

Original Article

Prevalence of post-menopausal depression and associated factors: A web-based cross-sectional study in Greece

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ABSTRACT

Objectives: The impact of depression on post-menopausal women is an important public health issue but remains largely unknown. The purpose of this study was to identify the prevalence of post-menopausal depression in Greece and outline the profile of the women it affects.

Study design: A sample of post-menopausal women completed an anonymous, self-administered, web-based survey which included the Beck Depression Inventory-II (BDI-II) and questions regarding socio-demographic data.

Main outcome measures: The dependent variable of interest was a BDI-II score ≥ 20 (the cut-off for moderate depression according to the BDI).

Results: Overall, 502 post-menopausal women participated in the study. The median BDI-II score was 13 (range 0–50); 136 (27.1%) of the women scored ≥ 20 and were considered screen-positive for depression. According to the multivariate logistic regression model, age < 55 years (OR: 1.621; 95% CI: 1.036–2.535), not working (OR: 1.580; 95% CI: 1.013–2.465), smoking (OR: 1.656; 95% CI: 1.081–2.536) and history of depression (OR: 1.650; 95% CI: 1.045–2.604) were independently associated with post-menopausal depression. Subgroup analyses revealed that current smokers (OR: 2.514; 95% CI: 1.485–4.256) had higher odds of moderate depression, while obesity (OR: 2.455; 95% CI: 1.206–4.996), absence of healthcare insurance (OR: 4.413; 95% CI: 1.970–9.887) and a history of depression (OR: 2.253; 95% CI: 1.212–4.190) were identified as independent risk factors for severe post-menopausal depression.

Conclusions: More than one out of four post-menopausal women were screen-positive for symptoms indicative of depression, while a personal history of depression, age < 55 years, smoking and current working status were independent predictors of its emergence.

1. Introduction

Menopause is defined by the occurrence of a 12-month amenorrhea and the period subsequent to the final menstrual period corresponds to post-menopause; this phase is classified by hormonal levels into early and late post-menopause and further subdivided into distinct stages, according to the STRAW criteria [1]. Data from high-impact longitudinal studies have unanimously reported a significant rise in depressive symptoms during the phase of early post-menopause, as opposed to

pre-menopause [2,3]. This finding has been associated with various contributing factors, including age at menopause [4], vasomotor symptoms [5], socioeconomic status [6], obesity [7] and history of depression [8]. Although affluent evidence reporting the elevated prevalence of depression during peri-menopause has been recurrently provided [9,10], consistent data on post-menopausal depression remain scarce [2].

With respect to the Greek population, latest data from a regular health survey conducted by the Hellenic Statistical Authority in 2014

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revealed that the prevalence of depression was 4.7% in the general population (more than 15 years old), 6% among women and 3.2% in men, predictably being almost two-fold more predominant among women [11]. The prevalence of post-menopausal depression in Greece has been investigated in a previous study, however, the sample included Greek, Cypriot and Maltese women and the mean age was 74 years, rendering its assumptions more pertinent to depression among the elderly [12].

Therefore, the main aim of this survey was to estimate the prevalence of post-menopausal depression in Greece. Further, we sought to portray post-menopausal women experiencing depressive symptoms and outline their profile by detecting sociodemographic and other characteristics associated with higher rates of depressive symptoms and comparatively assessing our findings with those reported in literature.

2. Methods

2.1. Study design, measures, variables

The study population included post-menopausal women that were approached through the Hellenic Menopause Society, a non-profit organization in Greece. An anonymized web-based cross-sectional design was employed and the STRAW criteria were adopted for the definition of menopause [1]. The study was conducted from June until August 2020. Social history and demographic data, as well as medical history were recorded for each participant.

To evaluate the depressive symptoms, the participants completed the Beck Depression Inventory-II (BDI-II), a standard self-administered depression screening scale that includes 21 items rated on a 4-point Likert-type scale ranging from 0 to 3. This well-established psychometric tool in clinical and community samples has a high degree of reliability and validity [13]. The respondents are requested to endorse statements characterizing how they have been feeling during the past two weeks; the higher the summed score (range = 0–63), the higher the level of depression. The severity of depression is classified into four categories according to the questionnaire score: 0–13 (minimal), 14–19 (mild), 20–28 (moderate) and 29–63 (severe). The BDI-II has been translated and validated in Greek with high internal consistency (Cronbach alpha coefficient = 0.85) [14].

All the study variables were converted into categorical variables. Hence, the variables of interest were age (cutoff: 55 years old), body mass index – BMI (cutoff: 30 kg/m²), post-menopausal status (5 years – cutoff of early and late post-menopause), educational status (university or higher vs lower than university), current living status (alone, with partner and/or children), current working status (working/not working), parity (nulliparous/multiparous), presence of healthcare insurance, smoking status, presence of any chronic disease, history of confirmed depression, social alcohol use and heavy alcohol use defined as more than three drinks per week (yes/no).

2.2. Statistical analysis

Following a precision approach, with an estimated prevalence of post-menopausal depression of 20%, it was estimated that 383 women would be required for sufficient precision, with a 4% margin of error and a 95% level of confidence. Continuous variables are presented as median (range), while the categorical variables as frequencies (%). The Chi-square test was used in the univariate analysis, in order to identify differences between the categorical variables. Then, using variables with $p < 0.20$ from the univariate model, a multivariate logistic regression analysis was conducted to identify the independent risk factors for post-menopausal depression. Regarding the primary outcome, the dependent variable of interest was the BDI-II score ≥ 20 (cut-off of moderate depression according to the BDI score). The odds ratios (ORs) and 95% confidence intervals (95% CI) were estimated. All the analyses were performed with the SPSS v.25.0.

2.3. Ethics

This study is part of a large prospective screening study on the mental health of women conducted by the Department of Clinical Pharmacology and the 3rd Department of Obstetrics and Gynecology, School of Medicine, Aristotle University of Thessaloniki in Greece. The study protocol was approved by the bioethics committee of the School of Medicine of the Aristotle University of Thessaloniki (reference number: 5.172/28.2.2020).

3. Results

The final sample consisted of 502 post-menopausal women, while the overall response rate was 82.9% (502/605) and the completion rate was 100% (participants had to answer all the questions of the survey before submission). The median age of the participants was 53 (45–70) years and the median BMI was 31.3 (20.0–61.3) kg/m². Sociodemographic characteristics and medical history are presented in Table 1.

The median BDI-II score in the total sample was 13 (0–50) while 136 (27.1%) of the women scored ≥ 20 and were characterized as screened positive for depression. More specifically, 259 women (51.6%) scored 0–13 (minimal depression), 107 (21.3%) scored 14–19 (mild depression), 81 (16.1%) scored 20–28 (moderate depression) and 55 (11%) scored 29–63 (severe depression). The median score was 10 (0–19) in women without depression and 27 (20–50) in women with depression post-menopausal women (Fig. 1).

According to the univariate analysis, the following variables

Table 1
Sociodemographic characteristics and medical history of the participants (n=502)

Characteristics	Frequency	Percentage (%)
Age		
≥ 55 years	204	40.6
< 55 years	298	59.4
Current BMI		
≥ 30	313	62.4
< 30	189	37.6
Postmenopausal status		
≥ 5 years (Late)	190	37.8
< 5 years (Early)	312	62.2
Educational status		
University or higher	244	48.6
Lower than university	258	51.4
Living status		
Alone	77	15.3
Partner and/or children	425	84.7
Current working status		
Yes	278	55.4
No	224	44.6
Parity		
Nulliparous	56	11.2
Multiparous	446	88.2
Healthcare insurance		
Yes	460	91.6
No	42	8.4
Smoking		
Yes	266	53.0
No	236	47.0
Chronic disease		
Yes	246	49.0
No	256	51.0
History of depression		
Yes	136	27.1
No	366	72.9
Social alcohol use		
Yes	246	49.0
No	256	51.0
Heavy alcohol use		
Yes	93	18.5
No	409	81.5

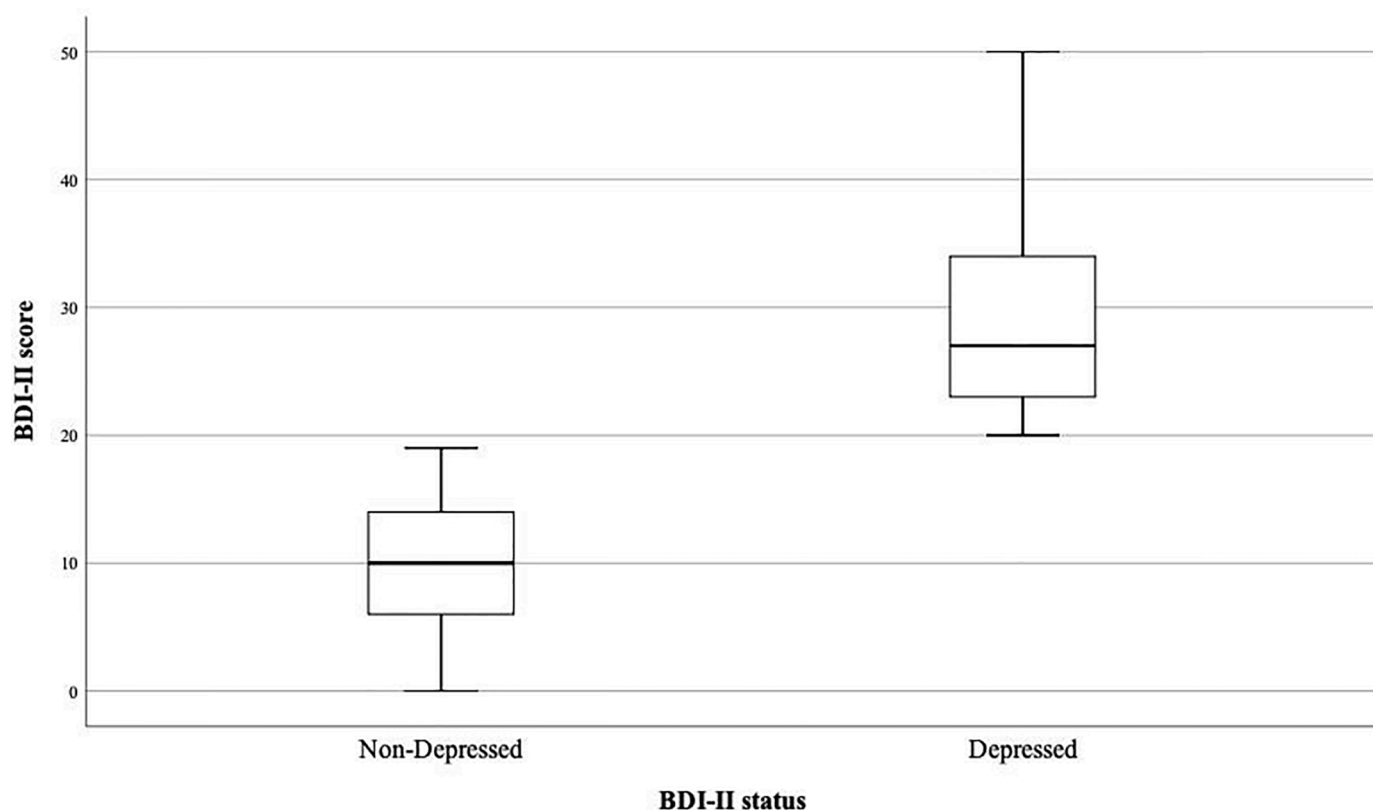


Fig. 1. Boxplots of BDI-II scores in depressed and non-depressed post-menopausal women in Greece. The top, the bottom of the box and the horizontal line represent the 75th centile, the 25th centile, and the median, respectively. The T-bars represent the maximum and minimum values.

demonstrated significant associations at a level of $p < 0.20$: age, educational status, current BMI, education, current working status, healthcare insurance, smoking, chronic disease and history of depression (Table 2). Then, these variables were entered in a multivariate logistic regression model which showed that age < 55 years old (OR: 1.621; 95% CI: 1.036–2.535), not working (OR: 1.580; 95% CI: 1.013–2.465), smoking (OR: 1.656; 95% CI: 1.081–2.536) and history of depression (OR: 1.650; 95% CI: 1.045–2.604) were independently associated with the prevalence of post-menopausal depression.

In subgroup analyses, we aimed to identify independent risk factors for moderate and severe post-menopausal depression as dependent variables of interest. Therefore, following multivariate analysis, current smokers (OR: 2.514; 95% CI: 1.485–4.256) had higher odds of moderate depression. Moreover, obesity (OR: 2.455; 95% CI: 1.206–4.996), absence of healthcare insurance (OR: 4.413; 95% CI: 1.970–9.887) and history of depression (OR: 2.253; 95% CI: 1.212–4.190) were identified as independent risk factors for severe depression in our sample (Table 3).

4. Discussion

This study has found that 27.1% of post-menopausal women that completed the survey exhibited symptoms indicative of at least moderate depression, as demonstrated by BDI-II scores of 20 or higher; 16.1% of the women had moderate depression and 11% were identified as sufferers from severe depression. We also identified a statistically significant and independent correlation of post-menopausal depression with history of depression, age, smoking and current working status. No statistically significant divergence was detected in the odds of a depressive onset between early and late post-menopausal women.

Our results on the prevalence of post-menopausal depression are in accordance with data from a cross-sectional study by Unsal et al. that examined the prevalence of depression among post-menopausal women of a town in Turkey by means of the BDI. Having set a cut-off score of 17,

the measured prevalence reached 24.7% in their sample, which however also included women with surgically-induced menopause [15]. Another cross-sectional survey measuring the prevalence of severe post-menopausal depression was performed among women living on Greek islands, Cyprus and Malta, within the frames of the Mediterranean Islands (MEDIS) Study [12]. In that study, 21% of the women experienced severe depressive symptoms, compared to 11% in our study. Of note, that study included women with a mean age of 74 years, 69% of whom had been post-menopausal for over 20 years, whereas in our study, the median age of the sample was 53 with almost 60% of women being under 55 years old. Furthermore, that study employed a different test, the self-reported Geriatric Depression Scale (GDS).

Regarding the factors significantly associated with a higher risk of onset of depression, history of depression was not surprisingly one of those covariates. Analogous findings have been reported by numerous longitudinal studies, one of which found that women with history of depression were roughly five times more prone to receive a major depression diagnosis during the transition to menopause [8]. However, even without a history of major depression, the risk of depression among peri-menopausal women remains significantly elevated, as they are twice as likely to experience depressive symptoms compared to their pre-menopausal counterparts [10]. A very insightful observation was made in the Harvard Study of Moods and Cycles, remarking that women with a history of depression exhibited a 20% elevated rate of early entrance to menopause compared to women without history. This finding implies the underlying correlation of such a history with a shorter reproductive period, leading to a premature drop in ovarian function [16]. Accordingly, the duration of the reproductive period as well as the age at menopause have been inversely associated with post-menopausal depression incidence, as stated in a meta-analysis of five relevant studies [4].

Passing on to the next associated factor, one of our most significant findings was that the age of post-menopausal women was inversely

Table 2
Factors associated with postmenopausal depression (BDI-II ≥ 20) (n=502).

Characteristics	Univariate analysis OR (95% CI)	Multivariate analysis OR (95% CI)
Age		
< 55 years	1.422 (0.944-2.142)	1.621 (1.036-2.535) ^a
≥ 55 years	Reference	Reference
Current BMI		
≥ 30	1.502 (0.988-2.285)	1.486 (0.956-2.312)
< 30	Reference	Reference
Last menstrual period		
< 5 years (early)	1.162 (0.771-1.751)	-
≥ 5 years (late)	Reference	
Educational status		
Lower than university	1.709 (1.145-2.552)	1.283 (0.835-1.971)
University or higher	Reference	Reference
Living status		
Alone	1.360 (0.805-2.296)	-
Partner and/or children	Reference	
Current working status		
No	1.792 (1.204-2.664)	1.580 (1.013-2.465) ^b
Yes	Reference	Reference
Parity		
Nulliparous	1.087 (0.587-2.013)	-
Multiparous	Reference	
Healthcare insurance		
No	2.422 (1.273-4.606)	1.972 (0.991-3.926)
Yes	Reference	Reference
Smoking		
Yes	1.855 (1.236-2.783)	1.656 (1.081-2.536) ^c
No	Reference	Reference
Chronic disease		
Yes	1.521 (1.023-2.262)	1.411 (0.923-2.156)
No	Reference	Reference
History of depression		
Yes	1.984 (1.299-3.030)	1.650 (1.045-2.604) ^d
No	Reference	Reference
Social alcohol use		
Yes	1.014 (0.684-1.504)	-
No	Reference	
Heavy alcohol use		
Yes	0.861 (0.512-1.446)	-
No	Reference	

^a $p=0.034$,^b $p=0.044$,^c $p=0.02$,^d $p=0.032$ **Table 3**
Factors associated with moderate (n=81) and severe (n=55) postmenopausal depression.

Characteristics	Multivariate analysis moderate depression OR (95% CI)	Multivariate analysis severe depression OR (95% CI)
Age		
< 55 years	-	1.964 (0.933-4.133)
≥ 55 years		Reference
Current BMI		
≥ 30	-	2.455 (1.206-4.996) ^b
< 30		Reference
Last menstrual period		
< 5 years (early)	-	1.047 (0.497-2.207)
≥ 5 years (late)		Reference
Educational status		
Lower than university	-	-
University or higher		
Living status		
Alone	-	-
Partner and/or children		
Current working status		
No	-	1.388 (0.740-2.603)
Yes		Reference
Parity		
Nulliparous	-	-
Multiparous		
Healthcare insurance		
No	-	4.413 (1.970-9.887) ^c
Yes		Reference
Smoking		
Yes	2.514 (1.485-4.256) ^a	-
No	Reference	
Chronic disease		
Yes	-	1.370 (0.741-2.530)
No		Reference
History of depression		
Yes	-	2.253 (1.212-4.190) ^d
No		Reference
Social alcohol use		
Yes	-	-
No		
Heavy alcohol use		
Yes	-	-
No		

^a $p=0.001$,^b $p=0.013$,^c $p<0.001$ ^d $p=0.01$

correlated with the prevalence of depressive symptoms. This finding further validates the thesis currently predominating the literature, which affirms that the phases of late pre-menopause, menopause transition as well as the first year of early post-menopause are the most decisive for the emergence of peri-menopausal depression [3]. This period has been characterized as a window of higher vulnerability of women to the onset of depression [17]. Although the MEDIS study positively correlated years since menopause with depression, that study involved women with a mean age of 74 years, therefore diverging from the strict analysis of peri-menopausal depression and rather reviewing depression among the elderly [12].

Further, in our multivariate analysis, statistical significance was also reached for smoking, correlating it with higher odds of developing depressive symptoms. This agrees with other studies equally noting that smokers accounted for a greater percentage of women with depressive symptoms than non-smokers [18]. Moreover, unemployment was positively associated with post-menopausal depression and this factor has also been reported as a correlate in other studies [5], which have

additionally denounced low social support and economic hardship as contributing factors [6].

When women were assorted according to the severity of their depressive symptoms, significance was reached only for the associated factor of smoking among those with moderate depression. On the other hand, severe depressive symptoms exhibited a positive correlation with the absence of healthcare insurance, obesity and history of depression.

Regarding health insurance status, another cross-sectional study that set this factor as a covariate also recorded that the proportion of women experiencing depressive symptoms was higher in the uninsured group, without however reaching significance. It is worth noting that the insured group in that survey also encompassed uninsured women whose husbands were only insured and this might account for the difference

between our findings [15].

With respect to obesity, women who had a BMI of 30 or higher were found significantly more likely to manifest severe depression than those having a lower BMI. These findings are well in line with those of other studies [5,7,17], that also found a positive association between obesity and the emergence of depressive symptoms or even major depressive episodes. Conceivably, this association could be attributed to the variation of reproductive hormone levels and mainly FSH, depending on the various BMI categories [9]. Although the underlying pathways remain yet unknown, another possible connection between depressive symptoms and obesity could be the elevated levels of cortisol detected in those cases during the late menopause transition [5].

Our sample consisted of early post-menopausal women both in the early and late post-menopause, as classified by the STRAW criteria [1]. However, as already mentioned, no statistically significant divergence was detected in the odds of a depressive onset between early and late post-menopausal women. This is in contrast with findings of a prospective study examining the prevalence of post-menopausal depression, as measured with an Edinburgh Depression Scale (EDS) score of 12 or higher. Prevalence rates of depression reached 24.2% among women in the post-menopausal phase, compared to 14.3% and 16.5% in pre-menopausal and peri-menopausal women, respectively. This survey further confirmed that both transitional phases from pre- to peri-menopause and from peri- to post-menopause are significantly correlated with a rising emergence of depressive symptoms [19].

4.1. Limitations

This study has certain limitations. Firstly, the web-based design may be associated with recall bias, while the cross-sectional design may preclude causal conclusions. Secondly, the BDI-II, as reported by the developer, is a screening and not a diagnostic tool. Additionally, post-menopausal depression has been correlated with numerous underlying determinants, the verification of which though exceeds the purposes of this survey. For instance, the presence of vasomotor symptoms has been multifold associated with high rates of depressive symptomatology during the peri- and post-menopause. This correlation has been attributed not only to the induced insomnia and quality of life impairment, but also to the underlying persistent hormonal imbalance that multifariously burdens post-menopausal women [20–22]. However, our analysis mostly aimed to outline the sociodemographic profile and psychiatric history of depressed post-menopausal women, rather than meticulously scrutinize all the associated determinants involved in the pathogenesis of post-menopausal depression.

Finally, the higher prevalence rates of post-menopausal depressive symptoms reported in our study compared to the equivalent cross-sectional data cannot be attributed to a more flexible assessment of depression, as our BDI-II scores seem to be quite strict compared to literature, nor are they due to the effects of surgical menopause, as women having undergone hysterectomy prior to natural menopause were excluded from this study. The most plausible explanation for this discrepancy is that our study was conducted during the COVID-19 pandemic, an era associated with an overall higher prevalence of depression, even marking a three-fold increase in some countries like the US [23].

5. Conclusions

To conclude, our study has shown that more than one out of four post-menopausal women were screen-positive for depression and that personal history of depression, age < 55 years, not working and smoking were independent predictors of its emergence. Given the adverse impact of depression on the quality of life and the risks associated with failure to diagnose this condition, health professionals should be appropriately trained to identify post-menopausal women in need for effective treatment.

Contributors

Georgios Papazisis* developed the original idea for the study, drafted and revised the final manuscript.

Ioannis Tsakiridis* evaluated the results, performed the statistical analysis and participated in manuscript writing.

Alexandra Ainatzoglou cooperated in analysis of the results and manuscript writing.

Athanasia Pappa coordinated the recruitment of the sample population.

Thalia Bellali coordinated the recruitment of the sample population.

Dimitrios Kouvelas participated in the manuscript revision.

Themistoklis Dagklis coordinated the statistical analysis and participated in the revision.

All authors accept responsibility for the entire content of this submitted manuscript and approved submission.

*Shared first authorship.

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Ethical approval

The study protocol was approved by the bioethics committee of the School of Medicine of the Aristotle University of Thessaloniki (reference number: 5.172/28.2.2020).

Provenance and peer review

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Research data (data sharing and collaboration)

There are no linked research data sets for this paper. Data will be made available on request.

Declaration of competing interest

The authors declare that they have no competing interests.

References

- [1] S.D. Harlow, M. Gass, J.E. Hall, R. Lobo, P. Maki, R.W. Rebar, S. Sherman, P. M. Sluss, T.J. De Villiers, Executive summary of the stages of reproductive aging workshop +10: addressing the unfinished agenda of staging reproductive aging, *Climacteric* 15 (2012) 105–114, <https://doi.org/10.3109/13697137.2011.650656>.
- [2] J.T. Bromberger, C.N. Epperson, Depression during and after the perimenopause: impact of hormones, genetics, and environmental determinants of disease, *Obstet. Gynecol. Clin. North Am.* 45 (2018) 663–678, <https://doi.org/10.1016/j.ogc.2018.07.007>.
- [3] P.J. Schmidt, N. Haq, D.R. Rubinow, A longitudinal evaluation of the relationship between reproductive status and mood in perimenopausal women, *Am. J. Psychiatry* 161 (2004) 2238–2244, <https://doi.org/10.1176/appi.ajp.161.12.2238>.
- [4] M.K. Georgakis, T.P. Thomopoulos, A.A. Diamantaras, E.I. Kalogirou, A. Skalkidou, S.S. Daskalopoulou, E.T. Petridou, Association of age at menopause and duration of reproductive period with depression after menopause: a systematic review and meta-analysis, *JAMA Psychiatry* 73 (2016) 139–149, <https://doi.org/10.1001/jamapsychiatry.2015.2653>.
- [5] N.F. Woods, K. Smith-DiJulio, D.B. Percival, E.Y. Tao, A. Mariella, E.S. Mitchell, Depressed mood during the menopausal transition and early postmenopause: observations from the Seattle midlife women's health study, *Menopause* 15 (2008) 223–232, <https://doi.org/10.1097/gme.0b013e3181450fc2>.
- [6] J.T. Bromberger, S. Harlow, N. Avis, H.M. Kravitz, A. Cordal, Racial/ethnic differences in the prevalence of depressive symptoms among middle-aged women: the study of women's health across the nation (SWAN), *Am. J. Public Health* 94 (2004) 1378–1385, <https://doi.org/10.2105/AJPH.94.8.1378>.
- [7] E.W. Freeman, M.D. Sammel, H. Lin, D.B. Nelson, Associations of hormones and menopausal status with depressed mood in women with no history of depression,

- Arch. Gen. Psychiatry. 63 (2006) 375–382, <https://doi.org/10.1001/archpsyc.63.4.375>.
- [8] E.W. Freeman, Associations of depression with the transition to menopause, *Menopause* 17 (2010) 823–827, <https://doi.org/10.1097/gme.0b013e3181db9f8b>.
- [9] H.G. Burger, E.C. Dudley, J.L. Hopper, N. Groome, J.R. Guthrie, A. Green, L. Dennerstein, Prospectively measured levels of serum follicle-stimulating hormone, estradiol, and the dimeric inhibins during the menopausal transition in a population-based cohort of women 1, *J. Clin. Endocrinol. Metab.* 84 (1999) 4025–4030, <https://doi.org/10.1210/jcem.84.11.6158>.
- [10] L.S. Cohen, C.N. Soares, A.F. Vitonis, M.W. Otto, B.L. Harlow, Risk for new onset of depression during the menopausal transition: the Harvard Study of moods and cycles, *Arch. Gen. Psychiatry* 63 (2006) 385–390, <https://doi.org/10.1001/archpsyc.63.4.385>.
- [11] Hellenic Statistical Authority, Health Study for the year 2014, <https://www.statistics.gr/documents/20181/1845c3bc-b9d5-41f6-89df-a5436ad3dc23>.
- [12] I.G. Tsiligianni, S. Tyrovolas, V. Bountziouka, A. Zeimbekis, E. Gotsis, G. Metallinos, D. Tyrovolas, E. Polychronopoulos, C. Lionis, D. Panagiotakos, Depressive symptoms in postmenopausal women: results from the MEDIS study, *Women Health* 54 (2014) 389–401, <https://doi.org/10.1080/03630242.2014.897678>.
- [13] A.T. Beck, R.A. Steer, G.K. Brown, *Manual for the Beck Depression Inventory-II*, TX Psychol. Corporation, San Antonio, 1996.
- [14] M. Giannakou, P. Roussi, M.-E. Kosmides, G. Kiosseoglou, A. Adamopoulou, G. Garyfallos, Adaptation of the Beck Depression Inventory-II to Greek population, *Hell. J. Psychol.* 10 (2013) 120–146.
- [15] A. Unsal, M. Tözün, U. Ayranç, Prevalence of depression among postmenopausal women and related characteristics, *Climacteric* 14 (2011) 244–251, <https://doi.org/10.3109/13697137.2010.510912>.
- [16] B.L. Harlow, L.A. Wise, M.W. Otto, C.N. Soares, L.S. Cohen, Depression and its influence on reproductive endocrine and menstrual cycle markers associated with perimenopause: the Harvard Study of moods and cycles, *Arch. Gen. Psychiatry* 60 (2003) 29–36, <https://doi.org/10.1001/archpsyc.60.1.29>.
- [17] J.T. Bromberger, H.M. Kravitz, Y.F. Chang, J.M. Cyranowski, C. Brown, K. A. Matthews, Major depression during and after the menopausal transition: study of women's health across the nation (SWAN), *Psychol. Med.* 41 (2011) 1879–1888, <https://doi.org/10.1017/S003329171100016X>.
- [18] J.T. Bromberger, L.L. Schott, H.M. Kravitz, M.F. Sowers, N.E. Avis, E.B. Gold, J. F. Randolph, K.A. Matthews, Longitudinal change in reproductive hormones and depressive symptoms across the menopausal transition: results from the study of women's health across the nation (SWAN), *Arch. Gen. Psychiatry* 67 (2010) 598–607, <https://doi.org/10.1001/archgenpsychiatry.2010.55>.
- [19] L.W.F. Maartens, J.A. Knottnerus, V.J. Pop, Menopausal transition and increased depressive symptomatology: a community based prospective study, *Maturitas* 42 (2002) 195–200, [https://doi.org/10.1016/S0378-5122\(02\)00038-5](https://doi.org/10.1016/S0378-5122(02)00038-5).
- [20] M. de Kruif, A.T. Spijker, M.L. Molendijk, Depression during the perimenopause: a meta-analysis, *J. Affect. Disord.* 206 (2016) 174–180, <https://doi.org/10.1016/j.jad.2016.07.040>.
- [21] J. Vivian-Taylor, M. Hickey, Menopause and depression: is there a link? *Maturitas* 79 (2014) 142–146, <https://doi.org/10.1016/j.maturitas.2014.05.014>.
- [22] M. Hunter, R. Battersby, M. Whitehead, Relationships between psychological symptoms, somatic complaints and menopausal status, *Maturitas* 8 (1986) 217–228, [https://doi.org/10.1016/0378-5122\(86\)90029-0](https://doi.org/10.1016/0378-5122(86)90029-0).
- [23] C.K. Ettman, S.M. Abdalla, G.H. Cohen, L. Sampson, P.M. Vivier, S. Galea, Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic, *JAMA Netw. Open* 3 (2020), e2019686, <https://doi.org/10.1001/jamanetworkopen.2020.19686>.