. All these cumulative factors increased their stress, depression and anxiety levels. This is well proven in study by Raj kumar RP[21] where cumulative factors proved to be a substantial addon to their perceived susceptibility to infection which was detrimental to the mental health.

We found this correlation in our study where respondents who had perception about severity of Covid 19, maternal and child care perception during pandemic and had frequent visits to health care facility for regular ANC, used preventive methods like wearing of mask.

Respondents of our study who had perception of the pandemic were more anxious, depressed and stressed(Table4). Respondents who were optimistic about arrival of vaccine or curative medicines had lower levels of anxiety. This was in accordance to previous studies on epidemics which perceived the disease would cause permanent bodily damage or had high fatality were significantly associated with severe mental stress.

In a study by Joseph TF Lau et al[22] perceptions related to bodily damages, efficacy of frequent handwashing, non-availability of effective vaccines, high chance of having a large scale local outbreak caused increased mental distress and hence was associated with frequent handwashing. As per study by Herbell K et al[23] stress in pregnancy is an exceedingly common issue that impacts the mother's mental health and the health of her baby. Yet, women with a supportive network of friends and family may experience lower stress and improved mental health which is in accordance with our study. Social support has a positive impact on mental health of every individual, including pregnant women. Those respondents who had better social support had better acceptance of mask usage, frequent handwashing and social distancing. Those who had little or no social support or had no go to person in times of anxiety faced more stressful situations.(Table4).

Usage of mask was inversely related to GAD7 scores, but had no correlation with EPDS scores. Rest parameters like frequent handwashing, social distancing, stressful behavior, not going out and frequent handwashing were directly related to GAD 7 and EPDS scores, which could be attributed to severity of preventive behavior with anxiety, depression and stress levels.

Limitations
There were several limitations in our study. Lot of mental health problems could be due to past medical history, personal history and family history which were not taken into account. Secondly, this was a cross sectional study taking into study population, those respondents who gave consent and met the inclusion criteria during the span of study period .Lastly confounding factors could not be adjusted in our study, since relationship between patient characteristic variables and psychological parameters was difficult to determine.

Conclusions
The present study revealed behavior related changes in pregnant women during first wave of Covid 19 pandemic. Mental health and preventive behavior of respondents could be attributed to socio demographic, social, situational, economic status, family conditions and perception of severity of Covid19. Steps should be taken to promote preventive behaviors, to increase social support and to educate pregnant ladies about the risks and after effects of Covid19.Also administration has to be careful while imposing strict countrywide lockdown rules as it leads to detrimental effects on mental health of pregnant women.

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Conflict of Interest: Nil   Source of support: Nil