

1 **A comparative analysis of depression between pregnant and non-pregnant adolescents in a**  
2 **southwestern town in Nigeria**

3 Authors: Julianah T. MOSANYA<sup>1</sup>, Temilade A. ADEGBITE<sup>2</sup>, Kazeem O. ADEBAYO<sup>3</sup>, Bolaji  
4 E. EGBEWALE<sup>4</sup>, Kayode T. IJADUNOLA<sup>5</sup>

5 Affiliation: 1. Department of Psychiatry, Osun State University (UNIOSUN) Teaching Hospital,  
6 Osogbo, Osun State, Nigeria

7 2. Department of Psychiatry, Lagos University Teaching Hospital, Lagos, Lagos  
8 State, Nigeria

9 3. Department of Psychiatry, Osun State University, Osogbo, Osun State, Nigeria

10 4. Department of Community Medicine, Ladoke Akintola University of Technology,  
11 Ogbomoso, Oyo State, Nigeria

12 5. Department of Community Health, Obafemi Awolowo University, Ile-Ife, Osun  
13 State, Nigeria

14 Corresponding author: J.T. Mosanya, [temdad2@yahoo.com](mailto:temdad2@yahoo.com)

15 **Abstract**

16 **Background:** Adolescence constitutes a risk factor for mental health problems, and this may be  
17 further complicated by pregnancy. The rate of adolescent pregnancy is still extremely high in the  
18 sub-Saharan Africa including Nigeria. Pregnancy and mental health problems during  
19 adolescence constitute double vulnerability for negative outcomes for the adolescents and their  
20 offspring.

21 **Methodology:** The study was cross-sectional in design and it compared prevalence of depression  
22 and associated factors among pregnant and non-pregnant adolescents. It was conducted in  
23 Osogbo metropolis, Osun State, Southwest, Nigeria. The study population comprised pregnant  
24 adolescents (aged 15-19 years) attending antenatal care (ANC) in selected formal and informal  
25 health facilities. Non-pregnant adolescents who were equally attending services at the facilities  
26 were recruited as the control group. Information was obtained from the adolescents with the use  
27 of a structured questionnaire and data was analysed with IBM-SPSS version 21 software.

28 **Results:** Three hundred and thirty-four respondents (167 per group) were involved in the study;  
29 the pregnant adolescents had a mean age ( $\pm$ SD) of 17.92 ( $\pm$ 1.13) years while the non-pregnant  
30 adolescents had a mean age of 17.70 ( $\pm$ 1.23) years. The prevalence of depression among the  
31 pregnant adolescents was 8.4% while that of the non-pregnant adolescents was 3.0%. The result  
32 showed a statistically significant association between pregnancy status and depression among the  
33 adolescents ( $p= 0.033$ ). Living arrangement was the only socio-demographic variable that had  
34 significant relationship with depression among the pregnant adolescents while living arrangement  
35 and employment status had significant relationships with depression among the non-pregnant  
36 adolescents. History of mental illness, childhood sexual abuse and anxiety symptoms showed  
37 significant relationship with depression among pregnant adolescents, however, only anxiety  
38 symptoms showed significant relationship with depression among non-pregnant adolescents.

39 **Conclusion:** The study concluded that the prevalence of depression is significantly higher  
40 among pregnant adolescents with similarities and differences in the factors associated with  
41 depression in the two groups.

42

43 **Keywords: Pregnant Adolescents, Depression, psychosocial, childhood physical abuse,**  
44 **childhood sexual abuse**

#### 45 **Introduction**

46 The challenges of the developmental phase of adolescence are enormous and constitute risk for  
47 various mental health problems including depression. Depression is a common mental health  
48 disorder among adolescents (1), with equal incidence in males and females before puberty.  
49 However, there is a steady increase in the incidence in females after puberty till adulthood, when  
50 the risk doubles in them. (2). The vulnerability of females to depression beginning in adolescence  
51 (3) and the impact of an unidentified and untreated illness remain a challenge globally (4).

52 According to the World Health Organization, about 16 million girls aged 15-19 years and 1 million  
53 girls under 15 years give birth annually and most live in the low/middle-income countries (5).The  
54 burden of pregnancy or parenting during adolescence constitutes a risk for mental health problems  
55 in addition to the developmental risks of adolescence (6,7). Pregnancy and mental health problems  
56 in adolescents therefore constitute “double vulnerability” for negative outcomes in them and the  
57 future generation.

58 The poor mental health of the mothers has a potential to exert enormous impact on them, the  
59 unborn child and their infants after delivery. A pregnant woman with poor mental health is more  
60 likely to attend antenatal clinics poorly, comply poorly with treatment and subject herself to  
61 practices that may be detrimental to her and the foetus (7–9), consequently, impairing the success  
62 of public health interventions targeted at reduction of both maternal and neonatal morbidity and  
63 mortality. The two most important stages in human growth and development- the foetal period  
64 and adolescence are at stake in the context of adolescent pregnancy, especially when complicated

65 by mental disorders. Poor attention to this vulnerable group of adolescents has a potential to set  
66 up a vicious cycle of poverty and mental health problems in them and the next generation (10).  
67 Depression has been recognized as one of the most common perinatal mental health disorders  
68 among women including adolescent mothers. Despite its high prevalence, significance and  
69 availability of effective treatment options, it is usually undetected and untreated (6,11). Many  
70 studies on depression among adolescents have considered the school population extensively in  
71 both developed and developing countries (3,12–16). There are however fewer studies on  
72 depression among the pregnant adolescents and most of the available studies were conducted in  
73 the developed nations (17,18) . The prevalence reported in some of these studies varied widely  
74 with rates as low as 1.6% (19) and as high as 68% (20), depending on various factors including  
75 the population, diagnostic criteria used, and age range of the respondents.

76 Commonly reported prevalence of current episode of depression among adolescents ranges  
77 between 2-10% (21–24). Although some studies in high-income countries showed that  
78 adolescent mothers are at a higher risk of depressive disorders compared with adult mothers  
79 (25,26) and non-pregnant adolescent girls (27), others refuted the evidence (28,29). However,  
80 there is a dearth of literature on both antepartum and postpartum mental disorders among  
81 adolescent girls in the developing countries where the burden of adolescent pregnancy is highest.  
82 This study aims to determine and compare the prevalence of depression and its relationship with  
83 sociodemographic and psychosocial variables between pregnant and non-pregnant adolescents in  
84 a south-western town in Nigeria.

## 85 **Materials And Methods**

### 86 **Study setting and Participants**

87 We employed a cross-sectional analytical design where comparison was made between the  
88 prevalence and correlates of depression among pregnant and non-pregnant adolescents aged 15 to  
89 19 years. The participants were recruited from formal and informal health care facilities in Osogbo,  
90 the capital town of Osun State in south-west, Nigeria.

91 The pregnant adolescents were recruited from the public primary and secondary health care  
92 facilities as well as informal health facilities where they were attending antenatal care (ANC).  
93 Non-pregnant adolescents who attended the same facilities for one health reason or the other at the  
94 time of the study were recruited as the control group. Adolescents who were acutely ill or had  
95 chronic medical conditions were excluded from the study.

96 Simple random sampling method (balloting) was used to select two Primary Health Care Centres  
97 (PHC) from each of Osogbo and Olorunda Local Government areas in Osogbo town. The only  
98 secondary health facility in the town, the State Specialist Hospital, was also included (making a  
99 total of five formal health facilities). The secondary facility was included because health care  
100 services are free as obtainable in the PHCs. Two traditional / faith homes offering services that  
101 included antenatal care were also selected by snowballing method from each of the local  
102 governments as there was no sampling frame for this group. In total, nine facilities were included  
103 in the study.

104 Consecutive pregnant adolescents were recruited serially and the controls were also recruited from  
105 the same facilities; for formal health services, they were recruited from the general outpatient  
106 section while for the informal services, they were recruited among clients that came to receive care  
107 for other reasons besides pregnancy in the same facility. They were also recruited serially and  
108 matched for age of the pregnant adolescents, using frequency matching techniques.

109

## 110 **Sample size determination**

111 Minimum sample size for each group required for this study was calculated using the formula for  
112 comparing two independent proportions (30).

113

$$114 \quad n = \frac{(Z_{\alpha/2} + Z_{\beta})^2 * \{P_1(1 - P_1) + P_2(1 - P_2)\}}{(P_1 - P_2)^2}$$

115

116 Where:

117 n = sample size in each group

118  $Z_{\alpha/2}$  = Standard normal deviate corresponding to confidence level; at confidence level of 95%,  $Z_{\alpha}$   
119 = 1.96 for a two tailed test

120  $Z_{\beta}$  = Standard normal deviate corresponding to (1-Power); at power of 80%,  $Z_{\beta} = 0.84$

121  $P_1$  is the estimate of prevalence of depression in the pregnant adolescents

122  $P_2$  is the estimate of prevalence of depression in the non-pregnant adolescents

123  $P_1$  and  $P_2$  were derived from an earlier study in Brazil where 26.3% of pregnant adolescents had  
124 depression compared with 13.6% of the non-pregnant adolescents (27).

125  $P_1 = 0.263$

126  $P_2 = 0.136$

127 
$$n = \frac{(1.96 + 0.84)^2 * \{0.263(0.737) + 0.136(0.864)\}}{(0.263 - 0.136)^2}$$

128 
$$n = \frac{(7.84) * (0.19381 + 0.117504)}{0.016129}$$

129 
$$= 151.33$$

130 
$$= 152$$

131 Ten percent was added to the sample size to make up for non-response  $(152 + 15) = 167$

132 One hundred and sixty-seven respondents were recruited for each group in this study.

133

### 134 **Data Collection**

135 Data was obtained from the respondents by means of a structured questionnaire. The questionnaire  
136 was administered to them after explaining the purpose of the research to them and obtaining  
137 informed consent/ assent. This was done after they had received care at the facility for the day.

138 An identification sticker was placed on the hospital card of the patients that have been interviewed  
139 to avoid repeat sampling. The researcher ensured that there was privacy for the respondents while  
140 completing the questionnaire. The first section had questions on socio-demographic data, sexual  
141 history, whether pregnancy was planned and disposition to it. The other sections contained  
142 measures for depression, anxiety, social support, childhood sexual and physical abuse and recent  
143 abuse.

144

## 145 **Measures**

146 **Depression:** The Beck Depression Inventory-II (BDI-II), which was used to assess depression in  
147 this study, is a popular screening instrument which has been validated and used previously among  
148 adolescents. It was adapted to the diagnostic criteria of major depressive episode of the Diagnostic  
149 and Statistical Manual of Mental Disorders-fourth edition (DSM-IV). It measures depressive  
150 symptomatology as well as assess the severity of depression in people who are thirteen years and  
151 above. It has 21 items, each item is scored 0 to 3 with possible total score of 0-63. A score of 0-16  
152 is considered normal while 17-20, 21-30, and 31 and above are considered borderline, moderate  
153 and severe depression respectively Those who scored 21 and above were regarded as depressed  
154 because this cut-off has been reported previously to correlate significantly with clinical depression  
155 (31).

156 **Anxiety:** Patient Health Questionnaire for Depression and Anxiety-4 (PHQ-4): PHQ-4 combined  
157 both the two item Patient Health Questionnaire (PHQ-2) and the Generalized Anxiety Disorder  
158 (GAD-2). The scales were derived from the original eight and seven items PHQ-8 and GAD-7  
159 respectively. PHQ-8 is used for screening for depression while GAD-7 is used for screening for  
160 anxiety. The first two of four items on PHQ-4 screened for anxiety and the last two screen for  
161 depression. Each item is rated on a scale of 0-3. Scores for each of the subscale is derived by  
162 adding scores for items on each subscales. Score  $\geq 3$  on each of the scale suggests that disorder.  
163 The scale for anxiety is used in this study as a measure of anxiety

164 **Social Support:** OSLO Social Support Questionnaire) has three items for assessing perceived  
165 social support, Minimum and maximum score obtainable on the scale are 3 and 14 respectively.

166 Higher score denotes higher level of perceived social support. Scores of 3-8 is considered “poor  
167 social support”, 9-11 “moderate support and 12-14 “strong support”.

168 **Childhood Physical and Sexual Abuse:** Sexual and Physical Abuse Questionnaire (SPAQ) used  
169 in this study is a nine-item questionnaire that was designed as a screening tool for sexual and  
170 physical abuse in childhood. For this questionnaire, the operational definition of sexual and  
171 physical abuse involved having actual contact for sexual abuse, while presence of physical harm  
172 like bruises is required for physical abuse (32).

173 **Abuse Assessment Screen (AAS):** Abuse assessment screen is a five-item screening tool for  
174 detection of domestic violence, an individual screens positive for abuse once any of the items is  
175 answered in the affirmative. The instrument was used as a measure of current/recent abuse in this  
176 study.

177 All instruments were translated to Yoruba and back translated to English to ensure content validity.

## 178 **Statistical Analysis**

179 Data were analyzed with the Statistical Package for Social Sciences (SPSS) version 21.  
180 Appropriate descriptive statistics such as percentages, means and standard deviation were used to  
181 summarize the data depending on the type of variable. Chi-square test was used to determine the  
182 relationship between the depression and the independent variables and significance level was set  
183 at  $p < 0.05$ .

## 184 **Ethical Considerations**

185 Ethical approval was obtained from the Institute of Public Health, Obafemi Awolowo University,  
186 Ile-Ife, Osun State. Permission was sought from the head of the selected health facilities and the

187 doctors whose patients were involved in the research. Informed consent was obtained from the  
188 pregnant adolescents or parents/guardians. All pregnant adolescents gave informed consent  
189 irrespective of their age because they were considered “matured minors” (33). The  
190 parents/guardians of those that were less than 18 years old were required to give consent while the  
191 adolescents gave assent after which they were enrolled for participation. The questionnaire was  
192 administered to the adolescents privately. Privacy and confidentiality of all participants were  
193 ensured during and after data collection.

194

## 195 **Results**

### 196 **Socio-demographic characteristics of pregnant and non-pregnant adolescents**

197 Three hundred and thirty-four respondents (167 per group) were involved in the study. The mean  
198 ( $\pm$ SD) age of all the respondents was 17.81 ( $\pm$ 1.18) years. There was no significant difference  
199 between the mean age of both groups of respondents ( $t = 1.670$ ,  $p = 0.096$ ). The pregnant  
200 adolescents had a mean age ( $\pm$ SD) of 17.92 ( $\pm$ 1.13) years while the non-pregnant adolescents had  
201 a mean age of 17.70 ( $\pm$ 1.23) years.

202 Thirty-nine percent of the pregnant adolescents compared with 84% of the non-pregnant  
203 adolescents were students and the difference was statistically significant ( $\chi^2 = 77.24$ ,  $p = 0.001$ ).

204 Thirty seven percent of the non-pregnant adolescents compared with 11% of the pregnant ones  
205 had attained tertiary education and the difference was statistically significant ( $\chi^2 = 29.525$ ,  
206  $p = 0.001$ ). Concerning employment status, 25% of the pregnant adolescents compared with 5% of  
207 the non-pregnant adolescents were employed. Although a higher proportion of pregnant  
208 adolescents were married (25%) compared with the non-pregnant ones (13%), the proportions of

209 both groups that were never married were high at 72% and 84% respectively. Concerning living  
210 arrangements of the respondents, 77 (46%) pregnant adolescents compared with 127 (76%) non-  
211 pregnant ones lived with their parents. However, significantly higher proportions of the pregnant  
212 ones (29%) lived with a partner (husband or boyfriend) compared with the non-pregnant ones  
213 (6%),  $p < 0.001$ . About 65% of the parents of the pregnant adolescents compared with 90.4% of  
214 the parents of the non-pregnant adolescents were married and the difference was statistically  
215 significant ( $\chi^2 = 31.839$ ,  $p = 0.001$ ). Likewise, 18% and 4.8% of mothers of the pregnant  
216 adolescents compared with 43.7% and 18.0% of the mothers of the non-pregnant ones had tertiary  
217 and postgraduate education respectively ( $\chi^2 = 58.445$ ,  $p = 0.001$ ). The pattern was also similar for  
218 the educational attainment of fathers of the respondents. (Table 1).

### 219 **Table 1: Sociodemographic Characteristics of Pregnant and Non-pregnant Adolescents**

220

#### 221 **Psychosocial characteristics of pregnant and non-pregnant adolescents**

222 The proportion of those that signified that they have had history of mental illness was 5.4% among  
223 the pregnant adolescents compared with 1.8% of the non-pregnant peers, the difference was not  
224 statistically significant ( $p = 0.139$ ).

225 Twenty-three (13.8%) of the pregnant adolescents compared with 30 (18.0%) of the non-pregnant  
226 adolescents had poor social support ( $p = 0.084$ ). Twenty-five (15%) and 33 (19.8%) of the pregnant  
227 adolescents compared with 16 (9.6%) and 30 (18.0%) of non-pregnant adolescents had history of  
228 childhood physical and sexual abuse respectively, but the difference in proportions were not  
229 statistically significant ( $p = 0.133$  and  $0.675$ ). Similarly, the proportions of those exposed to recent  
230 abuse was comparable between the two groups ( $p = 0.082$ ). Fewer, 13 (7.8%) of the pregnant

231 adolescents compared with 24 (14.4%) of the non-pregnant adolescents screened positive for  
232 anxiety, but the difference did not reach statistical significance ( $p= 0.055$ ) (Table 2).

### 233 **Table 2: Psychosocial Variables of Pregnant and Non-pregnant Adolescents**

#### 234 **Planning status of pregnancy and its disposition among pregnant adolescents**

235 Figure 1 and 2 shows the planning status of the pregnancy and their disposition to it among  
236 pregnant adolescents.

#### 237 **Figure 1: Planning Status of the Pregnancies of the Pregnant Adolescents**

#### 238 **Figure 2: Disposition of Pregnant Adolescents in Osogbo towards their** 239 **Pregnancies**

#### 240 **Depression**

241 The mean BDI score (which assessed depression among the respondents) of the pregnant  
242 adolescents was significantly higher, 8.32 ( $\pm 8.17$ ) than that of the non-pregnant adolescents (6.71  
243 ( $\pm 7.85$ )) ( $p < 0.001$ ). Overall, 19 (5.7%) of the respondents were categorized as being depressed, 14  
244 (8.4%) among the pregnant adolescents and 5 (3.0%) among the non-pregnant adolescents. The  
245 proportion of pregnant adolescents categorized as depressed was significantly higher than that of  
246 the non-pregnant adolescents ( $p = 0.033$ ).

247

#### 248 **Relationship between depression and sociodemographic and Psychosocial variables among** 249 **the respondents**

250 Table 3 shows the relationship between depression and selected sociodemographic variables  
251 among pregnant and non-pregnant adolescents. Living arrangement was the only variable that had  
252 significant relationship with depression among the pregnant adolescents while living arrangement  
253 and employment status had significant relationships with depression among the non-pregnant  
254 adolescents.

255 **Table 3: Relationship between depression and socio-demographic variables in pregnant**  
256 **and non-pregnant adolescents**

257  
258 Table 4 shows the relationship between depression and psychosocial variables among pregnant  
259 and non-pregnant adolescents. Among pregnant adolescents, 33% of those with positive history of  
260 mental illness compared with only 7% of those with negative history of mental illness had  
261 depression and the difference was statistically significant (Fisher's Exact Test,  $p=0.029$ ).  
262 Similarly, a higher proportion of those who were exposed to childhood sexual abuse (18%)  
263 compared to those who were not exposed (6%) had depression ( $p=0.023$ ). Conversely, exposure  
264 to childhood physical abuse had no significant relationship with depression among the pregnant  
265 adolescent. Also, social support and current abuse had no relationship with depression status.  
266 Similarly, whether pregnancy was planned or not as well as disposition to the pregnancy showed  
267 no relationship with depression among them. Anxiety however showed significant relationship  
268 with depression as significantly higher proportions of those that screened positive for anxiety  
269 (38.5%) compared with those that were negative (5.8%) had depression ( $p=0.001$ ).

270 **Table 4: Relationship between depression and psychosocial variables in pregnant and non-**  
271 **pregnant adolescents**

272 Among non-pregnant adolescents, the history of mental illness, social support, childhood physical  
273 as well as sexual abuse had no relationship with depression. Current experience of abuse also had  
274 no relationship with depression. However, screening positive for anxiety showed significant  
275 relationship with depression with 12.5% of those with anxiety compared with 1.4% of those  
276 without anxiety having depression,  $p=0.022$ .

## 277 **DISCUSSION**

278 The prevalence of depression among the pregnant adolescents (8.4%) was significantly higher than  
279 that of the non-pregnant adolescents (3.0%),  $p=0.033$ , this pattern followed the previous findings  
280 of pregnant adolescents having a higher risk of depression than their non-pregnant counterparts  
281 (27). The higher prevalence in the pregnant adolescents as found in this study may be due to the  
282 stress and/or physiological changes of pregnancy and social discrimination associated with teenage  
283 pregnancy (34). It may also be that the presence of depression actually predisposed to pregnancy  
284 in the adolescents as earlier studies suggested, that depression predisposes the adolescents to high-  
285 risk sexual behaviour which may increase the incidence of pregnancy in them and may account  
286 for the increased prevalence of depression among the pregnant adolescents (35,36). This finding  
287 highlights the importance of paying close attention to the mental health of adolescents in general  
288 and the pregnant ones in particular.

289 This observed relationship between studentship status and depression could make one to consider  
290 the possibility that being a student is protective against depression or that those who were not  
291 students had other risk factors like poverty that increased the risk of depression in them. On the  
292 one hand, it is possible that the presence of depressive disorder in these other groups predisposed  
293 them to dropping out of school, thereby looking for other things to do beyond schooling. On the

294 other hand, depression in them could be a psychological reaction to dropping out of school which  
295 was informed by reasons out of their control. There may be need to watch out for depression in  
296 adolescents who are out of school. This finding is in agreement with a study in India that found a  
297 significantly higher prevalence of depression among female adolescents that dropped out of school  
298 (19).

299 Concerning the relationship of depression with living arrangements in this study, the proportion  
300 of respondents who stayed alone or with partners (boyfriend or husbands) who had depression was  
301 significantly higher than those who stayed with their parents or grandparents ( $p < 0.001$ ). This  
302 finding suggests that living with parents or grandparents may be a protective factor against  
303 depression in this age group rather than living alone or living with a partner. Furthermore, living  
304 with partner, especially when unmarried may put significant emotional strain on those who were  
305 practicing it, therefore increasing the risk of depression in them since the practice is not culturally  
306 acceptable in the environment where the study was carried out. Beyond this, the social support  
307 available for those living alone or with partners may not be as good as those living with their  
308 parents or grandparents among this population, thereby putting significant strain on their emotional  
309 health. The finding of an association of depression with few socio-demographic factors in this  
310 study is contrary to the finding of an earlier study that found no such association in pregnant  
311 adolescents (37).

312 Among the psychosocial factors examined, three factors; the past history of mental illness, anxiety  
313 and childhood sexual abuse had a significant relationship with depression. The past history of  
314 mental illness having a significant relationship with depression among the pregnant adolescents is  
315 not surprising because depression and different other mental illnesses are chronic illnesses that are  
316 prone to relapse, so anyone who has had an episode could have further episodes (38). The fact that

317 there is no significant relationship between past history of mental illness and depression among  
318 the non-pregnant adolescents could then suggest that there is a relationship between mental illness  
319 and poor reproductive behaviour as suggested in previous studies (39), which could have  
320 predisposed the pregnant adolescents to the pregnancy in the first place. The type of mental illness  
321 that those with history of mental illness had previously was however not documented in this study,  
322 so it is not clear whether the past mental illness they had was depression or not.

323 The finding of a relationship between depression and childhood sexual abuse but not with  
324 childhood physical abuse among the pregnant adolescents in this study is surprising, since they are  
325 both forms of violence. It therefore raises the question as to whether sexual abuse has more  
326 emotional impact on the victims than physical abuse. In addition, one may want to know the  
327 contribution of sexual abuse to the occurrence of pregnancy as previous researches suggested (40).  
328 The finding of an association between depression and childhood sexual abuse in this study is in  
329 agreement with extant literature (41,42). Presence of anxiety symptoms had significant  
330 relationship with depression, this further confirms the strong possibility of depression co-existing  
331 with other psychological illnesses, especially anxiety symptoms/disorders as previous studies have  
332 documented. It is interesting to note that neither planned status of pregnancy nor disposition to the  
333 pregnancy had significant relationship with depression among the pregnant adolescents. This is at  
334 variance with findings among adults where unplanned pregnancy showed relationship with  
335 depression (43,44). This suggests that pregnancy in adolescence may be associated with emotional  
336 disturbance irrespective of the planned status or disposition of the adolescent to the pregnancy.

### 337 **Study strengths and Limitations**

338 The strength of the study includes the focus on antenatal depression which has been less studied  
339 compared with postnatal depression. Furthermore, the inclusion of a comparison group and the use

340 of structured instruments to assess the dependent and independent variables. However, there are  
341 few limitations, which include our inability to select the informal health facilities involved in this  
342 study randomly because effort made to get the sampling frame for the informal services was not  
343 successful. Also, screening instrument was used to assess depression as against structured  
344 diagnostic interview.

### 345 **Conclusion**

346 This study concludes that the prevalence of depression is significantly higher among the pregnant  
347 adolescents compared with the non-pregnant adolescents. Living arrangement is the only socio-  
348 demographic factor that has a significant relationship with depression among pregnant adolescents  
349 while employment status in addition to living arrangement showed significant relationship among  
350 non-pregnant adolescents. On the other hand, history of mental illness, childhood sexual abuse and  
351 anxiety were the psychosocial factors with significant relationship with depression among  
352 pregnant adolescents and only anxiety among non-pregnant adolescents.

### 353 **References**

- 354 1. Thapar A, Collishaw S, Pine DS, Thapar AK. Depression in adolescence. *The Lancet*.  
355 2012;379(9820):1056–67.
- 356 2. Parker G, Brotchie H. Gender differences in depression. *International Review of*  
357 *Psychiatry*. 2010 Oct 1;22(5):429–36.
- 358 3. Sajjadi H, Kamal SHM, Rafiey H, Vameghi M, Forouzan AS, Rezaei M. A Systematic  
359 Review of the Prevalence and Risk Factors of Depression among Iranian Adolescents. *Glob J*  
360 *Health Sci*. 2013 May;5(3):16–27.

- 361 4. Field T, Diego M, Sanders C. Adolescent depression and risk factors. *Adolescence*.  
362 2001;36(143):491–8.
- 363 5. WHO. Adolescent Pregnancy: Fact sheet. 2014; Available from:  
364 <http://www.who.int/mediacentre/factsheets/fs364/en/>
- 365 6. Mitsuhiro SS, Chalem E, Barros MM, Guinsburg R, Laranjeira R. Teenage pregnancy:  
366 use of drugs in the third trimester and prevalence of psychiatric disorders. *Revista Brasileira de*  
367 *Psiquiatria*. 2006;28:122–5.
- 368 7. Mitsuhiro SS, Chalem E, Moraes Barros MC, Guinsburg R, Laranjeira R. Brief report:  
369 Prevalence of psychiatric disorders in pregnant teenagers. *Journal of Adolescence*.  
370 2009;32(3):747–52.
- 371 8. Marcus SM. Depression during pregnancy: rates, risks and consequences. *Can J Clin*  
372 *Pharmacol*. 2009;16(1):15–22.
- 373 9. Patel V, Rahman A, Jacob KS, Hughes M. Effect of maternal mental health on infant  
374 growth in low income countries: new evidence from South Asia. *BMJ*. 2004;328(7443):820–3.
- 375 10. Plant DT, Barker ED, Waters CS, Pawlby S, Pariante CM. Intergenerational transmission  
376 of maltreatment and psychopathology: the role of antenatal depression. *Psychological Medicine*.  
377 2013;43(3):519–28.
- 378 11. Chalem E, Mitsuhiro SS, Manzolli P, Barros MCM, Guinsburg R, Sass N, et al.  
379 Underdetection of Psychiatric Disorders During Prenatal Care: A Survey of Adolescents in Sao  
380 Paulo, Brazil. *Journal of Adolescent Health*. 2012;50(1):93–6.

- 381 12. Adewuya AO, Ola BA, Aloba OO. Prevalence of major depressive disorders and a  
382 validation of the beck depression inventory among Nigerian adolescents. *European Child and*  
383 *Adolescent Psychiatry*. 2007;16(5):287–92.
- 384 13. Eisenberg D, Gollust SE, Golberstein E, Hefner JL. Prevalence and Correlates of  
385 Depression, Anxiety, and Suicidality Among University Students. *American Journal of*  
386 *Orthopsychiatry*. 2007 Oct 1;77(4):534–42.
- 387 14. Eskin M, Ertekin K, Harlak H, Dereboy Ç. Prevalence of and Factors Related to  
388 Depression in High School Students. *Turkish journal of psychiatry*. 2008;19(4).
- 389 15. Sooky Z, Sharifi KH, Tagharrobi Z. The depression prevalence and its related factors in  
390 teenagers in Kashan-Iran 2006. *European Psychiatry*. 2007 Mar 1;22:S246.
- 391 16. Unsal A, Ayranci U. Prevalence of Students With Symptoms of Depression Among High  
392 School Students in a District of Western Turkey: An Epidemiological Study. *J School Health*.  
393 2008 May;78(5):287–93.
- 394 17. Brown JD, Harris SK, Woods ER, Buman MP, Cox JE. Longitudinal study of depressive  
395 symptoms and social support in adolescent mothers. *Maternal and Child Health Journal*.  
396 2012;16(4):894–901.
- 397 18. Coelho FM, Pinheiro RT, Silva RA, Quevedo Lde A, Souza LD, Castelli RD. Major  
398 depressive disorder during teenage pregnancy: socio-demographic, obstetric and psychosocial  
399 correlates. *Revista brasileira de psiquiatria (Sao Paulo, Brazil: 1999) [Internet]*. 2013;35.  
400 Available from: <http://dx.doi.org/10.1016/j.rbp.2012.03.006>

- 401 19. Nair M, Paul MK, John R. Prevalence of depression among adolescents. *The Indian*  
402 *Journal of Pediatrics*. 2004;71(6):523–4.
- 403 20. Logsdon MC, Cross R, Williams B, Simpson T. Prediction of Postpartum Social Support  
404 and Symptoms of Depression in Pregnant Adolescents: A Pilot Study. *The Journal of School*  
405 *Nursing*. 2004 Feb 1;20(1):36–42.
- 406 21. Hoffmann F, Petermann F, Glaeske G, Bachmann CJ. Prevalence and Comorbidities of  
407 Adolescent Depression in Germany. *Zeitschrift für Kinder- und Jugendpsychiatrie und*  
408 *Psychotherapie*. 2012 Oct 29;40(6):399–404.
- 409 22. Mojtabai R, Olfson M, Han B. National Trends in the Prevalence and Treatment of  
410 Depression in Adolescents and Young Adults. *Pediatrics* [Internet]. 2016 Dec 1 [cited 2019 Nov  
411 15];138(6). Available from: <https://pediatrics.aappublications.org/content/138/6/e20161878>
- 412 23. Munhoz TN, Santos IS, Matijasevich A. Depression among Brazilian adolescents: A  
413 cross-sectional population-based study. *Journal of Affective Disorders*. 2015;175:281–6.
- 414 24. Rey JM, Sawyer MG, Clark JJ, Baghurst PA. Depression among Australian adolescents.  
415 *Medical Journal of Australia*. 2001;175(1):19–23.
- 416 25. Kim THM, Connolly JA, Tamim H. The effect of social support around pregnancy on  
417 postpartum depression among Canadian teen mothers and adult mothers in the maternity  
418 experiences survey. *BMC Pregnancy and Childbirth*. 2014;14(1):162–162.
- 419 26. Siegel RS, Brandon AR. Adolescents, Pregnancy, and Mental Health. *Journal of Pediatric*  
420 *and Adolescent Gynecology*. 2014;27(3):138–50.

- 421 27. Freitas GVS, Cais CFS, Stefanello S, Botega NJ. Psychosocial conditions and suicidal  
422 behavior in pregnant teenagers. *European Child & Adolescent Psychiatry*. 2008;17(6):336–336.
- 423 28. Biello KB, Sipsma HL, Kershaw T. Effect of Teenage Parenthood on Mental Health  
424 Trajectories: Does Sex Matter? *American Journal of Epidemiology*. 2010;172(3):279–87.
- 425 29. Troutman BR, Cutron CE. Nonpsychotic postpartum depression among adolescent  
426 mothers. *J Abnorml Psychol [Internet]*. 1990;99. Available from: [https://doi.org/10.1037/0021-](https://doi.org/10.1037/0021-843X.99.1.69)  
427 843X.99.1.69
- 428 30. Charan J, Biswas T. How to calculate sample size for different study designs in medical  
429 research? *Indian journal of psychological medicine*. 2013;35(2):121.
- 430 31. Steer RA, Scholl TO, Beck AT. Revised Beck Depression Inventory Scores of Inner-City  
431 Adolescents: Pre- and Postpartum. *Psychol Rep*. 1990 Feb;66(1):315–20.
- 432 32. Kooiman CG, Ouwehand AW, Kuile MM. The Sexual and Physical Abuse Questionnaire  
433 (SPAQ) A screening instrument for adults to assess past and current experiences of abuse. *Child*  
434 *abuse & neglect*. 2002;26:939–53.
- 435 33. Folayan MO, Haire B, Harrison A, Odetoyingbo M, Fatusi O, Brown B. Ethical issues in  
436 adolescents' sexual and reproductive health research in Nigeria. *Developing world bioethics*.  
437 2015;15(3):191–8.
- 438 34. Wiemann CM, Rickert VI, Berenson AB, Volk RJ. Are pregnant adolescents stigmatized  
439 by pregnancy? *J Adolesc Health*. 2005 Apr;36(4):352.e1-8.

- 440 35. Barnet B, Liu J, DeVoe M. Double jeopardy: Depressive symptoms and rapid subsequent  
441 pregnancy in adolescent mothers. *Archives of Pediatrics & Adolescent Medicine*.  
442 2008;162(3):246–52.
- 443 36. Hallfors DD, Waller MW, Ford CA, Halpern CT, Brodish PH, Iritani B. Adolescent  
444 Depression and Suicide Risk Association with Sex and Drug Behavior. *American Journal of*  
445 *Preventive Medicine* 2004. 2004;27(3).
- 446 37. Villanueva LA, Pérez-Fajardo MM, Fernando LI. [Sociodemographic factors associated  
447 with depression in pregnant adolescents]. *Ginecol Obstet Mex*. 2000 Apr;68:143–8.
- 448 38. Monroe SM, Harkness KL. Is depression a chronic mental illness? *Psychological*  
449 *Medicine*. 2012 May;42(5):899–902.
- 450 39. Lundberg P, Rukundo G, Ashaba S, Thorson A, Allebeck P, Östergren P-O, et al. Poor  
451 mental health and sexual risk behaviours in Uganda: A cross-sectional population-based study.  
452 *BMC Public Health*. 2011;11(1):125–125.
- 453 40. Noll JG, Shenk CE, Putnam KT. Childhood Sexual Abuse and Adolescent Pregnancy: A  
454 Meta-analytic Update. *Journal of Pediatric Psychology*. 2009;34(4):366–78.
- 455 41. Fergusson DM, Horwood LJ, Lynskey MT. Childhood Sexual Abuse and Psychiatric  
456 Disorder in Young Adulthood: II. Psychiatric Outcomes of Childhood Sexual Abuse. *Journal of*  
457 *the American Academy of Child & Adolescent Psychiatry*. 1996 Oct 1;35(10):1365–74.
- 458 42. Weiss EL, Longhurst JG, Mazure CM. Childhood Sexual Abuse as a Risk Factor for  
459 Depression in Women: Psychosocial and Neurobiological Correlates. *American Journal of*  
460 *Psychiatry*. 1999 Jun;156(6):816–28.

461 43. Faisal-Cury A, Menezes PR, Quayle J, Matijasevich A. Unplanned pregnancy and risk of  
462 maternal depression: secondary data analysis from a prospective pregnancy cohort. *Psychology,*  
463 *Health & Medicine.* 2017 Jan 2;22(1):65–74.

464 44. Ege E, Timur S, Zincir H, Geçkil E, Sunar-Reeder B. Social support and symptoms of  
465 postpartum depression among new mothers in Eastern Turkey. *Journal of Obstetrics and*  
466 *Gynaecology Research.* 2008;34(4):585–93.

467

468

1 **A comparative analysis of depression between pregnant and non-pregnant adolescents in a**  
 2 **southwestern town in Nigeria**

3 **TABLES AND FIGURES**

4 **Table 1: Sociodemographic Characteristics of Pregnant and Non-pregnant Adolescents**

| <b>Variable</b>          | <b>Pregnant<br/>(n=167)<br/>Frequency (%)</b> | <b>Non-pregnant<br/>(n=167)<br/>Frequency (%)</b> | <b>Total<br/>(n=334)<br/>Frequency(%)</b> | <b>Statistics</b>                       |
|--------------------------|---|---|---|---|
| <b>Age (years)</b>       |   |   |   |   |
| 15                       | 7 (4.2)                                       | 10 (6.0)  | 17 (5.1)                                  | $\chi^2 = 3.553$<br>df = 4<br>p = 0.470 |
| 16                       | 17 (10.2)                                     | 23 (13.8)   | 40 (12.0)                                 |   |
| 17                       | 21 (12.6)                                     | 28 (16.8)   | 49 (14.7)                                 |   |
| 18                       | 60 (35.9)                                     | 52 (31.1)   | 112 (33.5)                                |   |
| 19                       | 62 (37.1)                                     | 54 (32.3)   | 116 (34.7)                                |   |
| <b>Employment status</b> |   |   |   |   |
| Employed                 | 41(24.6)                                      | 8 (4.8)   | 49 (14.7)                                 | $\chi^2 = 77.24$<br>df = 3<br>p = 0.001 |
| Unemployed               | 29 (17.4)                                     | 14 (8.4)  | 43 (12.9)                                 |   |
| Student                  | 65 (38.8)                                     | 141 (84.4)  | 206 (61.7)                                |   |
| Apprentice               | 32 (19.2)                                     | 4 (2.4)   | 36 (10.7)                                 |   |
| <b>Religion</b>          |   |   |   |   |
| Christianity             | 57 (34.1)                                     | 80 (47.9)   | 137 (41.0)                                | $\chi^2 = 7.061$                        |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

|                               |            |            |            |                   |
|-------------------------------|------------|------------|------------|-------------------|
| Islam                         | 108 (64.7) | 84 (50.3)  | 192 (57.5) | df =2             |
| Traditional                   | 2 (1.2)    | 3 (1.8)    | 5 (1.5)    | <b>p = 0.029</b>  |
| <b>Educational attainment</b> |            |            |            |                   |
| Primary                       | 36 (21.6)  | 22 (13.2)  | 58 (17.4)  | $\chi^2 = 29.525$ |
| Secondary                     | 107 (64.1) | 81 (48.5)  | 188 (56.3) | df =3             |
| Tertiary                      | 70 (41.4)  | 51 (36.8)  | 80 (24.0)  | <b>p = 0.001</b>  |
| No formal                     | 5 (3.0)    | 3 (1.8)    | 8 (2.4)    |                   |
| <b>Marital status</b>         |            |            |            |                   |
| Never married                 | 120 (71.9) | 141 (84.4) | 261 (78.1) | $\chi^2 = 9.420$  |
| Married                       | 41 (24.6)  | 22 (13.2)  | 63 (18.9)  | df =3             |
| Separated/divorced            | 2 (1.2)    | 0 (0)      | 2 (0.6)    | <b>p = 0.024</b>  |
| Cohabiting                    | 4 (2.4)    | 4 (2.4)    | 8 (2.4)    |                   |
| <b>Living arrangement</b>     |            |            |            |                   |
| Partner                       | 49 (29.3)  | 10 (6.0)   | 59 (17.7)  | $\chi^2 = 55.329$ |
| Parents                       | 77 (46.1)  | 127 (76.0) | 204 (61.1) | df =3             |
| Grandparents                  | 34 (20.4)  | 11 (6.6)   | 45 (13.5)  | <b>p = 0.001</b>  |
| Alone                         | 7 (4.2)    | 19 (11.4)  | 26 (7.8)   |                   |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

5

6

7

8

9

10 **Table 2: Psychosocial Variables of Pregnant and Non-pregnant Adolescents**

| <b>Variable</b>                  | <b>Pregnant<br/>(n=167)<br/>Freq (%)</b> | <b>Non-pregnant<br/>(n=167)<br/>Freq (%)</b> | <b>Total<br/>(n=334)<br/>Freq (%)</b> | <b>Statistics</b>                       |
|----------------------------------|--|--|---------------------------------------|---|
| <b>History of mental illness</b> |  |  |                                       | Fisher's<br>Exact<br>P=0.139            |
| Yes                              | 9 (5.4)                                  | 3 (1.8)                                      | 12 (3.6)                              |   |
| No                               | 158 (94.6)                               | 164 (98.2)                                   | 322 (96.4)                            |   |
| <b>Social support category</b>   |  |  |                                       | $\chi^2 = 4.954$<br>df = 2<br>p = 0.084 |
| Poor                             | 23 (13.8)                                | 30 (18.0)                                    | 53 (15.9)                             |   |
| Intermediate                     | 108 (64.7)                               | 88 (52.7)                                    | 196 (58.7)                            |   |
| Strong                           | 36 (21.6)                                | 49 (29.3)                                    | 85 (25.4)                             |   |
| <b>History of CPA*</b>           |  |  |                                       | $\chi^2 = 2.252$<br>df = 1<br>p = 0.133 |
| Present                          | 25 (15)                                  | 16 (9.6)                                     | 41 (12.3)                             |   |
| Absent                           | 142 (85.0)                               | 151 (90.4)                                   | 293 (87.7)                            |   |
| <b>History of CSA**</b>          |  |  |                                       | $\chi^2 = 0.176$                        |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

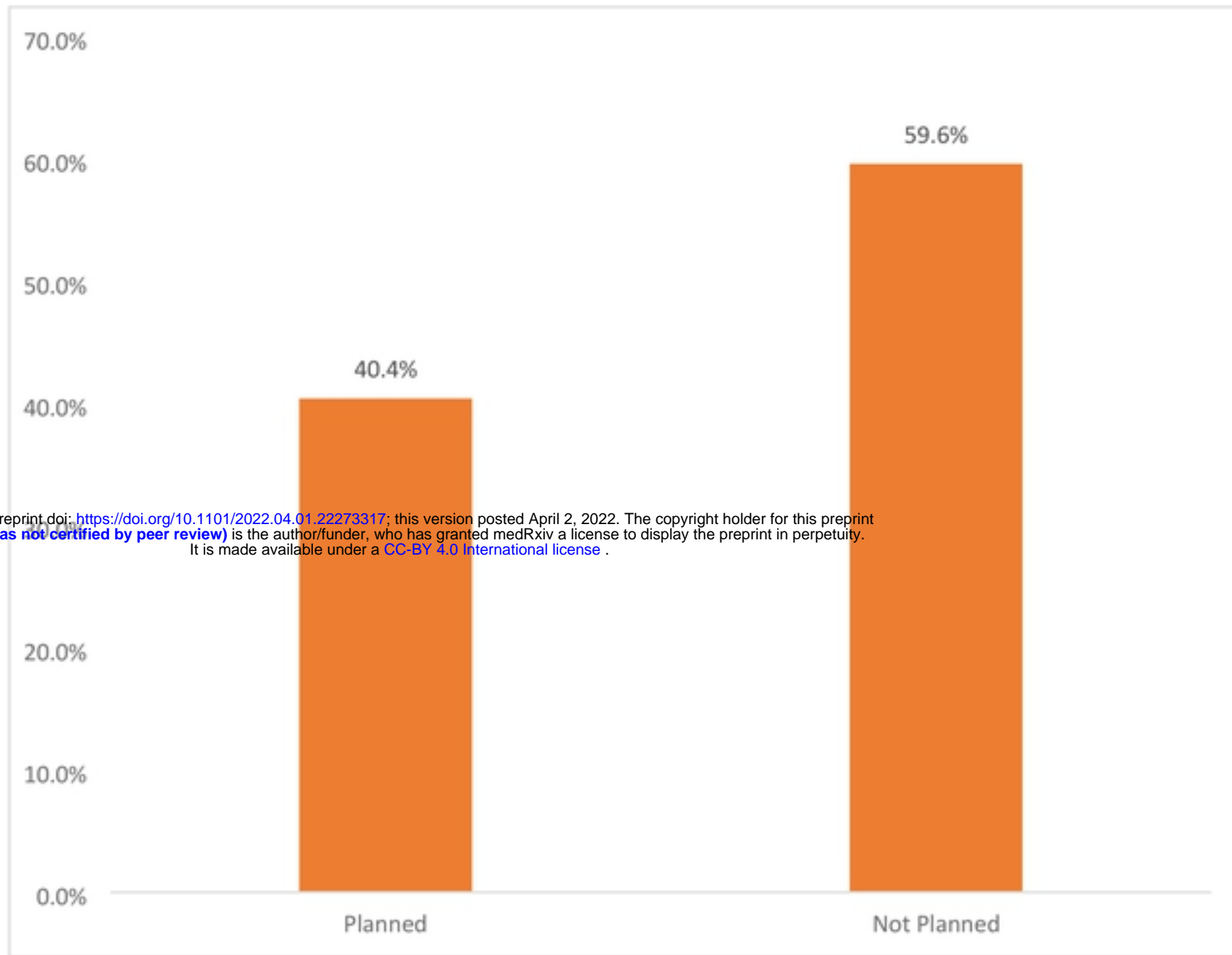
|                     |            |            |            |                  |
|---------------------|------------|------------|------------|------------------|
| Present             | 33 (19.8)  | 30 (18.0)  | 63 (18.9)  | df = 1           |
| Absent              | 134 (80.2) | 137 (82.0) | 271 (81.1) | p = 0.675        |
| <b>Recent Abuse</b> |            |            |            | $\chi^2 = 3.024$ |
| Absent              | 130 (77.8) | 116 (69.5) | 246 (73.7) | df = 1           |
| Present             | 37 (22.2)  | 51 (30.5)  | 88 (26.3)  | p = 0.082        |
| <b>Anxiety</b>      |            |            |            | $\chi^2 = 3.678$ |
| Negative            | 154 (92.2) | 143 (85.6) | 297 (88.9) | df = 1           |
| Positive            | 13 (7.8)   | 24 (14.4)  | 37 (11.1)  | p = 0.055        |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

11 \*CPA- childhood physical abuse, \*\*CSA- childhood sexual abuse

12

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](#).



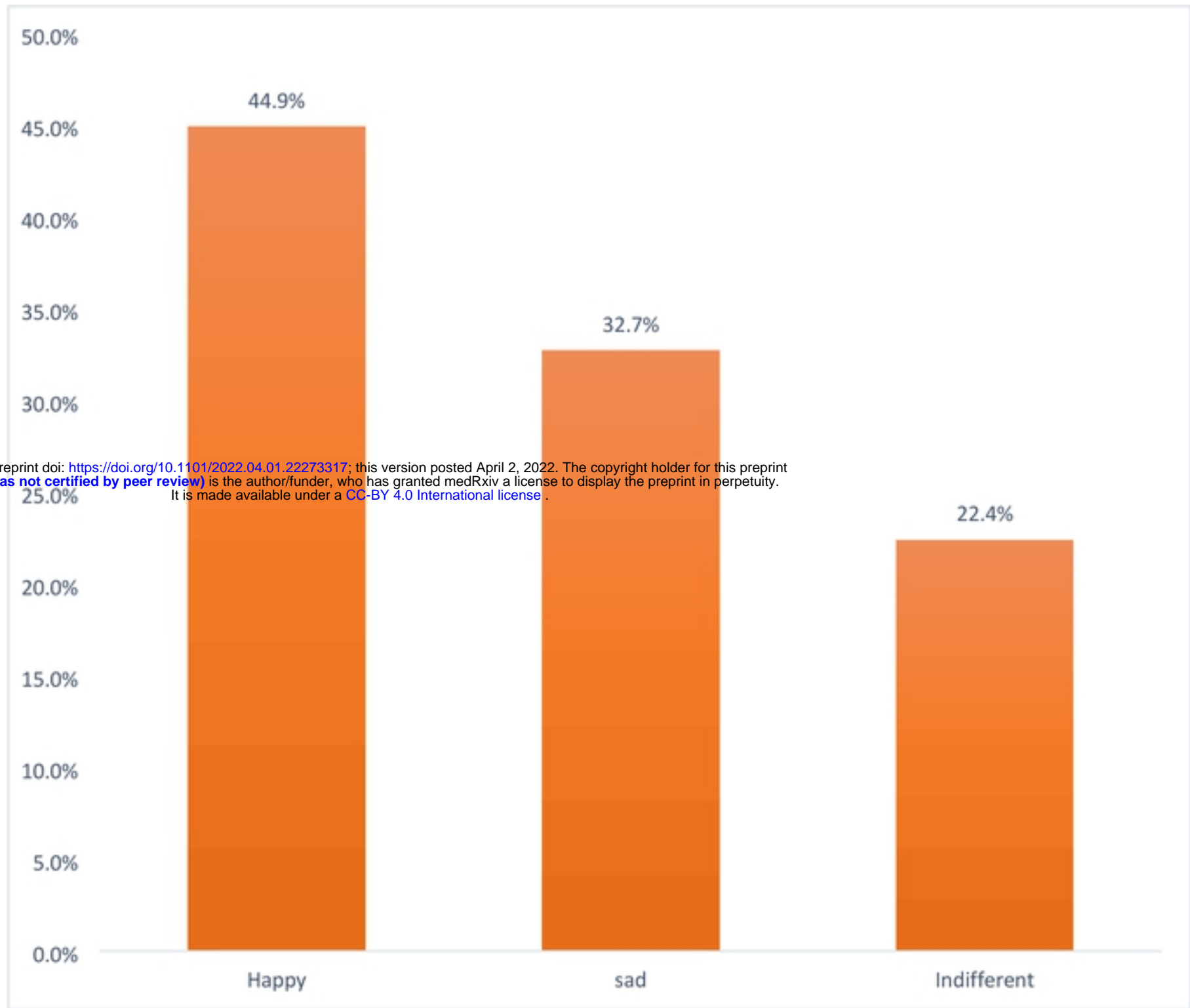
13

14 **Figure 1: Planning Status of the Pregnancies of the Pregnant Adolescents**

15

16

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](#).



17

18 **Figure 2: Disposition of Pregnant Adolescents in Osogbo towards their**  
19 **Pregnancies**

20

21 **Table 3: Relationship between depression and socio-demographic variables in pregnant**  
22 **and non-pregnant adolescents**

| Pregnant adolescents | Non-pregnant adolescents |
|----------------------|--------------------------|
|----------------------|--------------------------|

| Variable                      | Not Depressed<br>(n=153)<br>Freq (%) | Depressed<br>(n=14)<br>Freq (%) | Total<br>(n=167)<br>Freq (%) | Statistics                                | Not Depressed<br>(n=162)<br>Freq (%) | Depressed<br>(n=5)<br>Freq (%) | Total<br>(n=167)<br>Freq (%) |
|-------------------------------|--------------------------------------|---------------------------------|------------------------------|---|--------------------------------------|--------------------------------|------------------------------|
| <b>Marital Status</b>         |                                      |                                 |                              |   |                                      |                                |                              |
| Married                       | 38 (92.7)                            | 1 (7.3)                         | 39 (100.0)                   | Fisher's Exact                            | 21 (95.5)                            | 1 (4.5)                        | 22 (100.0)                   |
| Not married                   | 115 (91.3)                           | 11 (8.7)                        | 126 (100.0)                  | P=1.000                                   | 141 (97.2)                           | 4 (2.8)                        | 145 (100.0)                  |
| <b>Educational attainment</b> |                                      |                                 |                              |   |                                      |                                |                              |
| <Secondary                    | 37(90.2)                             | 4 (9.8)                         | 41 (100.0)                   | Fisher's Exact                            | 25(100.0)                            | 0 (0.0)                        | 25 (100.0)                   |
| ≥Secondary                    | 116 (92.1)                           | 10 (7.9)                        | 126(100.0)                   | P=0.748                                   | 137 (96.5)                           | 5 (3.5)                        | 142(100.0)                   |
| <b>Employment Status</b>      |                                      |                                 |                              |   |                                      |                                |                              |
| Employed                      | 38 (92.7)                            | 3 (7.3)                         | 41 (100.0)                   | χ <sup>2</sup> =0.814*<br>df=3<br>p=0.846 | 6 (75.0)                             | 2 (25.0)                       | 8 (100.0)                    |
| Unemployed                    | 27 (93.1)                            | 2 (6.9)                         | 29 (100.0)                   |   | 13 (92.9)                            | 1 (7.1)                        | 14 (100.0)                   |
| Student                       | 60 (92.3)                            | 5 (7.7)                         | 65 (100.0)                   |   | 140(99.3)                            | 1 (0.7)                        | 141 (100.0)                  |
| Apprentice                    | 28 (87.5)                            | 4 (12.5)                        | 32 (100.0)                   |   | 3 (75.0)                             | 1 (25.0)                       | 4 (100.0)                    |
| <b>Religion</b>               |                                      |                                 |                              |   |                                      |                                |                              |
| Christianity                  | 53 (93.0)                            | 4 (7.0)                         | 57 (100.0)                   | χ <sup>2</sup> =2.507*<br>df =2           | 77 (96.3)                            | 3 (3.8)                        | 80 (100.0)                   |
| Islam                         | 99 (91.7)                            | 9 (8.3)                         | 108 (100.0)                  |   | 82 (97.6)                            | 2 (2.4)                        | 84 (100.0)                   |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22233375>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

|                                |           |          |             |          |            |          |             |
|--------------------------------|-----------|----------|-------------|----------|------------|----------|-------------|
| Traditional                    | 1 (50.0)  | 1 (50.0) | 2 (100.0)   | p=0.286  | 3(100.0)   | 0 (0.0)  | 3 (100.0)   |
| <b>Living arrangement</b>      |           |          |             |          |            |          |             |
| Partner                        | 46 (93.9) | 3 (6.1)  | 49 (100.0)  | $\chi^2$ | 9 (90.9)   | 1(10.0)  | 10(100.0)   |
| Parents                        | 71 (92.2) | 6 (7.8)  | 77 (100.0)  | =12.903* | 126 (99.2) | 1 (0.8)  | 127 (100.0) |
| Grandparents                   | 33 (97.1) | 1 (2.9)  | 34 (100.0)  | df =3    | 11 (100.0) | 0(0.0)   | 11 (100.0)  |
| Alone                          | 3 (42.9)  | 4 (57.1) | 7 (100.0)   | p=0.005  | 16 (84.2)  | 3 (15.8) | 19 (100.0)  |
| <b>Parent's Marital Status</b> |           |          |             |          |            |          |             |
|                                |           |          |             | Fisher's |            |          |             |
| Married                        | 98 (90.7) | 10 (9.3) | 108 (100.0) | Exact    | 146 (96.7) | 5 (3.3)  | 151 (100.0) |
| Not Married                    | 55 (93.2) | 4 (6.8)  | 59 (100.0)  | P=0.772  | 16 (100.0) | 0 (0.0)  | 16 (100.0)  |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

23

24

25

26

27

28 **Table 4 :Relationship between depression and psychosocial variables in pregnant and non-**  
 29 **pregnant adolescents**

|  | Pregnant adolescents | Non-pregnant adolescents |
|--|----------------------|--------------------------|
|--|----------------------|--------------------------|

| Variable                    | Not Depressed<br>(n=153)<br>Freq (%) | Depressed<br>(n=14)<br>Freq (%) | Total<br>(n=167)<br>Freq (%) | Statistics                        | Not Depressed<br>(n=162)<br>Freq (%) | Depressed<br>(n=5)<br>Freq (%) | Total<br>(n=167)<br>Freq (%) |
|-----------------------------|--------------------------------------|---------------------------------|------------------------------|-----------------------------------|--------------------------------------|--------------------------------|------------------------------|
| <b>Hx of mental illness</b> |                                      |                                 |                              |                                   |                                      |                                |                              |
| Yes                         | 159 (97.0)                           | 5 (3.0)                         | 164 (100.0)                  | Fisher's Exact<br>P=0.029         | 3 (100.0)                            | 0 (0.0)                        | 3 (100.0)                    |
| No                          | 147 (93.0)                           | 11 (7.0)                        | 158 (100.0)                  |                                   | 159 (97.0)                           | 5 (3.0)                        | 164 (100.0)                  |
| <b>Social support</b>       |                                      |                                 |                              |                                   |                                      |                                |                              |
| Poor                        | 20 (87.0)                            | 3 (13.0)                        | 23 (100.0)                   | $\chi^2=4.954$<br>df=2<br>p=0.611 | 28 (93.3)                            | 2 (6.7)                        | 30 (100.0)                   |
| Intermediate                | 99 (91.7)                            | 9 (8.3)                         | 108 (100.0)                  |                                   | 87 (98.8)                            | 1 (1.1)                        | 88 (100.0)                   |
| Strong                      | 34 (94.4)                            | 2 (5.6)                         | 36 (100.0)                   |                                   | 47 (95.9)                            | 2 (4.1)                        | 49 (100.0)                   |
| <b>Hx of CPA*</b>           |                                      |                                 |                              |                                   |                                      |                                |                              |
| Absent                      | 131 (92.3)                           | 11 (7.7)                        | 142 (100.0)                  | Fisher's Exact<br>p=0.443         | 147 (97.4)                           | 4 (2.6)                        | 151 (100.0)                  |
| Present                     | 22 (88.0)                            | 3 (12.0)                        | 25 (100.0)                   |                                   | 15 (93.8)                            | 1 (6.3)                        | 16 (100.0)                   |
| <b>Hx of CSA++</b>          |                                      |                                 |                              |                                   |                                      |                                |                              |
| Absent                      | 126 (94.0)                           | 8 (6.0)                         | 134 (100.0)                  | $\chi^2=5.141$<br>df=1            | 134 (97.8)                           | 3 (2.2)                        | 137 (100.0)                  |
| Present                     | 27 (81.8)                            | 6 (18.2)                        | 33 (100.0)                   |                                   | 28 (93.3)                            | 2 (6.7)                        | 30 (100.0)                   |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

|  |            |          |             | <b>p=0.023</b>    |            |          |             |
|--|------------|----------|-------------|-------------------|------------|----------|-------------|
| <b>Recent Abuse</b>                      |            |          |             |                   |            |          |             |
| Absent                                   | 118 (90.8) | 12 (9.2) | 130 (100.0) | Fisher's          | 113 (97.4) | 3 (2.6)  | 116 (100.0) |
| Present                                  | 35 (94.6)  | 2 (5.4)  | 37 (100.0)  | Exact             | 49 (96.1)  | 2 (3.9)  | 51 (100.0)  |
|  |            |          |             | <b>p =0.737</b>   |            |          |             |
| <b>Anxiety</b>                           |            |          |             |                   |            |          |             |
| Negative                                 | 145 (94.2) | 9 (5.8)  | 144 (100.0) | $\chi^2 = 16.606$ | 141 (98.6) | 2 (1.4)  | 143 (100.0) |
| Positive                                 | 8 (61.5)   | 5 (38.5) | 13 (100.0)  | df = 1            | 21 (87.5)  | 3 (12.5) | 24 (100.0)  |
|  |            |          |             | <b>p=0.001</b>    |            |          |             |
| <b>Pregnancy*+ status</b>                |            |          |             |                   |            |          |             |
|  |            |          |             | $\chi^2 = 0.137$  |            |          |             |
| Planned                                  | 62 (92.5)  | 5 (7.5)  | 67 (100.0)  | df = 1            |            |          |             |
| Not planned                              | 90 (90.9)  | 9 (9.1)  | 99 (100.0)  | p=0.711           | -----      | -----    | -----       |
| <b>Pregnancy disposition<sup>s</sup></b> |            |          |             |                   |            |          |             |
| Happy                                    | 69 (93.2)  | 5 (6.8)  | 74 (100/0)  | $\chi^2$          |            |          |             |
| Sad                                      | 47 (87.0)  | 7 (13.0) | 54 (100.0)  | =2.035**          | -----      | -----    | -----       |
| Indifferent                              | 35 (94.6)  | 2 (5.4)  | 37 (100.0)  | df = 2            |            |          |             |
|  |            |          |             | <b>p=0.362</b>    |            |          |             |

medRxiv preprint doi: <https://doi.org/10.1101/2022.04.01.22273317>; this version posted April 2, 2022. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. It is made available under a [CC-BY 4.0 International license](https://creativecommons.org/licenses/by/4.0/).

30 \*CPA- childhood physical abuse; ++CSA-childhood sexual abuse; \*\*likelihood ratio  $\chi^2$

31 \*+n=166 ; <sup>s</sup>n=165

32