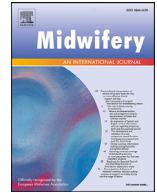




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Suicidal ideation: Prevalence and risk factors during pregnancy

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ARTICLE INFO

Article history:

Received 7 October 2020

Revised 10 December 2021

Accepted 13 December 2021

Keywords:

Prenatal suicidal ideation

Maternal mental health

Prevalence

Predictor Variables

Risk factors

Pregnancy

ABSTRACT

Introduction: Although suicide is the main cause of maternal death during pregnancy in industrialized countries, there are few research regarding the prevalence and risk factors of suicidal ideation during pregnancy, especially in Spain. **Method:** In a multicenter study, the sample included 1,524 pregnant women recruited from an obstetrics setting from two Spanish tertiary-care public hospitals. The prevalence of prenatal suicidal ideation was estimated by analyzing their responses to item 9 on the Patient Health Questionnaire (PHQ-9). The risk factors (which increases the probability of having suicidal ideation) included sociodemographic and biomedical variables, and the stress subscale from the revised prenatal version of the Postpartum Depression Predictors Inventory (PDPI-R). **Results:** A total of 2.6% of pregnant women reported suicidal ideation. Risk factors of suicidal ideation during pregnancy include sociodemographic, such as prior history of depression ($\beta = 0.120, p < .05$), unemployment ($\beta = 0.149, p < .05$), and being an immigrant ($\beta = 0.140, p < .01$), and biomedical variables, such as previous abortion ($\beta = 0.169, p < .01$) and assisted reproduction ($\beta = -0.100, p < .05$). **Discussion:** Given that the prevalence of suicidal ideation is higher than expected, the results of the study suggest the critical need for screening and designing preventive interventions adapted to pregnant women to decrease risk of associated suicidal behavior. In protocols carried out by midwives, specific risk factors should be included in health screenings during pregnancy.

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Introduction

Suicide is the leading cause of maternal death during pregnancy in industrialized countries and the leading cause of maternal mortality in the first 12 months after childbirth (Al-Halabi et al., 2019; The Australian Institute of Health and Welfare, 2014;). As shown in studies carried out in English-speaking countries, suicide among women during the perinatal period occurs less frequently than women in the general population (during the perinatal period, the rate is between 1 and 5; in the general population, 5–10 women commit suicide per 100,000 inhabitants; Howard et al., 2011).

Suicidal ideation is considered one of the main predictors of attempted and completed suicide in general population (Gelaye et al., 2016). Suicide is more common in people with sui-

cidal ideation than in perinatal women (O'Carroll et al., 1996). The scientific literature views suicide as moving along a continuum of different nature and severities ranging from ideation (the idea of death as a rest, the desire to die) to actual suicidal behavior (Khalifeh et al., 2016). O'Carroll et al. (1996) defined suicidal ideation as thoughts of carrying out behaviors related to suicide (O'Carroll et al., 1996).

Although antenatal depression has been a topic of research, there is less knowledge about suicidal ideation during pregnancy, in part because studies are hampered by social stigma and limited by available data (Zhong et al., 2016). However, it is known that depression is a risk factor for suicide ideation in pregnant women (Gavin et al., 2011; Rodriguez et al., 2018). Approximately 14.8% of women experience moderate to high levels of depressive symptoms during pregnancy (Rodríguez-Muñoz et al., 2017). In addition, negative outcomes of perinatal depression and maternal suicidal ideation include women's poor psychological health and, in the worst-case scenario, death. Studies indicate that pregnant women

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Table 1
Risk factors associated with suicidal ideation during pregnancy.

Study	N	Demographics/country	Suicidal ideation	Risk Factors
Gavin et al., 2011	2159	Mean age = 30.6 years Education <12 years 20.3% White (66.3%), Asian (11.2%), Latina (9.8%), Black (7.6%), multi-racial (3.9%), American Indian (2.6%), and Pacific Islander (1.3%). USA	PHQ- 15	Antenatal major depression Antenatal psychosocial stress
Gelaye et al., 2016	Mean sample size of the 57 eligible articles = 2534	USA, Europe, South America and Asia	PHQ-9 EPDS BDI BSI HSRD	Intimate partner violence Education <12 years Major depressive disorder
Kim et al., 2015	22,118	Unpartnered 17% Different ethnicities (Caucasian 55%, Hispanic 12%, African American 7%, and another ethnicity 26%) Different languages (English-speaking 93%, Spanish-speaking 6%) USA	EPDS	Younger maternal age Unpartnered Non-Caucasian ethnicity Non-English language Preexisting psychiatric diagnosis
Newport et al., 2007	383	Mean age = 32.4 years Different ethnicities (Caucasian 84.1%, African American 11.2%, Asian 2.1%, Native American 2.1%, and multiethnicity 0.5%) Mean education = 15.8 years Married 79.4%, 14.4% never married and 6.3% divorced/separated USA	BDI HRSD	Unplanned pregnancy Current major depressive Comorbid anxiety disorder
Onah et al., 2017	376	18–24 years 39%, 25–29 years 30% and > 29 years 31% In an intimate relationship 94% Low education level 40% Not working currently 58% Low socioeconomic status 71% South Africa	Mini-International Neuropsychiatric Interview suicide module	Major depressive episode Any anxiety disorder Lifetime suicide attempt Multiparous

who endorsed suicidal ideation are more likely to have current and lifetime comorbid depressive and anxiety disorders than did women without suicidal ideation (Copersino et al., 2008). Maternal suicidal ideation also results in negative effects on infants, including a poorer mother-infant relationship (Lara and Letechipia, 2009), lower birthweight (Gelaye et al., 2019; Lara and Letechipia, 2009), worse cognitive development in children (Mebrahtu et al., 2020), and childhood respiratory distress syndrome (Gandhi et al., 2006). Thus, there is substantial evidence suggesting that suicidal ideation and attempts are associated with severe consequences for fetal development and perinatal outcomes (Gelaye et al., 2016).

Consequently, Al-Halabi et al. (2019) emphasize the importance of adequately identifying women who present suicidal ideation during pregnancy and postpartum to prevent these adverse consequences. However, to our knowledge, few studies have collected

data on suicidal ideation during pregnancy, especially in Spanish-speaking countries.

Although the overall rates of suicide attempts and completions worldwide are lower in perinatal women than in the general female population, suicidal ideation is higher in pregnant women than in the general population (Rodriguez et al., 2018). Research found that during pregnancy, suicidal ideation is more common than suicide attempts or completed suicides. According to several studies (conducted mostly in English-speaking samples), the prevalence of suicidal ideation during pregnancy is between 2.3% and 2.7% (Arachch et al., 2019; Gavin et al., 2011; Melville et al., 2010). A systematic review of 57 studies, carried out in United States, Pakistan, Bangladesh, Finland, Italy, Brazil and Peru synthesized available research on antenatal suicidal ideation, including its prevalence, risk factors, consequences (Gelaye et al., 2016).

Overall, results from this systematic review indicate that pregnant women are more likely than the general population to endorse suicidal ideation. Risk factors for antepartum suicidal ideation were identified, including intimate partner violence, <12 years education and major depressive disorder. However, this review had some limitations. First, the samples across studies were predominantly English-speaking or Spanish-speaking women from less developed countries; therefore, there is a need to do additional research among pregnant women in Spain, a high-income country. Second, the systematic review did not consider biomedical factors, such as assisted reproduction, previous illness or previous abortions. Therefore, this study adds to this body of research by examining the prevalence of suicidal ideation in pregnancy and associated biomedical and psychological risk factors in Spain.

It is important to study suicidal ideation as this is the most common type along the suicide spectrum, and can lead to more severe suicide attempts and completions. Previous studies have conducted screenings of perinatal suicidal ideation in large populations based on responses to a single item on a questionnaire, thus demonstrating the importance of screening in this population (Copersino et al., 2008; Zhong et al., 2015). Gavin et al. (2011) found a prevalence rate of 2.7% of suicidal ideation, based on a positive response to item 9 on the *Patient Health Questionnaire* (PHQ-9, in a US-based sample of 2159 pregnant women. Additionally, Melville et al. (2010) examined the response to item 9 on the PHQ-15 to estimate the prevalence of suicidal ideation in pregnant women and found a rate of 2.6% in a US-based sample of 1888 women. Other authors, such as Zhong et al. (2015), used item 10 of the Edinburgh Postnatal Depression Scale (EPDS) to estimate the prevalence of suicidal ideation (8.8%) and assessed the level of agreement with the PHQ-9 when measuring suicidal ideation in pregnant women in Peru. They found that the PHQ-9 questionnaire was more sensitive than the EPDS as a screen for suicidal ideation among pregnant women (Zhong et al., 2015). To date, there is less research on the prevalence of suicidal ideation during pregnancy in Spanish-speaking countries.

In addition to examining the prevalence of suicidal ideation, it is also important to study its associated risk factors in pregnant women to prevent the onset of suicidal ideation and its adverse consequences. Worldwide, risk factors for suicidal ideation during pregnancy have been studied for this purpose (Orsolini et al., 2016). The results from existing studies are listed in Table 1.

The findings from earlier studies were primarily conducted with predominantly non-Spanish speaking women; therefore, it is unknown whether the risk factors identified with suicidal ideation in these studies (Gavin et al., 2011) are generalizable to Spanish-speaking perinatal population.

To our knowledge, there are no previous studies in Spanish-speaking samples in which suicidal ideation and associated risk factors have been evaluated. Therefore, the **objectives** of this study are to: 1) determine the prevalence of suicidal ideation in pregnant women and, 2) examine sociodemographic and psychological and biomedical risk factors associated with suicidal ideation in pregnant Spanish-speaking women.

Methods

Participants

The sample consisted of 1524 pregnant women recruited between 2014 and 2017 from the gynecology and obstetrics services from two Spanish tertiary-care public hospitals (Fig. 1) in Madrid (San Carlos Clinic Hospital, HSCS $n = 1124$) and Oviedo (University Hospital of Asturias, HUCA $n = 400$). The sample consisted of 1524 pregnant women recruited between 2014 and 2017 from

the gynecology and obstetrics services from two Spanish tertiary-care public hospitals (Fig. 1) Madrid (San Carlos Clinic Hospital, HSCS $n = 1124$) and Oviedo (University Hospital of Asturias, HUCA $n = 400$). Those sites were chosen to increase geographic representation in Spain, including women from an urban city, (Madrid, Spain's capital), and a smaller urban city in a rural setting (Oviedo). Women participated voluntarily and provided informed consent. Screening took place at the end of the first trimester of pregnancy, when the patients underwent ultrasound examinations. The inclusion criteria of the study were being pregnant and receiving prenatal care at one of these two hospitals. The exclusion criteria were not having Spanish fluency in reading and writing.

The study was approved by the Ethics Committees of both hospitals and followed the principles of the Declaration of Helsinki.

Instruments

Participants completed self-report questionnaires assessing suicidal ideation and associated risk factors.

The prevalence of prenatal suicidal ideation was estimated by using participants' responses to item 9 on *The Patient Health Questionnaire - 9* (PHQ - 9; Kroenke and Spitzer, 2002). This 9-item instrument measures the severity of depressive symptoms, and questions are scored on a 3-point Likert scale from endorsing the symptom as 'not at all' to 'nearly every day' in the last 2 weeks, with higher scores indicating higher severity of symptoms. To evaluate the presence of suicidal ideation, participants' responses on item 9 was used: 'Thoughts that you would be better off dead or of hurting yourself in some way?'. The PHQ-9 was selected as it has strong psychometric properties, is widely used in primary and obstetrics care settings, and applied to samples of pregnant women of various nationalities, including the Spanish population. The Spanish version of the PHQ-9 presents high internal consistency ($\alpha = 0.81$) (Marcos-Nájera et al., 2018).

Risk factors for suicidal ideation were measured using two questionnaires, as shown in Table 2. The first was a sociodemographic questionnaire developed for this study. The second was the Spanish prenatal version of the Postpartum Depression Predictors Inventory - Revised questionnaire (PDPI-R; Beck et al., 2006) which measures 10 different risk factors for postpartum depression. In this study, 'stressful life events' was used, with associated yes/no responses. The PDPI-R has been validated with Spanish-speaking population, yielding good internal consistency ($\alpha = 0.85$), sensitivity (62.3%), and specificity (69.5%) (Ibarra-Yruegas et al., 2018; Rodríguez-Muñoz et al., 2017).

Statistical analyses

Cross-tabulations were performed to determine the sample characteristics. Chi-square tests were used for categorical variables, and *t*-tests were applied for continuous variables to determine whether there were statistically significant differences in the association between the different sociodemographic factors and antenatal suicidal ideation. Women who endorsed suicidal ideation were compared to those who did not endorse suicidal ideation. A series of regressions was also performed to analyze the risk factors associated with prenatal suicidal ideation. The analyses were performed using the statistical program *Statistical Package for Social Science* (SPSS), Version 24.

Results

A total of 39 pregnant women (2.6%) surveyed reported some level of suicidal ideation. The results are shown in Table 3.

Table 4 shows the sociodemographic characteristics of the sample, stratified by the presence or absence of prenatal suicidal

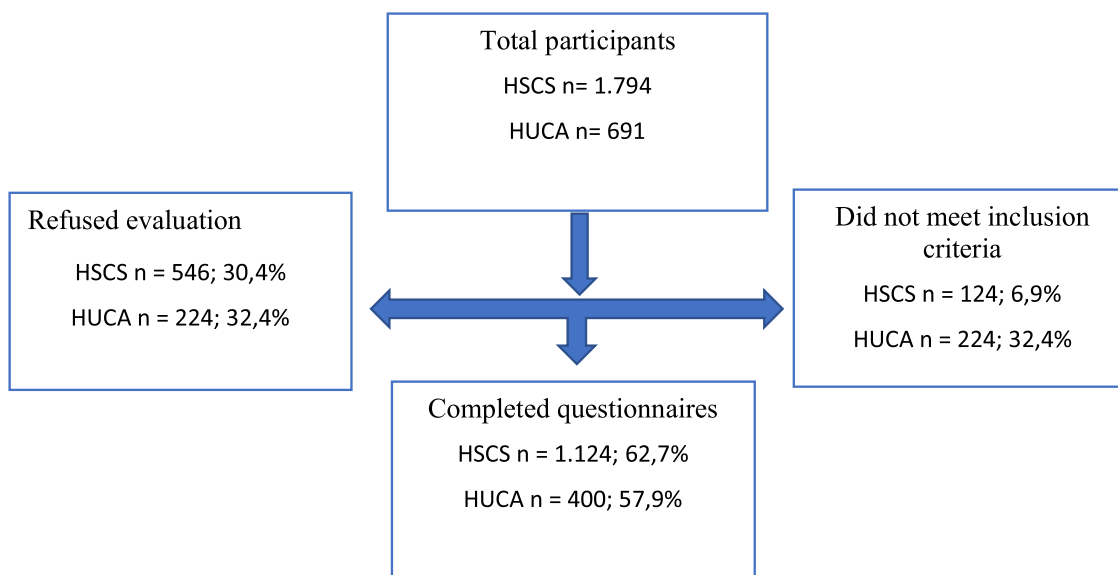


Fig. 1. Participants.

Table 2
Questionnaires used to measure risk factors for suicidal ideation.

Questionnaire	Variables
Sociodemographic questionnaire developed for this study	Age Educational Level Employment Country of Origin Marital Status Weeks' Gestation Participants Week of Pregnancy Methods of Assisted Reproduction Primiparity Healthy Habits and General Health (Previous Illnesses, Tobacco Use, Alcohol Use and Previous Abortion Previous of History Depression
Subscale related to stressful life events from The Postpartum Depression Predictors Inventory - Revised (PDPI - R) prenatal version	Financial Problems Marital Problems Death in the Family Unemployment Serious Illness in the Family Moving Job Change

Table 3
Suicidal ideation responses.

Never (0)	1448	(97.4)
Several days (1)	25	(1.7)
More than half of days (2)	8	(0.5)
Almost every day (3)	6	(0.4)

Note: Responses of women evaluated to item 9 PHQ-9.

ideation. The overall mean age was 32.98±5.3 years, and most participants were employed and not immigrants, partnered, had a high educational; most participants did not report a previous history depression, tobacco or alcohol consumption, previous abortions, and approximately half of the sample were primiparous.

As shown in Table 4, the group who endorsed suicidal ideation (compared to those who did not) had a higher proportion of the following characteristics: unemployed ($\chi^2 = 5.832, p < .05$), immigrants ($\chi^2 = 23.376, p < .01$), previous history of depression ($\chi^2 = 9.653, p < .01$), or a prior abortion ($\chi^2 = 6.679, p < .05$).

Table 5 shows the models used to examine the characteristics that were associated with prenatal suicidal ideation.

Sociodemographic and biomedical risk factors for suicidal ideation in pregnant women found were prior history of depression ($\beta = 0.120, p < .05$), unemployment ($\beta = 0.149, p < .05$), immigrant status ($\beta = 0.140, p < .01$), previous abortion ($\beta = 0.169, p < .01$) and had assisted reproduction ($\beta = -0.100, p < .05$).

Women's responses to life stressors on the PDPI-R is shown in Table 6.

Sociodemographic and particular stressful life events were found to be risk factors for suicidal ideation in pregnant women, such as financial problems ($\beta = 0.063, p < .05$) and marital problems ($\beta = 0.243, p < .01$).

Discussion

In our sample of 1524 Spanish-speaking pregnant women, the prevalence of suicidal ideation was 2.6%. This finding was virtually identical to the prevalence found in previous studies of pregnant women conducted in the US (2.6%, Melville et al., 2010; 2.7%, Gavin et al., 2011). These findings are likely to be representative of the pregnant population in Spain, as pregnant women receive medical services that standardized per institutional medical protocols in Spain. However, systematic mental health screenings are

Table 4
Sociodemographic characteristics.

	Total (n = 1524) M	(SD)	Women with suicidal ideation (n = 39) M (SD)	Women without suicidal ideation (n = 1448) M (SD)	t
Week of gestation	11.87	(1.836)	11.35 (2.2)	11.90 (1.819)	1.438
Age	32.98	(5.266)	31.29 (6.509)	33.07 (5.211)	1.671
	n	(%)	n (%)	n (%)	χ^2
Unemployed	383	(25.3)	16 (41)	347 (24)	5.832*
Immigrants	399	(26.3)	23 (59)	357 (24.7)	23.376**
Single	224	(14.8)	9 (23.1)	206 (14.23)	2.358
Basic educational level	245	(16.1)	8 (20.5)	225 (15.54)	0.697
Previous diagnosis of depression	42	(2.8)	4 (10.8)	35 (2.42)	9.653**
Assisted reproduction	112	(11)	0 (0)	110 (7.6)	2.916
Primiparous	719	(47.6)	16 (41)	688 (47.51)	0.715
Previous illness	285	(19.3)	7 (18.9)	274 (18.92)	0.009
Tobacco	169	(14.1)	5 (16.7)	162 (11.19)	0.146
Alcohol	38	(3.4)	3 (10.7)	33 (2.28)	4.899
Previous abortions	372	(48.7)	16 (76.2)	348 (24.03)	6.679*

*p < .05. ** p < .01.

Table 5
Regression analysis of sociodemographic risk factors for suicidal ideation.

	Model 1 <i>History of previous difficulties</i>	Model 2 <i>Sociodemographic factors</i>	Model 3 <i>Biomedical factors</i>
Previous diagnosis of depression	.119**	.098*	.118*
Unemployment		.126**	.136*
Being immigrant		.140**	.059
Basic educational level		.017	.011
Tobacco		.037	.053
Alcohol		.014	.023
Assisted reproduction			-.098*
Previous illness			.040
Previous abortions			.150**

*p < .05. ** p < .01.

Table 6
Regression analysis – stressful life events for suicidal ideation.

Scale items	Total R ² = 0.07 F (7;1399) = 15.025** B
Financial problems	.063*
Marital problems	.243**
Death in family	-.033
Unemployment	-.020
Serious illness in family	-.031
Moving	.011
Job change	.008

*p < .05. ** p < .01.

not offered during pregnancy, and there are no formal screenings on suicidal ideation. These services have not changed as a result of the pandemic.

In this study, we found several sociodemographic risk factors for suicidal ideation during pregnancy. First, our results revealed that a previous history of depression was a risk factor for prenatal suicidal ideation. This result is consistent with previous studies carried out in non-Spanish speaking populations (Copersino et al., 2008; Gavin et al., 2011; Gelaye et al., 2016; Khalifeh et al., 2016; Newport et al., 2007; Orsolini et al., 2016; Rodriguez et al., 2018). Second, we also found that unemployment was a risk factor for suicidal ideation. Unemployment is closely related to having financial problems, which has been previously found to be associated with a higher probability of suicidal ideation (Gavin et al., 2011; Onah et al., 2017). Third, and not surprisingly, marital problems was found to be risk factor of suicidal ideation for pregnant women in our sample. This finding aligns with a study conducted

with women in Mexico (Lara and Letechipia, 2009). Finally, we found a significant association between immigration and suicide ideation, which requires additional research.

Regarding biomedical factors, our study reports a positive relationship between having a previous abortion and suicidal ideation during pregnancy. This finding is consistent with previous studies conducted in other countries, including Brazil, the United Kingdom, and the US (Coelho et al., 2014). Additionally, while infertility-related stress has been associated with psychological morbidity in the literature, little is known about the relationship between infertility and suicidal risk (Shani et al., 2016). Our results suggest that becoming pregnant after receiving assisted reproduction procedures is a protective factor against suicidal ideation. This result should be cautiously interpreted as suicidal ideation was measured at 12 weeks gestation, where the increased risk of miscarriage has already passed. It is possible that suicidal ideation may be higher if this was measured later in pregnancy.

Overall, the results in this study add to the limited research about the prevalence and risk factors of suicidal ideation in the first months of pregnancy among women in Spain. The main strength of this study includes a large sample representing a wide geographic (both urban and rural) spectrum of the Spanish population. In addition, the study utilized a broad non-clinical sample, which provides a better understanding of the phenomenon of suicidal ideation during pregnancy.

These results have also clinical implications. First, the findings emphasize the need to pay special attention to women with a history of depression, those who are unemployed and are immigrants, and those who have suffered previous abortions. Compared to prior studies, being an immigrant and having had a previous

abortion have not been established risk factors for antenatal suicidal ideation among Spanish speaking population.

Evidence-based interventions are essential to prevent and address suicidal ideation. To date, there are no specific evidence-based guidelines for suicide prevention among perinatal populations (Khalifeh et al., 2016; World Health Organization, 2014). To our knowledge, there is no previous work on evidence-based psychological therapy for suicidal ideation during pregnancy. Research on this issue is still scarce, and more studies about effectiveness of preventive and management programs are required internationally.

Our study has some limitations. First, participants in this study were in their first trimester, and it would be important to determine if these findings are sustained throughout the latter trimesters. Future studies are needed to determine whether suicidal ideation starting in pregnancy persists over time. Second previous abortion were used such a general terminology. Future studies are needed to specify the difference between abortion and miscarriage.

Overall, 2.6% of the sample reported suicidal ideation. Our results also found that particular risk factors can be used to improve identification of pregnant women with suicidal ideation. Specifically, a history of depression, unemployment, immigration status, and previous abortion increased the risk of prenatal suicidal ideation in pregnant women, while pregnancy via assisted reproductive procedures may decrease risk of suicidal ideation. Finally, more specific studies are needed to progressively optimize the screening process and interventions aimed at reducing prenatal suicidal ideation.

Therefore, midwives and other health professionals can screen for suicidal ideation and inquire about these risk factors with pregnant women in Spain. This information is essential for the prevention of perinatal suicide. The need to implement prevention strategies is highlighted (Al-Halabi et al., 2021; Al-Halabi and Fonseca 2021). Preventing maternal suicidal ideation should be conducted through formalized screening measures for suicidal ideation and associated interventions are recommended in prenatal care settings.

Author statement

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All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors have no conflict of interest.

Acknowledgement

We thank the Gynecology and Obstetrics Unit at the Hospital Clinic San Carlos and Hospital Central de Asturias,

Funding

Not applicable

Research involving Human Participants and/or Animals

This article does not contain any studies with animals performed by any of the authors. All procedures performed in studies involving human participants were in accordance with the ethical standards. Informed Consent: Informed consent was obtained from all individual participants included in the study.

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