

ORIGINAL ARTICLE

Nazareth and Yezre'el Valley College (NYVC) study: Predictors of Stress, Anxiety and Depression among Pregnant Women During the First Wave of the COVID-19 Pandemic in Israel: original research

Doctor Jimmy E. Jadaon* MD- Nazareth Hospital and The Azrieli Faculty of Medicine, Israel.

Ms. Ola Ali-Saleh RN, PhD*- Max Stern Academic College of Emek Yezreel, Israel.

Ms. Ofra Halperin RN, CM, PhD- Max Stern Academic College of Emek Yezreel, Israel.

Doctor Jawad Karram MD- Nazareth Hospital, Israel.

Doctor Izhar Ben Shlomo MD- Zefat Academic College, Israel.

Doctor Liora Ore MD, MPH- Max Stern Academic College of Emek Yezreel, Israel.

*Contributed equally

Affiliations:

[The Azrieli Faculty of Medicine](#), Israel.

Max Stern Academic College of Emek Yezreel, Israel.

Zefat Academic College, Israel.

Nazareth Hospital.

Correspondence:

Doctor Jawad Karram, M.D- Nazareth Hospital, Israel.

Email: karramjawad28@gmail.com . ORCID 0000-0001-6126-0330.

Phone number: 00972- 507868698.

Fax number: 00972-46028856.

Emotional stressor among Pregnant Women during the COVID-19 Pandemic

Abstract:

Background: The new COVID-19 pandemic resulted in tremendous challenges to mankind in health, emotions and economy. A specifically vulnerable group are pregnant and postpartum women. We conducted a study that aimed to shed light on the effects of this pandemic on emotional state of pregnant and postpartum women.

Objective and Study Design: A cross-sectional study in northern Israel based on web questionnaire for the assessment of general stress, anxiety and depression during the quarantine period of COVID-19 pandemics from April 20th till May 7th. Participants were pregnant women and women up to a year after childbirth. Overall, 356 women of whom 251 pregnant and 101 post-partum filled the questionnaire.

Results: Among 251 pregnant women, 199 (79.3 %) reported moderate-high stress, 145 (57.8 %) high anxiety. A hundred and three (41.0%) reported high level of depression (PH2>3). Among pregnant women the following were the most prevalent stressors: fear that someone in their family will acquire the virus (80.1%), concern for the health of the baby (77.7%), fear that someone close will die from COVID-19 (72.9%) and worry of being infected within the hospital (71.7%). A univariate analysis of stress revealed that age ($\chi^2=10.93$, $p<.004$) and income level ($\chi^2=13.35$, $p<.001$) were associated with the level of stress. Stepwise logistic regression revealed that both age and income level below the mean were predictors of stress. Among the 165 multiparous pregnant women, age (25-34 vs. 35-44) was a predictor of stress ($p<.04$).

Conclusion: Our study clearly showed an enormous negative effect of the COVID-19 pandemic on emotional condition including stress, anxiety and depression on both pregnant and postpartum women. This provides an insight on the relation between economy and emotional state during uncertainty period. This effect adds a huge challenge to healthcare system and social support providers as well as the governments in providing means and solutions during pandemics and worldwide disaster.

Keywords: ANXIETY, COVID-19, DEPRESSION, DISASTER, PANDEMIC, POSTPARTUM, PREGNANT, STRESS

64 **Introduction**

65
66 COVID-19 was recognized initially on December 2019 in Wuhan, China. It has spread rapidly to most
67 countries worldwide and consequently by the world health organization (WHO) as public health
68 emergency international concern¹ and later as pandemic².

69 Pregnancy is always followed by fears and concerns, mostly regarding the welfare of the offspring. Not
70 surprisingly, during and after natural disasters and pandemics pregnant women are at increased risk of
71 psychological and mental disorders including higher levels of anxiety and depression³⁻⁶. Moreover, a
72 negative cognitive and neurological development was observed in children in whose mothers were
73 exposed to a natural disasters during pregnancy^{7,8}. The effect of COVID-19 on pregnancies and their
74 outcome is gradually being unraveled. Recent studies from Canada and turkey, reported an alarmingly
75 elevated levels of psychological distress, especially anxiety and depression, among pregnant
76 individuals^{9,10}. In addition to negative psychological effect during and after natural disasters, pregnant
77 women are at increased risk for developing pre-eclampsia, preterm labor, rupture of membranes,
78 spontaneous abortions, and intrauterine growth restriction^{3,7,11,12}. These complications need close follow
79 up and hospitalization.

80 In general, pregnant women are vulnerable to infectious diseases like Influenza-A, MERS-CoV, Sars-
81 CoV, and Ebola. Serious complications of pregnancy were reported with these infections, including
82 increased maternal mortality and morbidity, intrauterine fetal death (IUFD), spontaneous abortions, and
83 preterm deliveries¹³. Compared to theses, COVID-19 outcomes for the mother appear more promising,
84 as no maternal mortality was reported and most infected women develop mild respiratory symptoms¹⁴.
85 Fetal complications of COVID-19 infection include miscarriage (2%), intrauterine growth restriction
86 (IUGR; 10%), and preterm birth (39%), but no confirmed cases of vertical transmission were reported.
87 Naturally, no data is yet available on perinatal outcomes when the infection was acquired early in

88 pregnancy¹⁴.

89 A significant factor in the adequacy of medical follow up during pregnancy is the fear of women from
90 any contact with hospitals or medical staff, due to understandable concern regarding acquiring the
91 infection, which has so many unknowns regarding its consequences. In China this was formally
92 evaluated and reported¹⁵. This fear was prominent during labor and breastfeeding especially with the
93 need for social isolation, which influenced the emotional support given by the staff¹⁶.
94 In the study presented herein we aimed to evaluate by web-based questionnaires the emotional status
95 and predictors of stress, anxiety and depression among pregnant women who gave birth during the
96 pandemic in Israel, compared to those who had their recent baby during the year before.

97

98 **Methods**

99 A cross-sectional study in which pregnant women and women up to a year after childbirth (hereafter
100 referred to as post-partum), residents of northern Israel, Jewish and Arab, were asked through social
101 networks to fill in an online questionnaire during the COVID-19 epidemic. The questionnaire reached
102 422 women who were asked to participate, overall 356 women, 251 pregnant and 101 post-partum
103 responded. The questionnaire included an assessment of general stress, anxiety and depression, stress
104 specific to COVID-19, and other obstetric and demographic variables of the study population. The
105 reliability of each part of the questionnaire was tested separately using Cronbach's alpha test.
106 The data collection was completed during the general quarantine period, (April 20 to May 7, 2020).

107 **Sample size considerations:**

108 A sample size of 193 is needed to be within 7% of the true rate of stress among pregnant women during
109 the pandemic, assuming a 50% rate of stress. The number for anxiety evaluation within 7% of the true
110 rate of stress should be 189, assuming an anxiety rate of 57%. The sample size for the evaluation of

111 depression had to be 180, assuming a 37% rate of depression. Allowing for 15% rate of inconsistent or
112 missing data the total sample size had to be 222. According to Peduzzi, a sample size of 222 will allow
113 the use of 8 predictors of depression, assuming rate of depression is 37%.

114 **Ethics:** This study was conducted in accordance with the Helsinki Declaration and approved by the
115 Institutional Review Board of the Nazareth Hospital (reference number: MD739), in addition to the
116 Ethics Committee of the Yezreel Valley College (reference number: 91-2020 YVC EMEK). On the first
117 page of the questionnaire, electronic informed consent was obtained from each participant before
118 beginning the questionnaire.

119 **Stress Assessment:** PSS-10 - Perceived Stress Scale ¹⁷, a questionnaire that examines the extent to
120 which an individual assesses life stresses and refers to perceptions and emotions related to the overall
121 stress level recently. Likert scale from 0 = never to 4 = Often, the questionnaire included 10 items. A
122 score of 14-26 indicates moderate stress level, and higher scores indicated high stress level.

123 **Anxiety questionnaire:** A Generalized Anxiety Disorder 7-item questionnaire (GAD -7) ¹⁸ was used to
124 assess subjective anxiety symptoms over the past month. The answers to the questions are given on a 4-
125 point Likert scale from 0 = not at all to 3 = almost every day. A score of 0-4 indicated minimal, 5-9
126 mild, 10-14 moderate, and >15, severe anxiety. At the end of the questionnaire, the women were asked
127 to rate the degree of difficulty that their anxiety caused them at work, at home or in contact with other
128 people on a 4-point Likert scale, from 1= not causing any difficulty to 4 = caused the highest level of
129 difficulty.

130 **Depression Questionnaire:** The 2-PHQ questionnaire ¹⁹ was used, of which at least one positive item is
131 required to diagnose major depressive disorder (MDD) for any depressive disorder according to DSM-
132 IV. PHQ-2 scores can range from 0 to 6, and a cut-off point ≥ 3 indicates significant clinical depression.

133 **COVID-19-related stress perception:** The questionnaire was composed by us for this study. Six
134 statements reflecting the degree of concern, such as "I fear someone in my family will acquire COVID-
135 19" or "I'm afraid of acquiring COVID-19 in a hospital during labor". The answers were given on a 5-
136 point Likert scale from 1 = totally disagree and up to 5 = strongly agree. The sum of all answers was
137 considered to indicate the level of stress specific to the pandemic. The higher the score, the higher the
138 perception of related stress from Covid-19.

139 **Statistics:** Demographic and study measures of pregnant women were compared to post-partum women,
140 using χ^2 test and t-test as applicable. Differences in demographic and study measures between high and
141 low risk pregnancies were similarly compared. Stress, anxiety and depression were dichotomized into
142 high and low levels with high stress defined as PSS>13, high anxiety as GAD>9 and high depression as
143 PH2>3. Stepwise logistic regression was performed to identify which COVID-19-related stressors and
144 worries predicted high stress, anxiety, and depression. In the first step the significant univariate
145 demographic variables were tested and in the second step the significant stressors were added to the
146 model. All analyses were performed using IBM SPSS Statistics for Windows, Version 21.0. Statistical
147 significance was considered when $p<0.05$.

149 **Results**

150 Of the 352 women included in this study, 251 were pregnant women and 101 post-partum. The
151 demographics of pregnant women did not differ from that of their post-partum counterparts, except that
152 a significantly higher percentage of pregnant women worked remotely during the pandemic, compared
153 to their post-partum counterparts (37.1 vs. 19.8%, $\chi^2=9.80$, $p<.002$).

154
155 **Table 1: Demographic and health data, by study group (n=352).**

156

157 Among 251 pregnant women, 41 (16.9 %) reported high stress and 56 (22.3%) high anxiety (**Table 2**).

158 A hundred and three (41.0%) reported high level of depression ($PH2 > 3$). No differences in stress,

159 anxiety, depression and stress from COVID-19 was found between pregnant and post-partum women.

160

161 **Table 2: Comparison of stress, anxiety, depression and stress from Corona between pregnant**

162 **women and women up to a year after childbirth (N=352).**

163

164 The most prevalent stressors attributable to COVID-19 among the pregnant women were fear that

165 someone in their family will acquire the virus (80.1%), concern for the health of the baby (77.7%), fear

166 that someone close will die from COVID-19 (72.9%) and worry of being infected within the hospital

167 (71.7%) (**Table 3**).

168

169 **Table 3. Stress from COVID-19 among pregnant women - Absolute numbers and percentage**

170 **(N=251).**

171

172 **Predictors of Stress among pregnant women**

173 A univariate analysis of stress revealed that age ($\chi^2=10.93$, $p<.004$) and income level ($\chi^2=13.35$, $p<.001$)

174 were associated with the level of *stress*. A lower percentage of women aged 25-34 had high stress as

175 compared to women aged 35-44 (OR: 0.25, 95% CI: 0.07-0.86). A higher percentage of women with

176 family income level below the mean had high stress as compared to women with family income level at

177 or above the mean (OR: 3.31, 95% CI: 1.71-6.41). Remote work of the husband/partner was associated

178 with stress ($\chi^2=4.47$, $p<.04$), with more than twice the stress found in women whose husband/partner did

179 not work remotely. Worry about being alone in the hospital and or/at home ($\chi^2=22.80$, $p<.001$), fear of

180 acquiring infection within the hospital ($\chi^2=8.22$, $p<.004$) and concern about the health of the baby
181 ($\chi^2=4.08$, $p<.04$) were also associated with high level of stress. In addition, general fear of acquiring
182 COVID-19 ($\chi^2=6.39$, $p<.01$) was also associated with high level of stress.
183 Multivariate stepwise logistic regression analysis revealed that only fear of being alone in the hospital
184 and or/at home was a predictor of stress (**Table 4**).

185

186 **Table 4: Stepwise logistic model of high levels of stress among pregnant women, with significant**
187 **univariate demographic predictors in the first step (n=251).**

188

189 Among the 165 multiparous pregnant women, who answered the question regarding children at home,
190 age (25-34 vs. 35-44) was a predictor of stress ($p<.04$). In the second step, after controlling for age, fear
191 of being alone in the hospital or at home and having kids at home were predictors of stress. Both these
192 predictors increased the odds of stress more than 5-fold.

193

194 **Predictors of Anxiety among pregnant women**

195 Analysis of anxiety showed that religion ($\chi^2=10.62$, $p<.005$), education ($\chi^2=6.74$, $p<.009$) and income
196 level ($\chi^2=13.35$, $p<.001$) were univariate variables associated with anxiety. Higher percentage of Muslim
197 pregnant women reported a high level of anxiety as compared to their Christian counterparts (OR: 2.59,
198 95% CI: 1.43-4.70). In addition, a higher percentage of pregnant women without academic education
199 reported a high level of anxiety as compared to the women holding academic degrees (OR: 2.45, 95%
200 CI: 1.23-4.89). A higher percentage of women with family income level below the mean experienced
201 high anxiety as compared to women with family income level at or above the mean (OR: 2.00, 95% CI:
202 1.20-3.33). The work-related variables (working remotely, on unpaid leave) were not associated with

anxiety. Worried about being alone in the hospital or at home ($\chi^2=33.72$, $p<.001$), afraid of being infected within the hospital ($\chi^2=18.15$, $p<.001$), afraid to breastfeed ($\chi^2=20.18$, $p<.001$) and concern for the health of the baby ($\chi^2=16.79$, $p<.001$) were all stressors associated with anxiety. Responses to all 6 COVID-19-related stress questions were also associated with anxiety (fear of acquiring COVID-19: $\chi^2=30.48$, $p<.001$, perceived increased risk of acquiring COVID-19: $\chi^2=5.71$, $p<.02$, a relative acquiring COVID-19: $\chi^2=19.74$, $p<.001$, a relative die from COVID-19: $\chi^2=8.74$, $p<.003$, financial worries: $\chi^2=19.97$, $p<.001$, children at home: $\chi^2=8.96$, $p<.003$). However, support from family, friends and medical staff was not associated with anxiety.

Multivariate stepwise logistic regression analysis revealed that religion and income level below the mean were predictors of anxiety (Table 5). There were no 2-way interactions between religion and income level or academic education and income level. The fears of acquiring COVID-19 and being alone in the hospital or at home after delivery each increased the odds of having a high level of anxiety 4-fold as compared to women without these fears. Financial worries increased the odds of having a high level of anxiety 3-fold as compared to women without these worries.

217

Table 5: Stepwise logistic model of high levels of anxiety among pregnant women, with significant univariate demographic predictors in the first step (n=251).

220

Among the 172 multiparous pregnant women who had children, education level was the only significant demographic predictor of anxiety. In the second step, after controlling for education level, fear of acquiring COVID-19, fear of being alone in the hospital and having children at home were the only stressors that predicted of anxiety. Financial worries variable was no longer a predictor.

225

226 **Predictors of depression among pregnant women**

227 Religion, religiosity and high-risk pregnancy were univariate variables associated with depression. A
228 higher percentage of Muslim pregnant women reported a high level of depression as compared to their
229 Christian counterparts ($\chi^2=12.71$, $p<.001$). In addition, a higher percentage of religious pregnant women
230 reported depression as compared to secular women ($\chi^2=5.22$, $p<.02$). A higher percentage of women
231 with high-risk pregnancy reported depression as compared to women with normal risk pregnancies
232 ($\chi^2=4.56$, $p<.03$). Interestingly, after adjusting for religion and religiosity, high-risk pregnancy was no
233 longer associated with depression ($\chi^2=1.99$, $p>.16$).

234 Worried about being alone in the hospital or at home ($\chi^2=17.43$, $p<.001$), afraid of being infected in the
235 hospital ($\chi^2=5.37$, $p<.02$), afraid to breastfeed ($\chi^2=17.13$, $p<.001$) and concern for the health of the baby
236 ($\chi^2=7.67$, $p<.006$) were all stressors associated with depression. With the exception of fear of a death of
237 a relative, all responses to the COVID-19 stress questions were also associated with depression (fear of
238 acquiring COVID-19: $\chi^2=13.23$, $p<.001$, perceived increased risk: $\chi^2=4.31$, $p<.04$, a relative acquiring
239 COVID-19: $\chi^2=11.42$, $p<.001$, a relative dying of COVID-19: $\chi^2=8.74$, $p<.003$, financial worries:
240 $\chi^2=17.01$, $p<.001$, children at home: $\chi^2=13.19$, $p<.001$). However, support from family, friends and
241 medical staff was not associated with depression.

242 As shown in Table 6, multivariate stepwise logistic regression analysis showed that religion was the
243 only significant predictor of depression.

244 After correcting for religion, fear of acquiring COVID-19, financial worries and fear of being alone in
245 the hospital were the only predictors of depression with odd ratio of 2.3, 2.8 and 2.6 respectively (Table
246 6).

247

248 **Table 6: Stepwise logistic model of high levels of depression among pregnant women, with**
249 **significant univariate demographic predictors in the first step (n=251).**

250

251 Among the 172 multiparous pregnant women, religion was the only significant demographic predictor of
252 depression.

253 After correcting for religion, fear of acquiring the infection, financial worries and fear of being alone in
254 the hospital and children at home were the only significant predictors of depression.

255

256 **Structured Discussion:**

257

258 **Principal Findings:** We found that most pregnant women reported high stress, anxiety and depression
259 during the COVID-19 pandemic due to a variety of factors The leading factors were fear that someone
260 in their family will acquire the virus, concern for the health of the baby, fear that someone close will die
261 from COVID-19. Age and income level below the mean were also predictors of stress.

262 **Results:** During a large-scale disaster or a deep change of life, emotional responses are overwhelming.
263 In some aspects, depression, anxiety and stress may overlap. However, these are separate entities, which
264 demand adjusted interventions if corrective measures are considered. In the light of this view, it is of
265 prime importance to define the main factors that act in inducing any of these three emotional states.

266 Overall, the group of women who responded to our questionnaire had higher level of education than the
267 Israeli average (80% vs. 60%)²⁰. This overwhelming presence of people of this higher tier of education
268 should be considered when viewing the results. Interestingly, lower education was a predictor only for
269 higher anxiety, but not for stress or depression. This suggests that depression and stress affect equally
270 academically educated and less educated women.

271 Somewhat surprising is the fact that the systems usually serving to reduce the three emotional states, i.e.
272 family, social and medical/social workers' support, did not seem to affect their prevalence in the studied
273 population, neither were they predictive of the occurrence of any of the three emotional states. These
274 unexpected results may be partially explained by the enforced distancing from extended family members
275 and friends, as well as the inevitable estrangement created by the mask-covered faces with gloved hands
276 that one encounters upon reaching for medical support. This becomes even more pronounced when one
277 factor in the understandable stressful and worried manners of medical team members, being themselves
278 under the risk of acquiring the infection.

279 In the northern part of the country during the first wave of the pandemic, very few cases were recorded
280 and the chances of acquiring the virus for an average northern district Israeli citizen were exceptionally
281 low. Yet, financial condition or concern about the future of the financial condition were important
282 predictors of all three emotional states, emphasizing the central importance of economy aspects during
283 the current pandemic, which left the country with about 20% unemployment rate. It is worth noting in
284 this regard that the north of Israel is considered as a periphery, which historically had been hit
285 economically worse than the central regions of the country during crisis times. Admittedly, at those
286 initial stages of the outbreak, both information about COVID-19 and pregnancy and focused information
287 and education by the authorities were fragmentary. This in turn put pregnant women under tremendous
288 level of uncertainty, which could serve to increase any aspect of negative emotional response. Of all
289 these, anxiety, by its nature, is the one which is most affected by uncertainty ^{21,22}. Indeed, we found that
290 financial worries, fear of acquiring the virus and fear of being trapped alone in the hospital, all reflecting
291 uncertainty, were the most prominent predictors of anxiety. Interestingly, religious denomination was
292 also a predictor of anxiety, Muslims at the highest level, followed by Jews and Christians. Contrary to
293 this, depression was more prevalent among Christians, followed by Muslims and Jews. This last

294 observation might be explained by the fact that among the Israeli Arabs, Christians are a minority within
295 a minority, which might affect their overall response to crises. We could not think of any alternative
296 explanation. Previous studies indeed described higher levels of depression among Arab women as
297 compared to Jews²³⁻²⁵ and crisis may strengthen this tendency.

298 The other element, being a predictor of all three conditions is fear of remaining alone. This may reflect
299 both adequate response to a reality which left relatives separated due to mere chance, and a reflection of
300 Middle Eastern cultural tendency to view oneself as just a unite of the larger entity of the whole family.
301 This might hold true especially for women.

302 **Clinical Implications:** In future crises, like the current one, all attention should be given first to a
303 coherent flow of information from authorities to the public and then to a conscious effort to overcome
304 the "mask barrier", which alienates patients and serve to put them under stress.

305 **Research Implications:** Looking to the future, one must draw practical guidelines for future major
306 crisis situations, which according to some authorities are imminent. The points to be considered are:

- 307 1. Educations of medical and allied professions regarding the central issues, concerning pregnant
308 women during crisis. Among these should be alleviation of uncertainty by the provision of
309 maximum information; addressing individual concerns regarding the economic effects of the
310 situation; advocating regarding the need for family adaptation to address the situation.
- 311 2. Drawing the required response by the network of social workers and community nurses
312 following declaration of crisis state.
- 313 3. Preparing scripts to address those parts of the population who have an inevitable event, such as
314 labor or major planned operation, to provide clear guidelines for behavior under the new crisis
315 situation.

316 Future studies that we can think of can touch on the level of patients' compliance with follow-up
317 schedule for pregnancy during the COVID-19 pandemic. An additional subject that may yield insight
318 can be the eating habits and weight gain/loss and their reflection in newborns' characteristics.

319 **Strengths and Limitations:** The main limitation of our study lies in its reliance on the web, which is a
320 powerful selecting force. This might be reflected in the fact that 80% of the respondents were
321 academically educated, who are naturally more familiar with the internet. The other limitation is the size
322 of the study, which is modest. However, considering the worries and schedules of the subjects, any level
323 of participation is customary.

324 **Conclusions:** Our study clearly showed an enormous negative effect of the COVID-19 pandemic on
325 emotional condition including stress, anxiety and depression on both pregnant and postpartum women.
326 This provides an insight on the relation between economy and emotional state during uncertainty period.
327 This effect adds a huge challenge to healthcare system and social support providers as well as the
328 governments in providing means and solutions during pandemics and worldwide disaster.

329

330 **Disclosure of interests:** All authors declare that they have no conflict of financial, personal, political,
331 intellectual or religious interests.

332

333 **:Contribution**

334 .Conceptualization: Jimmy Jadon, Ola Ali-saleh, Ofra Halperin, Jawad Karram, Liora Ore
335 .Methodology: Jimmy Jadon, Ola Ali-saleh, Jawad Karram, Liora Ore
336 .Validation: Jimmy Jadon, Ola Ali-saleh, Jawad Karram, Liora Ore
337 .Writing: Jimmy Jadon, Ola Ali-saleh, Liora Ore
338 .Supervision: Jimmy Jadon
339 .Preparation of the manuscript: Izhar Ben Shlomo
340 .Software: Ola Ali-saleh, Jawad Karram
341

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344
345 **Details of ethics approval:** This study was conducted in accordance with the Helsinki Declaration and
346 approved by the Institutional Review Board of the Nazareth Hospital (reference number: MD739), in
347 addition to the Ethics Committee of the Yezreel Valley College (reference number: 91-2020 YVC
348 EMEK).

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351 **Bibliography**

- 352 1. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China,
353 2019. *N Engl J Med*. 2020. doi:10.1056/NEJMoa2001017
- 354 2. Δομή Και Λειτουργία Του Ελληνικού Συστήματος Υγείας(Διοικητικές Και Νομικές Διαστάσεις)No
355 Title. [https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-](https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020)
356 [media-briefing-on-covid-19---11-march-2020](https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020).
- 357 3. A. A, A. C. The post-disaster negative health legacy: pregnancy outcomes in Louisiana after
358 Hurricane Andrew. *Disasters*. 2015;39(4):665-686. doi:10.1111/disa.12125 LK -
359 [http://findit.library.jhu.edu/resolve?](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
360 [sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
361 [disaster+negative+health+legacy](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
362 [%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disas-](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
363 [ters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
364 [A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=](http://findit.library.jhu.edu/resolve?sid=EMBASE&issn=14677717&id=doi:10.1111%2Fdisa.12125&atitle=The+post-disaster+negative+health+legacy%3A+pregnancy+outcomes+in+Louisiana+after+Hurricane+Andrew&stitle=Disasters&title=Disasters&volume=39&issue=4&spage=665&epage=686&aulast=Antipova&aufirst=Anzhelika&aunit=A.&aufull=Antipova+A.&coden=&isbn=&pages=665-686&date=2015&aunit1=A&aunitm=)
365 4. S.C. G, W.R. R, S.M. E, C.E. K, D.B. R, J.A. H. Hurricane Charley Exposure and Hazard of Preterm
366 Delivery, Florida 2004. *Matern Child Health J*. 2016.
- 367 5. Oni O, Harville E, Xiong X, Buekens P. Relationships among stress coping styles and pregnancy
368 complications among women exposed to hurricane katrina. *JOGNN - J Obstet Gynecol Neonatal*
369 *Nurs*. 2015. doi:10.1111/1552-6909.12560
- 370 6. Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: Implications for
371 mothers, children, research, and practice. *Curr Opin Psychiatry*. 2012.
372 doi:10.1097/YCO.0b013e3283503680
- 373 7. King S, Laplante DP. Using natural disasters to study prenatal maternal stress in humans. In:
374 *Advances in Neurobiology*. ; 2015. doi:10.1007/978-1-4939-1372-5_14
- 375 8. Kinney DK, Miller AM, Crowley DJ, Huang E, Gerber E. Autism prevalence following prenatal
376 exposure to hurricanes and tropical storms in Louisiana. *J Autism Dev Disord*. 2008. doi:10.1007/
377 s10803-007-0414-0
- 378 9. PsyArXiv Preprints | Elevated depression and anxiety among pregnant individuals during the
379 COVID-19 pandemic. <https://psyarxiv.com/gdhkt/>. Accessed June 13, 2020.
- 380 10. Durankuş F, Aksu E. Effects of the COVID-19 pandemic on anxiety and depressive symptoms in
381 pregnant women : a preliminary study. *J Matern Neonatal Med*. 2020;0(0):1-7.

doi:10.1080/14767058.2020.1763946

11. Zahran S, Breunig IM, Link BG, Snodgrass JG, Weiler S, Mielke HW. Maternal exposure to hurricane destruction and fetal mortality. *J Epidemiol Community Health*. 2014. doi:10.1136/jech-2014-203807
12. Zahran S, Peek L, Snodgrass JG, Weiler S, Hempel L. Abnormal labor outcomes as a function of maternal exposure to a catastrophic hurricane event during pregnancy. *Nat Hazards*. 2013. doi:10.1007/s11069-011-0065-5
13. Olgun NS. Viral Infections in Pregnancy: A Focus on Ebola Virus. *Curr Pharm Des*. 2018. doi:10.2174/1381612824666180130121946
14. Dashraath P, Wong JL, Lim MXK, et al. Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *Am J Obstet Gynecol*. 2020;222(6):521-531. doi:10.1016/j.ajog.2020.03.021
15. Rashidi Fakari F, Simbar M. Coronavirus Pandemic and Worries during Pregnancy; a Letter to Editor. *Arch Acad Emerg Med*. 2020;8(1):e21.
16. O'Connell M, Crowther S, Ravaldi C, Homer C. Midwives in a pandemic: A call for solidarity and compassion. *Women and Birth*. 2020. doi:10.1016/j.wombi.2020.03.008
17. Spacapan S, Oskamp S, Cohen S, Williamson A. Perceived stress in a probability sample of the United States BT - The social psychology of health: Claremont Symposium on applied social psychology. In: *The Social Psychology of Health*. ; 1988.
18. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med*. 2006. doi:10.1001/archinte.166.10.1092
19. Kroenke K, Spitzer RL, Williams JBW. The Patient Health Questionnaire-2. *Med Care*. 2003. doi:10.1097/01.mlr.0000093487.78664.3c
20. central bureau of statistics 2016. <https://www.cbs.gov.il/he/mediarelease/Pages/2020/2020-לקט-נתונים-לרגל-יום-האישה-הבין-לאומי.aspx>.
21. Logan S, Steel Z, Hunt C. Intercultural willingness to communicate within health services: Investigating anxiety, uncertainty, ethnocentrism and help seeking behaviour. *Int J Intercult Relations*. 2016. doi:10.1016/j.ijintrel.2016.07.007
22. Presbitero A, Attar H. Intercultural communication effectiveness, cultural intelligence and knowledge sharing: Extending anxiety-uncertainty management theory. *Int J Intercult Relations*. 2018. doi:10.1016/j.ijintrel.2018.08.004
23. Kaplan G, Glasser S, Murad H, et al. Depression among Arabs and Jews in Israel: A population-based study. *Soc Psychiatry Psychiatr Epidemiol*. 2010;45(10). doi:10.1007/s00127-009-0142-1
24. Shwartz N, Shoahm-Vardi I, Daoud N. Postpartum depression among Arab and Jewish women in Israel: Ethnic inequalities and risk factors. *Midwifery*. 2019;70. doi:10.1016/j.midw.2018.12.011
25. Glasser S, Tanous M, Shihab S, Goldman N, Ziv A, Kaplan G. Perinatal depressive symptoms among Arab women in Northern Israel. *Matern Child Health J*. 2012;16(6). doi:10.1007/s10995-011-0845-2

426 **Table 1:**
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	Group						
	Pregnant women (N=251)		Up to a year after childbirth (N=101)		p value	Entire group (N=352)	
	N	%	N	%	p	N	%
Age					.12		
18-24	33	13.1	6	5.9		39	11.1
25-34	181	72.1	76	75.2		257	73.0
35-44	37	14.7	19	18.8		56	15.9
Religion					.49		
Jewish	53	21.1	25	24.8		78	22.2
Muslim	126	50.2	53	52.5		179	50.9
Christian	72	28.7	23	22.8		95	27.0
Religiosity					.52		
Secular/atheist	59	23.5	31	27.6		88	25.0
Traditional	103	41.0	43	38.5		139	39.5
Religious/ultra-orthodox	89	35.5	37	34.9		125	35.5
Marital status					.80		
Married	247	98.4	99	98.0		356	98.3
Unmarried	4	1.6	2	2.0		6	1.7
Number of children					---		
0=Nulliparous	84	33.5	0	0.0		84	23.9
1=Primiparous	81	32.3	43	43.0		124	35.3
2-6=Multiparous	86	34.3	57	57.0		143	40.8

Education					.32		
Non-academic	50	19.9	25	24.8		75	21.3
Academic	201	80.1	76	75.2		277	78.7
Partners education¹					.65		
Non academic	119	47.8	51	50.5		170	48.6
Academic	130	52.2	50	49.5		180	51.4
Employment					.24		
Housewife	43	17.1	11	10.9		54	15.3
Employee	168	66.9	69	68.3		237	67.3
Self employed	15	6.0	11	10.9		26	7.4
Other	25	10.0	10	9.9		35	9.9
Work outside the home					.52		
Yes	183	72.9	77	76.2		260	73.9
No	68	27.1	24	23.8		92	26.1
Work remotely during pandemic					.002		
Yes	93	37.1	20	19.8		113	32.1
No	158	62.9	81	80.2		239	67.9
Income level					.44		
A lot below average	53	21.1	18	17.8		71	20.2
Below the average	76	30.3	37	36.6		113	32.1
The average	73	29.1	23	22.8		96	27.3
Above the average	49	19.5	23	22.8		72	20.5
Residence					.34		
City	135	53.8	60	59.4		195	55.4
Other	116	46.2	41	40.6		157	44.6

Health status					.86		
Normal	240	95.6	97	96.0		337	95.7
Background diseases	11	4.3	4	4.0		15	4.3
Subjective health evaluation					.62		
Excellent	130	51.8	58	53.2		187	53.1
Very good	101	40.2	40	36.7		136	38.6
Good/not so good	20	8.0	11	10.1		29	8.2

¹ N=249 in pregnant women group

² N=246 in pregnant women group

³ N=246 in pregnant women group, N=100 in the post group

⁴ N=241 in pregnant women group

Table 2:

Total women of the 2 groups (N=352)	p value	Up to a year after childbirth (N=101)	Pregnant women (N=251)	
Mean±SD		Mean±SD	Mean±SD	2.1 Continuous variables
19.8±7.2	.15	20.6±6.4	19.4±7.5	Stress-PSS
10.8±5.8	.71	11.1±5.3	10.8±5.8	Anxiety-GAD
2.95±1.78	.52	3.05±1.66	2.92±1.82	Depression-PH2
21.5±5.1	.08	21.0±5.0	21.8±5.0	Stress from Corona
3.58±1.30	.13	3.41±1.39	3.65±1.26	Fear get corona
2.89±1.47	.001	2.11±1.29	3.20±1.42	Increased perceived risk to acquire COVID-19
4.23±1.12	.66	4.19±1.16	4.25±1.10	Fear someone in

				family will acquire COVID-19
4.15±1.17	.29	4.26±1.11	4.11±1.19	Fear someone close to me will die from COVID-19
3.56±1.27	.14	3.72±1.24	3.50±1.30	I worry about my financial situation
2.88±1.48 (N=268)	.14	3.06±1.47	2.78±1.47 (N=172)	I feel busy because the kids are at home
N (%)		N (%)	N (%)	2.2. Categorical variables
	.45			Stress Level
67 (19.0)	.20	15 (14.9)	52 (20.7)	Low (0-13)
285 (81.0)		86 (85.1)	199 (79.3)	Moderate-High (>13)
	.46			Anxiety Level
142	.26	36 (35.6)	106 (42.2)	Minimal-low (0-9)
210		65 (64.4)	145 (57.8)	Moderate-high (>9)
	.52			Anxiety influence
66		20	66	None
125		58	125	Some
54		20	54	Moderate amount
6 (2.4)		3 (3.0)	6 (2.4)	A lot
	.93			Depression
217 (61.6)		59 (58.4)	148 (59.0)	Low (0-3)
135 (38.4)		42 (41.6)	103 (41.0)	High (4-6)

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Table 3:

Stress from Corona	Yes (4+5)	No (1,2,3)
	N (%)	N (%)
Fear of acquiring COVID-19	154 (61.4)	97 (38.6)
Perceived increased risk to acquire COVID-19	112 (44.6)	139 (55.4)
Fear someone in family will acquire COVID-19	201 (80.1)	50 (19.9)
Fear someone close to me will die from COVID-19	183 (72.9)	68 (27.1)
I worry about my financial situation	129 (51.4)	122 (48.6)
I feel busy because the kids are at home	62 (36.0)	110 (64.0)
Worried of being alone in hospital or at home after delivery	131 (56.2)	120 (43.8)
Afraid being infected within the hospital	180 (71.7%)	71 (28.3%)
Afraid to breastfeed for fear of infecting the baby	105 (41.8%)	146 (58.2%)
I am concerned for the health of the baby	195 (77.7%)	56 (22.3%)
Family work status		
Both work remotely during the pandemic	33 (13.1)	
One work remotely during the pandemic	90 (35.9)	
Neither works remotely during the pandemic	128 (51.0)	
Unpaid leave of one or both of the couple	98 (39.0)	153 (61.0)

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Table 4:

First step							Second step					
	β	SE	Wald	p	OR	95% CI	β	SE	Wald	p	OR	95% CI
<i>Age</i>			8.558	.01					6.67	.04		
18-24	-.294	.971	.092	.76	0.74	0.11-5.00	-.540	.992	0.30	.59	0.58	0.08-4.07
25-34	-1.573	.635	6.14	.01	0.21	0.06-0.72	-1.507	.646	5.44	.02	0.22	0.06-0.79
35-44	---	---	---	---	1.00	reference	---	---	---	---	1.00	reference
<i>Income level below mean</i>	1.171	.350	11.18	.001	3.22	1.62-6.40	.827	.382	4.70	.03	2.29	1.08-4.83
<i>Fear of being alone in the hospital/at home</i>							1.367	.374	13.34	.001	3.92	1.88-8.17
<i>Partners remote work</i>							---	---	1.05	.30	---	---
<i>Fear of contracting infection in the hospital</i>							---	---	0.80	.37	---	---
<i>Worry about health of baby</i>							---	---	0.02	.89	---	---
<i>Fear of contracting COVID-19</i>							---	---	0.49	.48	---	---

Table 5:

First step							Second step					
	β	SE	Wald	p	OR	95% CI	β	SE	Wald	p	OR	95% CI
<i>Religion</i>			8.18	.02					11.28	.00		

Jewish	---	---			1.00	reference	---	---			1.00	reference
Muslim	.461	.344	1.80	.18	1.59	0.81-3.11	.511	.404	1.60	.21	1.67	0.76-3.68
Christian	-.414	.369	1.26	.26	0.66	0.32-1.36	-.715	.429	2.78	.10	0.49	0.21-1.13
<i>Income level below mean</i>	.589	.269	4.80	.03	1.80	1.06-3.05	-.080	.324	0.06	.81	0.92	0.49-1.74
<i>Nonacademic education</i>	.677	.369	3.37	.07	1.97	0.96-4.06	---	---	---	---	---	---
<i>Fear of contracting COVID-19</i>							1.408	.318	19.56	.001	4.09	2.19-7.49
<i>Fear of being alone in the hospital/at home</i>							1.398	.314	19.80	.001	4.05	2.19-7.49
<i>Financial worries</i>							1.178	.313	14.00	.001	3.29	1.75-5.96
<i>Afraid of contracting COVID-19 in hospital</i>							---	---	1.18	.28	---	---
<i>Afraid to breastfeed</i>							---	---	0.88	.35	---	---
<i>Fear of health of baby</i>							---	---	0.21	.64	---	---
<i>Increased risk of COVID-19</i>							---	---	0.00	.99	---	---
<i>Fear relative will contract COVID-19</i>							---	---	0.83	.36	---	---
<i>Fear death of relative from COVID-19</i>							---	---	0.01	.93	---	---

Table 6:

First step						Second step					
β	SE	Wald	p	OR	95% CI	β	SE	Wald	p	OR	95% CI
<i>Religion</i>		13.21	.001					12.94	.002		

Jewish	---	---			1.00	Reference	---	---			1.00	reference	
Muslim	.598	.393	2.32	.13	1.82	0.84-3.93	.879	.42 7	4.24	.04	2.41	1.04-5.56	
Christian	1.162	.325	12.76	.001	3.20	1.69-6.05	1.262	.35 1	12.94	.001	3.53	1.78-7.03	
Religiosity			2.42	.30					---	---			
Secular					1.00	reference							
Traditional			0.52	.47	---	---							
Orthodox			2.07	.15	---	---							
High risk pregnancy			2.14	.14	---	---			---	---			
								.30 7	7.69	.006	2.34	1.28-4.27	
								.29 8	9.94	.002	2.56	1.43-4.58	
								.29 1	12.29	.001	2.78	1.57-4.91	
Afraid of contracting covid-19 in hospital								---	---	0.00	.99	---	---
Afraid to breastfeed								---	---	2.41	.12	---	---
Fear of health of baby								---	---	0.09	.77	---	---
Increased risk of covid-19								---	---	0.00	.99	---	---
Fear relative will contract covid-19								---	---	0.92	.34	---	---