Subjective well-being’s alterations as risk factors for major depressive disorder during the perimenopause onset: an analytical cross-sectional study amongst Mexican women residing in Guadalajara, Jalisco

Adrián Enrique Hernández-Muñoz¹*, Ana Méndez-Magaña², Ana Lilia Fletes-Rayas², Miguel A. Rangel¹, Lenin Torres García¹ and José de Jesús López-Jiménez²,³

Abstract

Background: Subjective well-being (SWB) can be defined as a self-report evaluation that reflects the satisfaction, and emotional level, over several social and personal indicators. Alterations in these indicators could become risk factors (RF) for major depressive disorder (MDD), but this association has not been studied at women’s life stages such as the perimenopause onset, despite its increasing prevalence for depressive symptomatology. Therefore, the aim of this study was to identify if SWB’s alterations determine RF for MDD during the perimenopause.

Methods: An analytical cross-sectional study was realized in 252 Mexican women with perimenopause’s age range (48 ± 1.7) and menopausal symptomatology, treated on Medical Units belonging to Jalisco’s 13th Health-Region. We applied the INEGI’s Basic Self-Reported Wellbeing Survey (BIARE) that measured 30 SWB’s indicators. To identify MDD’s presence, the Beck’s Depression Inventory-II (BDI-II) was applied. The sample was studied with associative analysis, along with logistic regression models, to determine adjusted odds ratio (aOR) and corresponding 95% confidence interval (95% CI).

Results: Through the BDI-II we identified 40.5% women with MDD. When compared with the undepressed group we found lower scores in all the SWB’s indicators, along with significant associations for depressive symptomatology. However, the logistic regression allowed us to identify significant RF when the women specifically reported personal life-dissatisfaction (aOR 9.6, 95% CI 1.90–17.68), emotional imbalances between happiness/sadness (aOR 7.1, 95% CI 1.49–13.57) and concentration/boredom (aOR 6.7, 95% CI 1.43–13.48); free-time dissatisfaction (aOR 5.5, 95% CI 1.17–13.70), public security unconformity (aOR 5.4, 95% CI 2.20–11.3), and sense of purposelessness (aOR 4.2, 95% CI 1.07–19.41).

Conclusion: The main objective of the study was to determine if SWB’s alterations are RF for depressive symptomatology, finding that social indicators with low scores are associated with MDD by means of aOR -Which were higher...
Background
The major depressive disorder (MDD) has become an important public health problem that represents the fifth-leading contributor to the Global Burden of Disease, and the fourth cause among the women [1]. Likewise, it has been reported that women’s life stages with hormonal changes become windows of vulnerability for the presence of MDD; especially the perimenopause stage that, when compared to premenopausal and postmenopausal stages, has a higher prevalence for altered mood states and somatic alterations—Along with an increasing likelihood for depressive symptomatology [2, 3].

To understand the causes of this affective disorder specifically during the menopause transition, many research papers have tried to analyze the women’s hormonal, clinical, and sociodemographic background [4]. However, as means to identify possible risk factors (RF) for MDD, recent studies have reported the importance of identifying alterations at the women’s social context [5, 6]. According to this, one of the variables that needs to be measured is the women’s Subjective Well-Being (SWB): a self-report measurement that reflects the personal experience in different elements [7], that measures the individual’s adaptive functioning for social conditions and societal progress [8].

Methodologically speaking, the SWB integrates multiple social indicators that can be divided into three main components: a cognitive component (CC), scoring the satisfaction level over different life domains; an affective component (AC), determining the emotional imbalance that a person have throughout the day; and an eudemonic component (EC), measuring the conformity degree between physical, emotional and adversity situations [7, 9]. The relationship between the alteration in these components and the prevalence for MDD’s symptomatology could be explained with the Well-Being’s Homeostasis Theory, which states that depression is a psychological state preceded by the loss of positive well-being [10].

Additionally, and considering the recommendations for the SWB’s periodical measurement stipulated by the Organization for Economic Cooperation & Development (OECD) and the World Health Organization (WHO) [11], the Mexican Institute for Statistics & Geography (INEGI) has identified more altered scores in women’s groups between 45 and 50 years old [12]—Same age range for the perimenopause onset in Mexican women (48 years ± 1.7) [13]. However, despite the latter, few research studies have explored if SWB’s lower scores could become associated RF for MDD, this is because most of the observational studies explore the linear correlation between the well-being’s indicators and the long-term development for depression [14].

The lack of these associations analyses, along with the increasing prevalence of depressive symptoms in Latin American women [15], makes the necessity to identify SWB’s alterations and their repercussions with the onset of MDD’s symptomatology. By understanding this associated interdependence, the results could promote future health care policies that pursue the correct attention of the women’s social conditions, especially during their menopause transition [16]. With this in view, the present study will seek to identify alterations in SWB’s indicators, and determine if they condition RF for the development of MDD amongst perimenopausal women.

Methods
Study design and ethical approval
To meet the objective, an analytical cross-sectional study was carried out through 2019’s Last Quarter and 2021’s First Quarter. This study was part of an extensive PhD thesis project, which sought to determine the clinical and psychosocial RF for MDD amongst Mexican women during their perimenopause stage, concluding in the summer of 2021.

Likewise, this project was evaluated, approved and consented by the Ethics Committee of the Jalisco’s 13th Health Region of the Central Zone of Guadalajara-Jalisco, which allowed the application of the research project in seven Medical Units that included medical, psychological and psychiatric care. The ethical approving code for the research project was 47/RXIII-JAL/2018.

Similarly, all the methods and data recollection were carried out in accordance with relevant guidelines and regulations, specifically the ethical principles of the Declaration of Helsinki. In accordance to this, we considered the ethical principles regarding the regulations of possible medical risks (16th to 22nd Principle), the guidelines concerning the research’s evaluation by a Research Ethical Committee (23rd Principle) and the

**Keywords:** Perimenopause, Depression, Depressive disorder, major, Risk factor, Subjective well-being, Affective balance
recommendations to obtain a written-informed consent in all the patients (25th to 32nd Principles) [17].

**Sample characteristics**

The sample was calculated by means of the statistical open source program OpenEpi 2.3, and was based on the 21.3% prevalence of depressive symptomatology amongst Mexican women residing in Jalisco [18]. Likewise, by considering a population of 10,854 users of public health services on the Jalisco Secretariat of Health -Medically treated throughout 2018 and 2019- and a 95% level of confidence, we obtained a sample of 252 women.

For the selection of the participants we developed a consecutive case series by inviting those women with the age range of interest (48 years ± 1.7) [13], along with the presence of menopausal symptomatology and amenorrhea in the last 12 months, which was previously checked in their medical records. We included those women who were waiting for clinical attention at the selected Health Centers, and who accepted to participate by signing a written informed consent letter [17]. We excluded those with a clinical background of artificial menopause, or neurocognitive disorders that could prevent them from participating in the research.

**Study questionnaires**

Subsequently, we applied the Beck’s Depression Inventory II (BDI-II) as a screening tool for the detection of DMD in the last two weeks [15]. With 83.3% sensitivity, 86.8% specificity and a 0.96 Cronbach’s alpha coefficient, the BDI-II uses a 0–3 Likert scale and a cutoff point of ≥ 14 scale to detect the presence and absence of MDD [19]. Alongside with the BDI-II, we applied the Basic Self-Reported Well-Being Survey (BIARE) to score SWB’s indicators, which was developed by the INEGI considering the OECD’s Guidelines [9], and has a Cronbach’s alpha coefficient of 0.91 [20].

The BIARE has a total of 30 SWB’s indicators measured by a 0–10 Likert scale, and distributed into four main sections: life satisfaction level, life domains, eudaimonic statements and emotional balance [12]. The first two sections set up the BIARE’s CC and, through the means of 14 indicators, measure the currently satisfaction level, along with the satisfaction over personal life aspects and public sphere domains (i.e. Public security, Country’s security satisfaction, and Residential area satisfaction) [9].

The third section of the BIARE scored the EC with the use of eleven statements: ten of them reflected the level of agreement or conformity with the person’s surroundings, and one negative statement described the adversity level and inability to return to a normal state [12]. Finally, the last section of the BIARE evaluated the AC’s imbalance throughout the day by employing five positive mood indicators, along with five negative ones that represented their counterpart which -When subtracted- resulted in five statements with scores that ranged from −10 to 10.

**Variables measurement and statistical analysis**

Normally, the BIARE’s indicators can be expressed as quantitative data, but depending on their score value they can also be grouped into qualitative categories. In the case of the 14 CC’s indicators and 11 EC’s statements, there are four categories: Very Dissatisfied/Strongly Disagree (Score values of 0 to 4), Dissatisfied/Disagree (5–6), Satisfied/Agree (7–8), and Very Satisfied/Strongly Agree (9–10). Meanwhile, there are three categories for the AC’s score: a negative group (Scores from −10 to −1), along with two positive score groups that range from 0 to 5 and from 6 to 10 [12].

However, to facilitate the bivariate and logistic analysis, two cutoff points were re-assigned for the CC and EC’s indicators: score values from 0 to 6 were used to identify SWB’s Alterations/Disagreements, and score values from 7 to 10 were used to determine Satisfaction/Conformity. Similarly, two value groups were established for the five AC’s statements: negative scores that ranged from −10 to −1, and positive scores that ranged from 0 to 10.

After employing the BDI-II we identified MDD symptomatology, which allowed the grouping of the sample into a depressed (≥ 14) and a non-depressed group (< 14); subsequently applying the BIARE to obtain SWB’s Alterations/Disagreements, and score values from 7 to 10 were used to determine Satisfaction/Conformity. Similarly, two value groups were established for the five AC’s statements: negative scores that ranged from −10 to −1, and positive scores that ranged from 0 to 10.

The BDI-II was calibrated by means of the 2nd version of the Statistical Program IBM SPSS for Windows (IBM Corp., Armonk, New York, USA).

**Results**

The application of the BDI-II allowed us to identify 102 women with depressive symptomatology (40.5% prevalence of MDD); dividing the sample into a depressed and a non-depressed group. Through the application of the BIARE survey, and by means of a t test, we found that the satisfaction levels among the CC’s indicators were lower on the depressed group (Table 1), especially in public sphere domains such as the personal satisfaction with
their city (x = 6.0 ± 2.8), country (x = 5.8 ± 3.0), and public security (x = 4.7 ± 3.3).

As for the EC’s statements (Table 2), the group of women with MDD presented low score values in all the positive valence indicators, being the statement with lowest ranking the one that scores the women’s feeling of fullness with themselves (x = 6.9 ± 2.4). Moreover, when evaluating the adversity level statement, women from the depressed group showed higher scores within the inability to return to a normal state after feeling bad with themselves (x = 7.0 ± 2.2).

Subsequently, in relation to the AC’s imbalance (Table 3), the group of women diagnosed with MDD obtained lower scores in all the statements that measured the negative balance throughout their days, specifically the balance between good and bad humor (x = 6.7 ± 2.5).

**Table 1** CC* indicators scores regarding the presence of MDD**

| Indicators | With MDD scores (x ± SD) | Without MDD scores (x ± SD) | Mean differences | P value |
|------------|--------------------------|----------------------------|-----------------|--------|
| Life satisfaction | | | | |
| Throughout the present year | 7.1 ± 2.1 | 8.9 ± 1.1 | 1.8 | 0.001 |
| Throughout the last year | 6.8 ± 2.6 | 8.4 ± 1.7 | 1.6 | 0.001 |
| Life domains | | | | |
| Satisfaction with life | 7.2 ± 2.2 | 8.8 ± 1.3 | 1.6 | 0.001 |
| Satisfaction with the health level | 6.9 ± 2.3 | 8.7 ± 1.3 | 1.8 | 0.001 |
| Satisfaction with personal achievements | 7.5 ± 2.5 | 8.9 ± 1.1 | 1.4 | 0.001 |
| Satisfaction with personal relationships | 7.5 ± 2.4 | 8.8 ± 1.6 | 1.3 | 0.001 |
| Satisfaction with future perspectives | 7.1 ± 2.6 | 8.8 ± 1.2 | 1.7 | 0.001 |
| Satisfaction with the personal free time | 6.0 ± 3.3 | 8.3 ± 2.0 | 2.3 | 0.001 |
| Satisfaction with the public security | 4.7 ± 3.3 | 7.1 ± 2.7 | 2.4 | 0.001 |
| Satisfaction with the principal activity | 7.1 ± 2.6 | 8.9 ± 1.3 | 1.8 | 0.001 |
| Satisfaction with the living place | 7.2 ± 2.7 | 8.6 ± 1.6 | 1.4 | 0.001 |
| Satisfaction with their neighborhood | 6.6 ± 2.9 | 8.1 ± 2.0 | 1.5 | 0.001 |
| Satisfaction with the city of residence | 6.0 ± 2.8 | 7.4 ± 2.3 | 1.4 | 0.001 |
| Satisfaction with the country of residence | 5.8 ± 3.0 | 7.0 ± 2.5 | 1.2 | 0.001 |

**Table 2** EC* statements scores regarding the presence of MDD**

| Indicators | With MDD scores (x ± SD) | Without MDD scores (x ± SD) | Mean difference | P value |
|------------|--------------------------|----------------------------|-----------------|--------|
| Eudaimonia/positive statements | | | | |
| Feeling of fullness with oneself | 6.9 ± 2.4 | 8.9 ± 1.2 | 2.0 | 0.001 |
| Optimism with their own future | 7.2 ± 2.7 | 8.9 ± 1.2 | 1.7 | 0.001 |
| Freedom of choice in their own lives | 7.4 ± 2.8 | 9.1 ± 1.6 | 1.7 | 0.001 |
| Presence of strengths to adversities | 7.6 ± 2.6 | 9.0 ± 1.4 | 1.4 | 0.001 |
| Feeling that what they do is worth it | 7.7 ± 2.5 | 9.4 ± 1.1 | 1.7 | 0.001 |
| Feeling of fortune | 7.4 ± 2.9 | 9.5 ± 1.0 | 2.1 | 0.001 |
| Feeling that what happens is because of them | 7.6 ± 2.6 | 9.0 ± 1.3 | 1.4 | 0.001 |
| Feeling of purpose in their life | 7.9 ± 2.5 | 9.3 ± 0.3 | 1.4 | 0.001 |
| Importance of religion in their lives | 7.4 ± 2.8 | 8.6 ± 2.1 | 1.2 | 0.001 |
| Feeling of achievement throughout the day | 7.4 ± 3.0 | 9.3 ± 1.0 | 1.9 | 0.001 |
| Adversity/negative statements | | | | |
| Inability to return to a normal state after feeling bad | 7.0 ± 2.2 | 5.0 ± 3.1 | -2.0 | 0.001 |

**Cognitive component, **major depressive disorder

x = mean, SD = standard deviation
Table 3  AC * imbalance statements scores regarding the presence of MDD **

| Statements                        | With MDD scores (x ± SD) | Without MDD scores (x ± SD) | Mean differences | P value |
|-----------------------------------|--------------------------|-----------------------------|------------------|---------|
| Balance between good/bad humor    | 6.7 ± 2.5                | 8.8 ± 1.5                   | 2.1              | 0.001   |
| Balance between tranquility/concern | 7.2 ± 2.7               | 8.9 ± 1.2                   | 1.7              | 0.001   |
| Balance between energy/fatigue     | 7.4 ± 2.8                | 9.1 ± 1.6                   | 1.7              | 0.001   |
| Balance between concentration/boredom | 7.6 ± 2.6               | 9.0 ± 1.4                   | 1.4              | 0.001   |
| Balance between happiness/sadness | 7.7 ± 2.5                | 9.4 ± 1.1                   | 1.7              | 0.001   |

*Affective component, **major depressive disorder

x = Mean, SD = standard deviation

Yet, the statements with higher scores were the ones that measured the concentration/boredom (x = 7.6 ± 2.6) and happiness/sadness imbalance (x = 7.7 ± 2.5).

Finally, we found significant associations within all the SWB's indicators (Table 4). Nevertheless, the logistic analysis allowed us to determine RF for the MDD when the women reported personal life dissatisfaction (aOR 9.6, 95% CI 1.90–17.68), dissatisfaction with their free time (aOR 5.5, 95% CI 1.17–5.70), and with their public security (aOR 5.4, 95% CI 2.20–1.13). Similarly, the presence of emotional imbalances between happiness and sadness (aOR 7.1, 95% CI 1.49–13.57), concentration and boredom (aOR 6.7, 95% CI 1.43–13.48), and having no sense of purpose in life (aOR 4.2, 95% CI 1.07–19.41) were associated with the risk for depressive symptomatology.

Discussion

The menopause transition is a natural process that involves physical, psychological, and social changes in the women; however, it has been reported that when this transition is negatively perceived, it conditions a decrease in the women's emotional resilience [21]. The latter creates a cascading effect that affects the women's SWB and subsequently causes the prevalence of depressive symptomatology [21, 22]. This last situation is reflected with the high prevalence of MDD that we found in our sample, which is similar to Taiwanese and Chinese research studies [23] but higher compared to other Mexican reports [24].

On the other hand, the INEGI studied women's groups between 45 and 50 years old and residing on urban zones, which reported lower SWB's scores in all of the CC's indicators of satisfaction in contrast to other age groups. Comparing these results with the depressed group, we found a decrease of almost two units in the women's satisfaction level, particularly with those belonging to the public sphere [25]. This dissatisfaction could be explained by the sociocultural perception that the Mexican population have with public aspects of their lives, such as their personal security and residential satisfaction, which can affect their daily activities and economic situation.

Similarly, the prevalence for adversity sensations with the AC's statements of the depressed group was almost two times greater compared to the INEGI's reports [24], possibly caused by an altered perception of the perimenopause transition. This is according to results from international cross-sectional and prospective studies, which have described that this rejection triggers long-term sensations of vulnerability and loss of control, modifying the women's SWB degrees of conformity [26], their satisfaction levels, and in less quantity their emotional balance throughout the day [27].

Furthermore, the aOR of the CC and AC's statements were four times greater than RF reported by British and Southeast England studies [6, 8]. This difference could be caused by the fact that the samples used in both researches involved women over 50 and 60 years old, which doesn't present menopausal symptomatology or high SWB's alterations -Thus presenting a lower presence for MDD symptomatology [28]. However, systematic reviews have explained that the menopause symptomatology doesn't directly affect the women's positive well-being [27]. Instead, the presence of MDD during this life period is directly influenced by an altered SWB, which it is related to the Well-Being's Homeostasis Theory previously commented [10].

Subsequently, the aOR for the AC's imbalance statements were two times greater than the RF reported in a North-American research. The reason for this difference could be explained by the fact that this last research measured the AC's statements separately from the others SWB's components. Regarding to this, it has been reported that most of the well-being's scales -Applied during the perimenopause stage- focus more on the separate evaluation of its components and, unlike previous research studies [6], we used a SWB's survey which measured and analyzed all of the main SWB's indicators at once. This last situation, has led to the research proposal for the standardized use of SWB's surveys that simultaneously measure all of its main indicators [29].
Table 4  Bivariate and adjusted analysis of the BIARE* components to identify RF** for MDD***

| Variables                        | With MDD | Without MDD | OR  | 95% CI   | P value | aOR  | 95% CI   | P value |
|----------------------------------|----------|--------------|-----|----------|---------|------|----------|---------|
|                                  | No       | %            | No  | %        |         |      |          |         |
| **Cognitive component**          |          |              |     |          |         |      |          |         |
| Life satisfaction throughout the present year |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 33       | 32.4         | 5   | 3.3      | 13.9    | 5.19–37.1 | 0.001   | 9.6     | 1.9–17.7 | 0.002   |
| Without alterations (7–10)²       | 69       | 67.6         | 145 | 96.7     | –       | –     | –        | –       |
| Life satisfaction throughout the last year |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 37       | 36.3         | 16  | 10.7     | 4.8     | 2.47–9.20 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 65       | 63.7         | 134 | 89.3     | –       | –     | –        | –       |
| Satisfaction with life           |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 32       | 31.4         | 6   | 4.0      | 11.0    | 4.38–27.5 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 70       | 65.7         | 141 | 94.0     | –       | –     | –        | –       |
| Satisfaction with the health level |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 35       | 34.3         | 9   | 6.0      | 8.2     | 3.08–23.1 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 67       | 65.7         | 141 | 94.0     | –       | –     | –        | –       |
| Satisfaction with personal achievements |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 23       | 22.6         | 5   | 3.3      | 8.4     | 3.08–23.1 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 79       | 77.4         | 145 | 96.7     | –       | –     | –        | –       |
| Satisfaction with personal relationships |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 24       | 23.5         | 7   | 4.7      | 6.3     | 2.59–15.3 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 78       | 76.5         | 143 | 95.3     | –       | –     | –        | –       |
| Satisfaction with future perspectives |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 30       | 29.4         | 6   | 4.0      | 10.0    | 3.98–25.1 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 72       | 70.6         | 144 | 96.0     | –       | –     | –        | –       |
| Satisfaction with the personal free time |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 47       | 46.1         | 19  | 12.7     | 5.9     | 3.17–10.9 | 0.001   | 5.5     | 1.2–5.7 | 0.02    |
| Without alterations (7–10)²       | 55       | 53.9         | 131 | 87.3     | –       | –     | –        | –       |
| Satisfaction with the public security |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 68       | 66.7         | 48  | 32.0     | 4.3     | 2.49–7.26 | 0.001   | 5.4     | 2.2–11.3 | 0.02    |
| Without alterations (7–10)²       | 34       | 33.3         | 102 | 68.0     | –       | –     | –        | –       |
| Satisfaction with the principal activity |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 32       | 31.4         | 10  | 6.7      | 6.4     | 2.98–13.8 | 0.001   | –       | –       |
| Without alterations (7–10)²       | 70       | 68.6         | 140 | 93.3     | –       | –     | –        | –       |
| Satisfaction with the living place |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 25       | 24.5         | 15  | 10.0     | 2.9     | 1.45–5.9  | 0.001   | –       | –       |
| Without alterations (7–10)²       | 77       | 75.5         | 135 | 90.0     | –       | –     | –        | –       |
| Satisfaction with their Neighborhood |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 40       | 39.2         | 29  | 19.3     | 2.7     | 1.53–4.8  | 0.001   | –       | –       |
| Without alterations (7–10)²       | 62       | 60.8         | 121 | 80.7     | –       | –     | –        | –       |
| Satisfaction with the city of residence |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 46       | 45.1         | 38  | 25.3     | 2.4     | 1.42–4.1  | 0.001   | –       | –       |
| Without alterations (7–10)²       | 56       | 54.9         | 112 | 74.7     | –       | –     | –        | –       |
| Satisfaction with the country of residence |          |              |     |          |         |      |          |         |
| With alterations (0–6)¹           | 51       | 50.0         | 48  | 32.0     | 2.1     | 1.27–3.6  | 0.001   | –       | –       |
| Without alterations (7–10)²       | 51       | 50.0         | 102 | 68.0     | –       | –     | –        | –       |
| **Eudaimonic component**          |          |              |     |          |         |      |          |         |
| Feeling of fullness with oneself  |          |              |     |          |         |      |          |         |
| In disagreement (0–6)¹           | 42       | 41.2         | 7   | 4.7      | 14.3    | 6.02–33.6 | 0.001   | –       | –       |
| In agreement (7–10)²              | 60       | 58.8         | 143 | 95.3     | –       | –     | –        | –       |
| Optimism with their own future    |          |              |     |          |         |      |          |         |
| In disagreement (0–6)¹           | 34       | 33.3         | 7   | 4.7      | 10.2    | 4.31–24.2 | 0.001   | –       | –       |
| In agreement (7–10)²              | 68       | 66.7         | 143 | 95.3     | –       | –     | –        | –       |
Table 4 (continued)

| Variables                                    | With MDD | Without MDD | OR  | 95% CI | P value | aOR  | 95% CI | P value |
|----------------------------------------------|----------|-------------|-----|--------|---------|------|--------|---------|
| Freedom of choice in their own lives         |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 32       | 31.4        | 7   | 4.7    | 9.3     | 3.93–22.2 | 0.001 | –       | –       |
| In agreement (7–10)                          | 70       | 68.6        | 143 | 95.3   | –       | –    | –      | –       |
| Presence of strengths to adversities         |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 29       | 28.4        | 6   | 4.0    | 9.5     | 3.79–24.0 | 0.001 | –       | –       |
| In agreement (7–10)                          | 73       | 71.6        | 144 | 96.0   | –       | –    | –      | –       |
| Feeling that what they do is worth it         |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 28       | 27.5        | 4   | 2.7    | 13.8    | 4.67–40.9 | 0.001 | –       | –       |
| In agreement (7–10)                          | 74       | 72.5        | 146 | 97.3   | –       | –    | –      | –       |
| Feeling of fortune                           |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 27       | 26.5        | 4   | 2.7    | 13.1    | 4.43–38.9 | 0.001 | –       | –       |
| In agreement (7–10)                          | 75       | 73.5        | 146 | 97.3   | –       | –    | –      | –       |
| Feeling that what happens is because of them  |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 27       | 26.5        | 10  | 6.7    | 5.0     | 2.32–11.0 | 0.001 | –       | –       |
| In agreement (7–10)                          | 75       | 73.5        | 140 | 93.3   | –       | –    | –      | –       |
| Feeling of purpose in their life             |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 27       | 26.5        | 3   | 2.0    | 17.6    | 5.18–60.0 | 0.001 | 4.2     | 1.1–19.4 | 0.04 |
| In agreement (7–10)                          | 75       | 73.5        | 147 | 98.0   | –       | –    | –      | –       |
| Importance of religion in their lives        |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 32       | 31.4        | 18  | 12.0   | 3.4     | 1.76–6.4 | 0.001 | –       | –       |
| In agreement (7–10)                          | 70       | 68.6        | 132 | 88.0   | –       | –    | –      | –       |
| Feeling of achievement throughout the day    |          |             |     |        |         |      |        |     |
| In disagreement (0–6)                        | 30       | 29.4        | 3   | 2.0    | 20.4    | 6.03–69.2 | 0.001 | –       | –       |
| In agreement (7–10)                          | 72       | 70.6        | 147 | 98.0   | –       | –    | –      | –       |
| Inability to return to a normal state after feeling bad |          |             |     |        |         |      |        |     |
| In agreement (7–10)                          | 63       | 61.8        | 51  | 34.0   | 3.1     | 1.86–5.3 | 0.001 | –       | –       |
| In disagreement (0–6)                        | 39       | 28.2        | 99  | 66.0   | –       | –    | –      | –       |
| Affective component                          |          |             |     |        |         |      |        |     |
| Balance between good/bad humor               |          |             |     |        |         |      |        |     |
| Negative values (−10 to −1)                  | 27       | 26.5        | 9   | 6.0    | 5.6     | 2.55–12.6 | 0.001 | –       | –       |
| Positive values (0 to 10)                    | 75       | 73.5        | 141 | 94     | –       | –    | –      | –       |
| Balance between tranquility/concern          |          |             |     |        |         |      |        |     |
| Negative values (−10 to −1)                  | 41       | 40.2        | 13  | 8.7    | 7.0     | 3.54–14.2 | 0.001 | –       | –       |
| Positive values (0 to 10)                    | 61       | 59.8        | 137 | 91.3   | –       | –    | –      | –       |
| Balance between energy/fatigue               |          |             |     |        |         |      |        |     |
| Negative values (−10 to −1)                  | 43       | 42.2        | 16  | 10.6   | 6.1     | 3.19–11.7 | 0.001 | –       | –       |
| Positive values (0 to 10)                    | 59       | 57.8        | 134 | 89.3   | –       | –    | –      | –       |
| Balance between concentration/boredom        |          |             |     |        |         |      |        |     |
| Negative values (−10 to −1)                  | 38       | 37.2        | 6   | 4.0    | 14.3    | 5.74–35.4 | 0.001 | 6.7     | 1.4–13.5 | 0.01 |
| Positive values (0 to 10)                    | 64       | 62.8        | 144 | 96.0   | –       | –    | –      | –       |
| Balance between happiness/sadness            |          |             |     |        |         |      |        |     |
| Negative values (−10 to −1)                  | 37       | 36.3        | 6   | 4.0    | 13.7    | 5.49–34.0 | 0.001 | 7.1     | 1.5–13.6 | 0.01 |
| Positive values (0 to 10)                    | 65       | 63.7        | 144 | 96.0   | –       | –    | –      | –       |

1 Basic Self-Reported Well-Being Survey, **risk factors, ***major depressive disorder
2 95% confidence intervals, 2 Adjusted odds ratio
3 Sum of the frequencies of “Very Unsatisfied” (0 to 4 scores) and “Unsatisfied” (5 to 6 scores) categories
4 Sum of the frequencies of “Very Satisfied” (7 to 8 scores) and “Satisfied” (9 to 10 scores) categories
5 In this variable the order of the rows was changed by taking into account the characteristic of the variable
Strengths, limitations and proposals
In view of the latter, the main strength of our research consists in the complete measurement of the main SWB’s components and indicators by means of the BIARE survey; analyzing the women’s social and personal context, by means of quantitative scores and qualitative data [12]. Throughout the understanding of these altered social indicators, and followed by the estimation of associated RF for MDD, our research explores a new etiological understanding for the depressive symptomatology at the menopause transition.

However, given the type of research design, one limitation in our research was the lack of analysis over previous chronic pathologies, economical factors and medical access, along with new SWB’s components such as the physical and perceived financial well-being which could influence the psychological health [29]. Similarly, this type of research design doesn’t allow follow-ups or a closer approach to the understanding of the psychosocial and geographical background that the Mexican women currently have with their surroundings.

Taking this into account, and given the geographical nature that some of the SWB’s indicators have, we suggest the future development of prospective research studies that allow clinical follow ups, as well as geocoding analysis [6, 9]. The last statement is related to what the OECD proposes with the public sphere domains, which can be used to understand the linear correlation between geographical context’s alterations and the presence of depressive symptomatology [9].

Conclusion
Recently, the epidemiological exploration at the individual’s SWB has become an important objective of the WHO Health Policies [30]. This goal seeks the reduction of psychological disorders that affects a person’s life quality. So, by measuring the women’s SWB components during their perimenopause, and by comparing them with national and international reports, we expose the high prevalence of SWB’s alterations that the Mexican women have during their menopause transition, along with the risk that they entail for the presence of MDD.

Therefore in conclusion, we propose the development of future research projects that studies the women’s dissatisfaction levels with their social, personal or geographical context, especially in this stage of their lives. Considering the importance that the women’s SWB’s have in their emotional resilience, we suggest that the health personnel seek the correct measurement of social indicators -by means of scales that contemplate all the main components- throughout the clinical interviews. This last statement is expressed so that any social alterations can be identified, thus helping for the reduction of the increasing prevalence that the depressive symptomatology have during the perimenopause stage.

Abbreviations
MDD: Major depressive disorder; SWB: Subjective well-being; RF: Risk factors; CC: Cognitive component; EC: Eudemonic component; AC: Affective component; BDI-II: Beck Depression Inventory II; BIARE: Basic Self-Reported Well-Being Survey; INEGI: Mexican Institute of Statistics and Geography; OECD: Organization for Economic Cooperation and Development; WHO: World Health Organization; X: Average; SD: Standard deviation; OR: Odds ratio; aOR: Adjusted odds ratio; 95% CI: 95% confidence intervals.

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12905-022-01848-1.

Acknowledgements
The authors thank all of the participants for their collaboration. They also want to acknowledge the participation and help from Diana María Acosta-Hernández, Matix Violeta Díaz-Benavidez, Wendy Yaritza González-Cervantes, Natalia Karina Lazcano-Álvarez, and Jessica Paulina Martínez-Gutierrez, who were students from the Summer Research Delfin Program at the University of Guadalajara.

Author contributions
AEHM developed the project, collected the data and drafted the manuscript, a process that was methodologically supervised by AMM, who also made corrections throughout the realization of the project. LTG and MAR managed the data analysis and recoding for its analysis with SPSS, along with the provided assistance for the correct evaluation with the SWB and MDD variables. Finally, ALFR and JJLJ supervised the support of the students from the Summer Research Delfin Program that helped with the development of the research. Likewise, all the authors have read, reviewed and approved the final manuscript.

Funding
None.

Availability of data and materials
The datasets generated and analyzed during the current study are available in Additional file 1 [Quantitative Dataset.csv] and Additional file 2 [Qualitative Dataset.csv].
Declarations

Ethics approval and consent to participate
This project was evaluated, approved and consented by the Ethics Committee of the Jalisco’s 13th Health Region of the Central Zone of Guadalajara-Jalisco, which had an ethical approving code of 47/ROIII-JAL/2018. Likewise, we also obtained written informed consents from all the participants. Experiments on humans and/or the use of human tissue samples, or the use of any animal during the research, was not applicable throughout the project because we applied and observational research design. However, all methods were carried out in accordance with relevant guidelines and regulations, specifically the Declaration of Helsinki. Regarding this Declaration, we considered the 16th to 22nd Ethical Principles (About Risk, Burdens and Benefits), along with the 23rd (Research Ethics Committees) and the 25th to 32nd articles (Informed Consent).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
1 Facultad de Medicina, Universidad Autónoma de Querétaro, Santiago de Querétaro, Mexico. 2 Universidad de Guadalajara, Guadalajara, Mexico. 3 CIBO, Centro de Investigación Biomédica de Occidente, Guadalajara, Mexico.

Received: 28 December 2021   Accepted: 20 June 2022
Published online: 05 July 2022

References
1. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2017;390:1211–59.
2. Tsai K-W, Lin S-C, Koo M. Correlates of depressive symptoms in late middle-aged Taiwanese women: findings from the 2009 Taiwan National Health Interview Survey. BMC Womens Health. 2017. https://doi.org/10.1186/s12905-017-0461-4.
3. American Psychiatric Association. Depressive Disorders. In: Diagnostic and Statistical Manual of Mental Disorders. Arlington, VA: American Psychiatric Association; 2013. p. 155–88.
4. Jung S, Shin A, Kang D. Menarche age, menopause age and other reproductive factors in association with post-menopausal onset depression: Results from Health Examinees Study (HEXA). J Affect Disord. 2013;155(187):127–35.
5. Azizi M, Fooladi E, Abdollahi F, Elyasi F. Biopsychosocial risk factors of depression in the menopausal transition: a narrative review. Iran J Psychiatry Behav Sci. 2018. https://doi.org/10.5812/ippbs.12928.
6. Wood AM, Joseph S. The absence of positive psychological (eudemonic) well-being as a risk factor for depression: a ten year cohort study. J Affect Disord. 2010;122(3):213–7.
7. Castellanos R. El bienestar subjetivo como señal de progreso. Satisfacción con la vida, indicadores objetivos y contexto social. In: Bienestar subjetivo en México. México City, Mexico: UNAM; 2018. p. 21–51.
8. Lagnado A, Gilchrist K, Smastuen MC, Memon A. Is subjective wellbeing associated with depression? A cross-sectional survey in southeast England. Annu Memon. Eur J Public Health. 2017. https://doi.org/10.1093/eurpub/ckx187.179.
9. OECD. Measuring subjective well-being. In: Guidelines on measuring subjective well-being. Paris, France: OECD Publishing; 2013; p. 139–72.
10. Garciuola RA, Stokes MA. Subjective well-being as an indicator for clinical depression. Soc Indic Res. 2009;92(3):517–27.
11. Gigantesco A, Fagnani C, Toccaceli V, Stazi MA, Lucidi F, Violani C, Picardi A. The relationship between satisfaction with life and depression symptoms by gender. Front Psychiatry. 2019;10:1–9.
12. INEGI. Bienestar subjetivo – BIARE Básico. 2021. https://www.inegi.org.mx/investigacion/bienestar/basic/default.html/ Accessed 23 Oct 2021.
13. Sosa L, Corrales F, Díaz K. Síndrome Climatérico. In: Climaterio y Menopausia. Mexico City, Mexico: FLASOG; 2016. p. 29–44.
14. Ruini C, Cesetti G. Spotlight on eudaimonia and depression. A systematic review of the literature over the past 5 years. Psychol Res Behav Manag. 2019;12:767–92.
15. Patruncio D, Manzo Z, González-Blanco M. Depresión en la perimenopausia y en la posmenopausia. Rev Obstet Ginecol Venez. 2016;76(3):176–81.
16. Diener E, Oishi S, Lucas RE. National accounts of subjective well-being. Am Psychol. 2015;70(3):234–42.
17. WMA Declaration of Helsinki—Ethical Principles for Medical Research involving human subjects. https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/. Accessed 28 Jan 2022.
18. Arias-Merino E. Salud Mental en el adulto mayor. SALME. 2014;3:3–13.
19. Park K, Jaekel E, Yoon S, Lee S-H, Choi K-H. Diagnostic utility and psychometric properties of the Beck Depression Inventory-ll among Korean adults. Front Psychol. 2020;10:2934.
20. Vargas D. Evaluación de las dimensiones de la satisfacción con la vida. Un enfoque metodológico. In: Bienestar subjetivo en México. México, D.F.: UNAM; 2018. p. 85–116.
21. Duffy OK, Iverien L, Acuto L, Hannaford PC. Factors associated with resilience or vulnerability to hot flushes and night sweats during the menopausal transition. Menopause. 2012;20(4):383–92.
22. Abdelrahman RY, Abushaikha LA, al-Motlaq MA. Predictors of psychological well-being and stress among Jordanian menopausal women. Qual Life Res. 2014;23(1):167–73.
23. Zheng R, Zhou Y, Fu Y, Xiang Q, Cheng F, Chen H, et al. Prevalence and associated factors of depression and anxiety among nurses during the outbreak of COVID-19 in China: a cross-sectional study. Int J Nurs Stud. 2021;114:1–10.
24. Carranza-Lira S, Palacios-Ramírez M. Frecuencia de depresión en mujeres premenopáusicas y posmenopáusicas. Rev Med Inst Mex Seguro Soc. 2018;56(6):533–6.
25. INEGI. Indicadores de Bienestar Autorreportado de la población urbana: Cifras al mes de enero del 2021. Boletín de Prensa 2021;160(21):1–20.
26. Brown L, Bryant C, Brown V, Bei J, Judd F. Investigating how menopausal factors and self-compassion shape well-being: An exploratory path analysis. Maturitas. 2015;81(2):293–9.
27. Brown L, Bryant C, Judd F. Positive well-being during the menopausal transition: a systematic review. Climacteric. 2015;18(4):456–69.
28. Denneenstein L, Lehnert P, Guthrie J. The effects of the menopausal transition and biopsychosocial factors on well-being. Arch Womens Ment Health. 2002;5(1):15–22.
29. Lui PP, Fernando GA. Development and initial validation of a multidimensional scale assessing subjective well-being: the Well-Being Scale (WebS). Psychol Rep. 2018;121(1):135–60.
30. Lindert J, Bain PA, Kubanszky LD, Stein C. Well-being measurement and the WHO health policy Health 2010: systematic review of measurement scales. Eur J Public Health. 2015;25(4):731–40.

Publisher's Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.