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Detection of Depressive-Anxiety Symptomatology and Associated Risk Factors Among Pregnant Women in a Low-Income Neighborhood.

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ABSTRACT

Aim: To determine the prevalence of anxiety-depressive symptomatology and associated risk factors in a population of pregnant women in the low-income neighborhood of Roquetes (Barcelona, Spain).

Design: Quasi-experimental, cross-sectional study.

Location: The study was carried out at the Primary Care Center, Roquetes Canteres, Barcelona.

Participants: Between 2015-2017, all pregnant women who visited the Sexual and Reproductive CareTeam in Primary Care (ASSIR) or their Family Physician (FP) were invited to take part in a study if they met the following criteria: a) over 18 years old b) able to understand in any of the 4 study languages. Of a total of 239 gestating women, 19 declined to participate, 14 moved away from the area and 16 underwent voluntary termination of pregnancy, leaving a sample of 190 subjects.

Material and methods: The Edinburgh Perinatal Depression Scale (EPDS) was used to detect depressive symptomatology, the State-Trait Anxiety Inventory (STAI) was used to assess anxiety, and a sociodemographic data questionnaire was administered. Once all descriptive demographic data from the whole sample was analyzed, baseline clinical and demographic characteristics were compared using the independent t-test for continuous variables and the chi-squared analysis for categorical variables.

Results: The t-test showed that 48% of pregnant women presented an at-risk degree of anxiety-depressive symptomatology, double that found in the general population. Applying a chi-squared test to the at-risk and non-risk groups revealed associated prenatal risk factors including: having a history of violence; living in a rented room, mistreatment in infancy and mental health issues. The ROC curves analysis obtained a cut-off point score of 4 Accumulated Associated Factors (AAF) (AUC 0.765, $p<0.001$, 57% sensitivity and 79% specificity). Conclusions: Our study shows that rates of anxiety-depressive symptomatology in a population with considerable socio-economic deprivation can more than double. AAF in the population at risk of anxiety and depression were detected, highlighting the need to allocate resources to identification and

prevention during pregnancy. This requires the involvement of a multidisciplinary, professional team with a biopsychosocial perspective.

KEY WORDS: Depression/Anxiety, Pregnancy, Low-income, Risk factors, Cross-sectional.

Introduction

The study of perinatal mental health and concern over its impact on the mental health of children has increased in recent years [1],[2]. Depression with anxiety symptomatology is the most frequent diagnosis during the first year postpartum, while untreated depression is related to a high risk of relapse [3]. Recently published studies estimate that 20% of women suffer from postpartum depression [4], [5], making it the most frequent diagnosis in this vital period. According to the Spanish study [6], a prevalence of 21.1% of DPP is observed in women, using an EPDS cut-off point score of 9.

Various studies describe perinatal depression risk factors. However, there is a knowledge gap regarding risk factors in low-income populations (WHO 2008) [7], although we are aware that the incidence of perinatal depression can double in this type of population [8]. A systematic review [9] concluded that perinatal mental health among women who live in low- and middle-income countries has only lately become a focus for research.

Perinatal depression can have serious long-term effects on women's wellbeing, infant development, and the link between mother and baby [10], [11], [12], [13]. Recent results [12] suggest that detection of depression during pregnancy and postpartum reduces both the symptoms and prevalence of the disorder. The mother's depression involves severe risks to the baby's development, the mother herself and the proper establishment of the mother-baby link. This has been confirmed in longitudinal studies of depression and anxiety [11,13]. The latter explored the association between risk factors in pregnancy and subsequent behavioral disorders and hyperactivity in the children. Separately, a study carried out in Finland with a sample of 10,000 families concluded that the fact that the mother had not suffered from postpartum depression constituted an important protective factor against the risk of psychosis in the child [14]. In Barcelona, pregnant women were assessed at a public perinatal psychiatric service. The results show that emotional abuse in infancy, family psychiatric history, previous psychiatric hospitalization and anxiety during pregnancy were significant predictors of postpartum disorders [15].

Diagnosis of depression during pregnancy reveals varying degrees of symptomalogical intensity [6]. The most severe depression is quite evident and often includes requests for help, while minor depression and anxiety symptoms frequently go unnoticed. Without effective treatment, some 30% of depression becomes chronic as recurrent depressive disorder. Perinatal depression is frequent, under-diagnosed, and can have serious long-term effects on the wellbeing of mothers, their partners and their babies [10].

Hypothesis: The purpose of the current research study was to determine whether the prenatal depressive-anxiety symptomatology is higher in a low-income neighborhood than in the general population. Furthermore, we were interested in whether depressive and anxious subjects presented with associated risk factors at the first screening.

Material and methods

The research procedures were approved by the Clinical Research Ethics Committee at IDIAP Jordi Gol i Gurina; code number P715 dated 17/04/2015.

This is a quasi-experimental, cross-sectional study for the detection of depressive-anxiety symptomatology and associated factors. A screening program was performed in the pregnant population attending Roquetes-Canteres Primary Care Center (PCC).

This study forms part of a wider, prospective investigation[1] which analyzes changes over time in pregnant women with depressive-anxiety symptomatology following a brief psychotherapeutic intervention (PCP, parenthood-centered psychotherapy) [16]. This replicates, in a low-income neighborhood in Barcelona, the research conducted by the Geneva School-Geneva University Hospitals (GUH) [17] coordinated by Dr. Nanzer.

Characteristics of the neighborhood population.

The study took place at a Primary Care Center (PCC) in a low-income neighborhood in Barcelona (1.46 multiple deprivation index). The research was performed at the Roquetes-Canteres PCC, which covers a population of 16,361 people and is located in the Nou Barris district of Barcelona. Family income in this neighborhood, with respect to the Barcelona average, is almost half (Barcelona 50.4%) [18], the unemployment rate is much higher than average, and immigrants represent 21.95% of inhabitants. The proportion of older people (>75 years account for 9.67%) is lower than that in Barcelona. The neighborhood is known for its housing problems. On the other hand, it has a very active, demanding residents' network, with a strong sense of belonging. The neighborhood itself was created through the joint efforts and labor of migrants who arrived in an earlier wave of migration in the 1960s. The Primary Care Team (PCT) at Roquetes-Canteres PCC has functioned as a community health service since its inception. In 2003, the Community Development Plan was implemented to provide a health program specifically for the neighborhood and the PCT was established to perform this role.

Inclusion and exclusion criteria

Study inclusion criteria were: pregnant women, aged 18 years or over, and attending the Roquetes-Canteres PCC. Exclusion criteria were: inability to communicate in Catalan, Spanish, French or English, intellectual disability or psychiatric pathology severe enough to require intensive treatment.

Study design

Detection and follow-up was carried out by the multi-disciplinary team: midwife (SRHCP), general practitioner (GP), nurse, social worker, pediatrician (PCT), and psychologist.

All pregnant women consulting PCC and Sexual and Reproductive Health Care Professionals (SRHCP), and who met inclusion criteria, were invited to participate. Signed informed consent was requested from all participants by the first care provider who met the pregnant women. After

[1] The impact of an intervention in parenthood in Primary Health Care for pregnant women at risk of anxiety and depression: development of maternal representations and the mother-baby relationship.

an introductory visit to explain the study at 8 weeks of pregnancy, socio-demographic questionnaires (Ad-hoc) for maternity were administered through an interview. Subsequently, the midwife (pregnancy week 13) and/or then the general practitioner (pregnancy week 24) administered the depression (EPDS) and anxiety (STAI) questionnaires. The clinical psychologist telephoned the pregnant women to inform them about the results of the questionnaires, and propose Parenthood-Centered Psychotherapy (PCP) if they were considered to be at risk. Two groups of pregnant women were established: one group at risk of depression and/or anxiety and a second group in which risk of either was not detected.

In the first two years of the study (Sept' 2015-Dec' 2017), data from the interviews and questionnaires were collected on pregnant women who attended the PCC. Of a total of 239 women, 19 declined to take part in the study. Some 30 women were lost-to-study; 14 due to change of address and 16 due to termination of pregnancy, leaving a sample of 190 pregnant women.

Study instruments

The following instruments were used to evaluate depressive anxiety symptoms

- *EPDS The Edinburgh Postnatal Depression Scale* (Cox, Holden and Sagovsky) was initially validated to assess depressive symptomatology in the postnatal period. It was later validated as a reliable means of identifying symptoms of depression in pregnant women [19,20]. A score equal to or greater than 9 is considered to indicate risk. We used the version validated in a Spanish population [6].

- *STAI Questionnaire***.** The State-Trait Anxiety Inventory [20] is one of the instruments used most frequently to measure anxiety. It differentiates between situations causing temporary anxiety, and permanent anxiety as a trait. It has been shown to be a valid, sensitive instrument for the measurement of anxiety in different populations and has been validated in a Spanish adult population [22]. A score equal or greater than 39 is commonly used as a cut-off point.

To analyze sociodemographic data and associated risk factors:

- *Sociodemographic and risk factors data questionnaire (SRFDQ).* This is an interview created ad-hoc by the primary care research team and administered during the first visit. It collects data on the following variables: socio-demographic (housing, nationality, age, educational level, employment status), previous indicators (terminations, planned or unplanned pregnancy, and number of children), psychological data (partner support, family support), and mental health history (previous mental health care, psychotropic medication, substance use, mistreatment in infancy, violence and abuse), and important family losses.

Statistical analysis

The statistical analysis was carried out with the SPSS version 20 for Windows and Medcalc for ROC curves analysis.

First, we analyzed descriptive demographic data for the whole sample. Subsequently, we compared baseline demographic and clinical characteristics using the independent t-test for continuous variables and chi-squared analysis for categorical variables.

We established two groups; a risk and a non-risk group according to EPDS and STAI-S and STAI-T scores. Differentiation into two groups allowed a new analysis of risk factors associated with prenatal mental health to be carried out. The risk group contained pregnant women who obtained high scores in at least two of the three instruments. We applied the chi-squared test to study the relationship with the associated factors and their odds ratio. Based on the significant associated factors, the averages of the number of accumulated factors for both the risk and non-risk groups were calculated, as well as the correlation between the accumulated associated factors and the EPDS and STAI values for both groups. We applied a ROC curve to study the number of AAF to discriminate between the risk and non-risk groups.

Results

Of the 190 women who agreed to take part in the study, 71 women (37.37%) presented an EPDS score indicating risk of depression. On the STAI, 104 pregnant women (54.76%) had clinically significant scores for state anxiety and 78 women (41.05%) had significant scores for trait anxiety.

Based on the subjects who met criteria for risk of depressive and anxiety symptomatology, we obtained a total sample of 91 patients, which represented a rate of 47.89%.

We obtained statistically significant differences when comparing the means of the risk and non-risk groups in both the EPDS ($p<0.000$; mean risk group 12.26 (SD 2.44) vs 3.79 (SD 4.61) non-risk group), and the STAI (STATE: $p<0.000$ mean risk group 64.46 (SD 24.64) vs 21.91 (SD 19.93) non-risk group and TRAIT: $p<0.000$ mean risk group 58.97 (SD 26.72) vs 16.43 (SD 13.55) non-risk group).

(Graph 1. Summarizes the depression (1a) and anxiety (1b) scores in the risk and non-risk groups).

At the statistical level, the chi-squared statistic was employed to compare the at-risk and non-risk groups and identify which associated factors were significant.

In the following table, we compare the characteristics of the pregnant population with non-risk scores and the population with risk scores, indicating statistical significance.

Table 1. Sociodemographic description and associated factors results for the non-risk and at-risk groups.

Following identification of the 14 associated factors that discriminated between the groups, we found very significant Pearson correlations in EPDS (0.457), and STAI State (0.416) and STAI trait scores (0.461). These factors allowed us to study whether the number of Accumulated Associated Factors (AAF) affects prenatal mental health. The mean AAF for the non-risk group became 2.9 (SD 1.88) while in the risk group, the mean AAF nearly doubled (5.32; SD 2.53); while significant statistical differences were observed between these two groups in AAF by applying a mean score comparison for independent samples (p 0.000). The cut-off score of the

AAF through the Youden index was 4 and higher (AUC 0.765, $p<0.001$, 57% sensitivity and 79% specificity, +LR 2.69 and -LR 0.54).

Discussion

The study population presents a high percentage of prenatal depressive-anxiety symptomatology, which is more than double (48%) the rate reported in the literature [6]. This high rate may be explained by the circumstances of a low-income population [8].

We detected a significant presence of risk factors associated with depressive-anxiety symptomatology. Both a WHO 2008 study [7] and a systematic review [9] highlight depression and anxiety during pregnancy and recent stressful events as factors strongly predictive of postpartum depression. It also emphasized the importance, among the associated factors, of the quality of the couple's relationship and family support, social and economic circumstances, the presence of previous voluntary termination, and unplanned pregnancy [9].

In our study, unemployment and not having one's own home (living in a rented room) emerged as highly significant associated factors. Also of note were two variables related to traumatic situations in infancy and violence that were not reported in the previously mentioned studies.

Surprisingly, we did not find the important family losses variable to be discriminant between the at-risk and non-risk groups in anxiety and depression during pregnancy despite the fact that earlier studies indicate the importance of losses in postpartum depression [8]. This may be explained by the elevated presence of family member losses in both groups (risk and non-risk) in this low-income neighborhood.

Many authors have pointed out that in low-income populations such as the one studied, the multiplicity of accumulated associated risk factors (AAF) detected requires more extensive studies and underlines the value of prenatal detection and the longitudinal approach in Primary Health Care (PHC). More than 4 AAFs in an individual represented significant prenatal depression/anxiety risk. Further study in this field would allow in-depth evaluation of the importance of prevention in antenatal mental health care through the identification of associated risk factors. In a low-income neighborhood, with the associated high risk of prenatal depression, risk factors need to be identified from the beginning of the pregnancy to plan mental health care for the baby and the mother.

The results of this study have important consequences for therapeutic intervention in pregnant women with 4 or more AAF, involving follow-up by a social worker. This aspect is highly relevant as it allows women at greater risk to be accompanied more closely and receive biopsychosocial support, including a psychotherapy. As previously mentioned, this study forms a part of a wider investigation in which all pregnant women with EPDS and STAI clinical scores receive Parenthood-Centered Psychotherapy (PCP), which has had positive results in earlier studies [17].

As mentioned previously, the literature highlights the effects of perinatal depression and anxiety on the baby's development, the mother-baby bond and on the course of the mothers' symptomatology, as it already known as maternal anxiety is related to adverse outcomes

[23]. Detection and treatment needs to be approached from a biopsychosocial perspective in pregnancy, as this allows both containment and the freeing of a space for a healthy mother-baby link to be established that promotes the child's development. Treating early bonding in the mother-baby relationship has long-lasting effects on the construction of the baby's self. This classical psychological concept is in line with recent contributions [14] on the absence of postpartum depression as a protective factor against severe developmental disorder in the baby.

It is important to emphasize the need to perform a comprehensive exploration of depression/anxiety symptoms together with AAF in pregnant women and a multidisciplinary biopsychosocial follow-up, particularly in low-income neighborhoods. The present study should be extended to other types of populations to determine universal risk factors in pregnancy.

Prenatal detection in PHC allows continuity of care and interdisciplinary cooperation in a period of high vulnerability through the involvement of many PHC professionals (midwife, GP, obstetrician, social worker, pediatrician and pediatric nurse, psychotherapists) who monitor the mother and baby's emotional development [12]. Indicators of depression in the mother-baby relationship should be shared with pediatrics (medicine and nursing) to permit a global understanding of the mother-baby link. The social worker deals with the social aspects of risk, coordinating with the network to reduce fragmentation of care services. It should be stressed that interdisciplinary work promotes detection of risk and the adherence of pregnant women to the study.

Sensitization and training on perinatal issues for professionals, and the offer of psychotherapeutic care (PCP) from the PCT, promotes detection and care of pregnant women at risk in a network. Parenthood represents an essential life transition. The prevalence of depression and anxiety in the perinatal period underlines the need for mothers to have the opportunity to avail of mental health care.

There is growing consensus on the importance of detection and early intervention in prenatal depression. As such, it would be useful to promote biopsychosocial detection systems and lines of research [24] that would allow us to identify not only indicators of risk, but also protective factors. In low-income neighborhoods, community health care provided through a network is especially important. Future research could include the study of psychotherapeutic care programs for the prevention of perinatal depression and anxiety in this high risk population, and follow-up of infant development and the mother-baby link through primary health care.

Among the limitations of our study, we would like to highlight the exclusion of the population <18 years, those pregnant teenagers who, due to their characteristics, have specific SRHCP care facilities, and the non-inclusion of pregnant women >18 with language barriers. This excluded population is potentially at high risk and needs further care and study.

Conclusions

Prenatal anxiety-depressive symptomatology reached a rate of 48% in the study sample. This is in line with information showing that rates in low-income populations can rise to more than double those seen in the general population.

Prenatal detection of new significant risk factors associated with depressive-anxiety symptomatology by PHC allows development of preventive strategies for health professionals and policy-makers that can be tested in subsequent studies with larger samples.

The accumulation of associated risk factors with depressive-anxiety symptomatology suggests that there is a need to promote systematic interdisciplinary work and inter-level care (SRHC, PHC, Maternity Hospital). This favors detection and treatment adherence in pregnant women, facilitating continuity of care in the nuclear family to prevent symptoms of depression and anxiety and promote healthy mother-baby interactions.

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Conflict of interest
The authors declare no conflict of interest.

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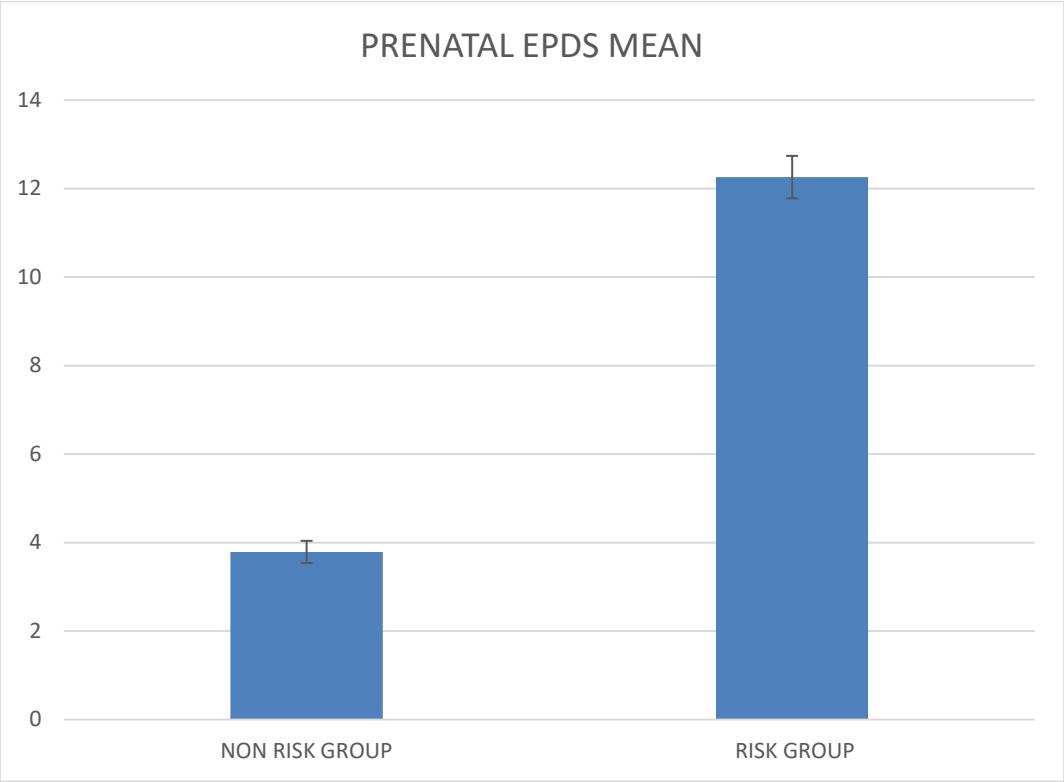
Graph 1a. Comparison of Prenatal EPDS Mean score between Risk group and Non risk group. (p<0.000)



Graph 1b. Comparison of Prenatal STAI Mean score between Risk group and Non risk group. . (p<0.000)

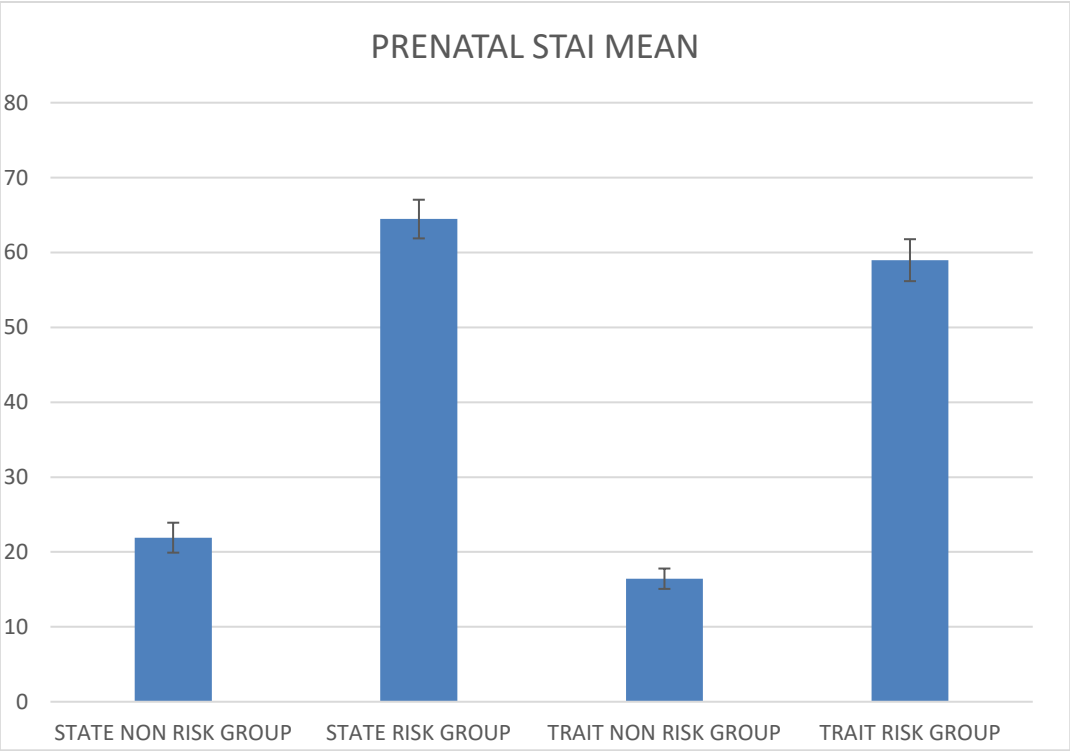


Table 1. Sociodemographic description and associated factors results for the non-risk and at-risk groups.

	Table 1. Descriptive results (general population of pregnant women with non-risk scores and the cohort sample with risk scores).			
	Non-risk group N=99 (%)	At-risk group N = 91 (%)	p-value	Odds ratio
Age, M (SD)	30.77 (5.57)	29.49 (5.82)	0.125	
Origin outside Europe**	**33 (33.33)**	**49 (53.85)**	**0.004**	**2.333**
University education	26 (26.26)	17 (18.68)	0.212	
No basic education*	**18 (18.18)**	**28 (30.77)**	**0.043**	**2.000**
Offspring (average) M (SD)	0.69 (0.88)	0.86 (1,01)	0.214	
First child	54 (54.54)	40 (43.96)		
Second child	26 (26.26)	33 (36.26)		
Important family member losses	40 (40.40)	40 (43.96)	0.620	
Living in one room**	**4 (4.04)**	**19 (20.88)**	**0.000**	**6.267**
Unemployed*	**24 (24.24)**	**36 (39.56)**	**0.023**	**2.065**
Lack of partner support**	**1 (1.01)**	**17 (18.68)**	**0.000**	**22.514**
Lack of family support**	**2 (2.02)**	**20 (21.98)**	**0.000**	**12.799**
Lack of social relationships*	**1 (1.01)**	**8 (8.79)**	**0.012**	**9.446**
Previous miscarriage*	**32 (32.32)**	**48 (52.75)**	**0.004**	**2.141**
Previous voluntary pregnancy termination*	**21 (21.21)**	**34 (37.36)**	**0.014**	**1.705**
Unplanned pregnancy	26 (26.26)	35 (38.46)	0.072	
History of mental health problems**	**11 (11.11)**	**28 (30.77)**	**0.001**	**3.556**
Consumption of psychotropic drugs*	**11 (11.11)**	**22 (24.18)**	**0.018**	**2.551**
Stressful events in the previous 24 months*	**38 (38.38)**	**50 (54.95)**	**0.022**	**1.792**
Previous experience of violence**	**4 (4.04)**	**25 (27.47)**	**0.001**	**8.996**
Experience of mistreatment in infancy**	**5 (5.05)**	**20 (18.6)**	**0.001**	**5.296**

* p<.05 ** p<.001.

Figure 1. Roc curve of Accumulated Associate Factors in Risk and Non-Risk group.