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Daily Mate Drinking Is Associated with a Low Level of Depressive Symptoms among a Sample of Syrian University Students

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Abstract

Background & Aim: In this survey study, we investigated prevalence of depression and the possible anti-depressant effects of regular consumption of mate or chimarrão (a traditional infused drink popular in Latin America and the Levant, made by soaking dried leaves of the holly species Ilex paraguariensis) in a sample of Syrian youth. Experimental: A cross-sectional study with random sampling of 196 students in two different medical universities in Damascus, Syria. Students were assessed using Beck Depression Inventory Scale-II and a structured questionnaire was used for collecting data regarding yerba mate consumption. Results & Discussion: Our results showed a prevalence of depression at 70.10% (n = 136), also a significant correlation between depression and mate consumption. Practical Recommendation: We recommend further studies on the antidepressant role of yerba mate.

Keywords

Depression, Syrian Universities, Yerba Mate

1. Introduction

Depression disorder is a common illness, and we know now that patients of it and other mood disorders start showing symptoms at an early stage of life (Smith & Blackwood, 2004), and there is a lack of research regarding young people experience with depression, compared to older age groups (McCann, et al., 2012), university students, in particular, are considered a high-risk group for depression (Ibrahim et al., 2013). Although it is a major issue, there has been a failure to direct resources and focus toward researching the disease in the developing world (Patel et al., 2004). When it comes to treatment and aside from

psychotherapy, there are many pharmacological options available to deal with depression (Belmaker & Agam, 2008), but in mild cases of depression where the benefit is limited, and the risk increases, it is advised to avoid prescribing those drugs (NICE, 2009). In light of this, many depression patients tend to seek an alternative to antidepressants in herbal medicine (Ernst, 2007), and there has been a growing trend among people suffering from depression to resort to complementary medicines (Silvers et al., 2006), for example, Hypericum perforatum, also known as St John's has shown to be effective and superior to placebo in treating Major Depression Disorder (Linde et al., 2015). Therefore, it may be interesting to find another natural compound that exists in the daily life of the population that may serve as a safer adjunct to antidepressants.

Within this framework, Ilex paraguariensis, is a plant widely consumed in South America, the Levant, and to a lesser extent in Europe, North America (Bracesco et al., 2011). Ilex paraguariensis leaves and other plant parts are very rich in polyphenolic acid contents and flavonoids such as quercetin and rutin (Gambero & Ribeiro, 2015). Research has indicated an antidepressant-like effect of rutin (Nöldner & Schötz, 2002). Yerba mate also has a high content of caffeine and saponins (Bastos et al., 2007). Some studies showed that caffeine has a partial antidepressant activity (Khadrawy et al., 2018). Published studies have also shown that yerba mate has antioxidant activity (Gugliucci, 1996). According to Bilici et al. (2001) oxidative damage has been implicated in the pathogenesis of depression and similar diseases. The literature data have suggested that aqueous extract of Ilex paraguariensis has an antidepressant-like effect in rats (Reis et al., 2014) and compared to other stimulant beverages, such as coffee and tea, there are few scientific reports relating to yerba mate. And research has primarily focused on negative aspects such as the supposed link between mate consumption and the risk of developing esophageal cancer (Loria et al., 2009).

2. Materials and Methods

We conducted the study on a sample of university students. Our study goals involved screening for depression via the Beck Depression Inventory Scale-II (BDI), also studying the association between yerba mate intake and depressive symptoms. It was a representative cross-sectional study.

2.1. Sample Size

To calculate our sample size, we used the formula Equation (1),

$$n = \frac{z_{\alpha}^{2} pq}{d^{2}} \tag{1}$$

(where $Z(a) = 1.96$ at 95% confidence; p = prevalence of depression; $q = 1 - p$; d = absolute allowable error).

To calculate d we relied on previously published research that estimated the prevalence of the disease among university students at 33% and corresponded to (20/100) * 33 = 0.2 * 33 = 66 {Taking a relative precision of 20%}. A total of 196

student participants from two universities in Damascus, Syria were targeted but only 194 participated making the response rate of 98.98%.

2.2. Data Collection

Systematic random sampling was used to choose the sample after obtaining the approval of the head of the institutions; the researchers approached the student to collect data. A departmental board gave permission to the study. The ethical committee of scientific research in our university approved the experiment after confirming that the study complied with the university regulation. After describing the objectives behind our research to the students, they were assured confidentiality and given the option not to participate without any further questions or consequences. The subject's informed consent was obtained, and the researchers immediately collected the questionnaires back once the students finished answering; each participant needed approximately 5 to 10 minutes to finish answering. We attached a copy of the informed consent.

2.3. Study Tool

We constructed a structured questionnaire to collect data on the Sociodemographic situation of the students in the sample and their mate consumption and drinking habits. Students were asked about lifetime YM (yerba mate) consumption, the quantity (milliliter/per day), and frequency of consumption (days per month).

We used the Beck Depression Inventory Scale-II (BDI) to screen for depression, the Beck Depression Inventory is a multiple-choice inventory that rates the responses on a 4 points scale (from 0 - 3), and therefore the sum of the scores range from 0 to 63. Use the table illustrated (Table 1) to interpret the Beck Score (Alshahri & Shrim, n.d.).

Data analysis was done using statistical package for the social sciences, SSPS 26 for Windows. We ran a Pearson's (Pearson correlation coefficient) to investigate a relationship between mate drinking and depression. We calculate the Odds ratio and means.

3. Results

The response rate was 98.98% as 194 have answered the questionnaires out of a sample size of 196.

Table 1. BDI scores and levels of depression.

Total score	Levels of Depression
0 - 9	No depression
10 - 15	mild
16 - 23	moderate
24 - 36	severe
37 and above	Very severe

96 (49.48%) were females and 98 (50.52%) were males. We found the overall prevalence of depression at 70.10% (n = 136) of that 45.59% (n = 62) had a mild degree of depression, and 19.85% (n = 27) had severe depression. In our findings 52.94% (n = 72) of the depressed were males and 47.05% (n = 64) were females. The association between the level of depression and sex was statistically significant ($p = 0.031$) (Table 2).

There was no difference in the mean of depression between males and females (Table 3).

The Association between the level of depression and the year of study was not statistically significant ($p = 106$) (Table 4).

Concerning the second part of the questionnaire, mate consumption patterns among college students, there were 75.26% (n = 146) subjects who reported that they drink mate daily, those students have a significantly low mean of depression (Table 5). Daily mate drinking was equal for both women 50% (n = 73) and men 50% (n = 73).

We found an inverse relationship between the risk of depression and mate consumption, the association between depression and mate consumption was statistically significant ($p = 0.456$), (Odds ratio = 0.537) (Figure 1).

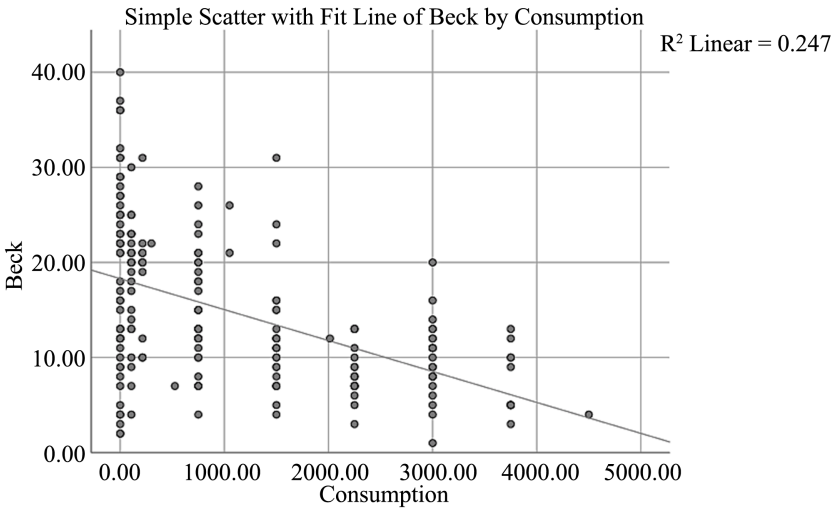

Figure 1. Prevalence of depression according to mate consumption.

Table 2. Levels of depression according to gender.

Grades of depression	Male (%)	Female (%)	Total (%)
Denial (0 - 9)	13.40 (26)	16.49 (32)	29.89 (58)
Mild (10 - 15)	19.07 (37)	12.88 (25)	31.96 (62)
Moderate (16 - 23)	10.31 (20)	13.92 (27)	24.23 (47)
Severe (24 - 36)	7.22 (14)	5.67 (11)	12.89 (25)
Very severe (<36)	0.52 (1)	0.52 (1)	1.03 (2)
Total	50.52 (98)	49.48 (96)	100 (194)

($p = 0.031$).

Table 3. Mean of depression according to gender.

Gender	Mean	N
Female	14.87	96
Male	14.39	98
Total	14.63	194

Table 4. Levels of depression according to the year of study.

Grades of depression	2nd year	3rd year	4th year	5th year	Total
Denial (0 - 9)	4	18	27	9	58
Mild (10 - 15)	10	15	26	11	62
Moderate (16 - 23)	4	13	18	12	47
Severe (24 - 36)	2	2	16	5	25
Very severe (<36)	0	0	2	0	2

($p = 0.106$).

Table 5. Mean of depression according to mate drinking.

Mate drinking	Mean	N
Drink	13.24	146
Does not drink	18.85	48
Total	14.63	194

4. Discussion

We investigated the possible relation between the consumption of yerba mate and depression in university students, where depression is a major issue because students are less likely to seek help (Furr et al., 2001). The prevalence of depression in our research was consistent with other studies. Bostanci et al. found that in Denizli, Turkey around 26.2% of university students had a BDI score of 17 or higher (Bostanci et al., 2005). A study at Damascus University during this period of war in Syria found the overall prevalence of depression in students at 60.6% (Al Saadi et al., 2017). Gonçalves et al. (2012) found out in a study of undergraduate students of pharmacy in Syria that 77% of students presented depressive symptoms. And one study in Kenya reported a 41.33% prevalence of depression (Othieno et al., 2014). Other studies in Saudi Arabia, Iraq, and Lebanon revealed 43%, 45.9% and 27.63% prevalence of depression respectively (Afsar & Kulsoom, 2015; Kathem et al., 2021; Mehanna & Richa, 2006). These differences could be explained to be due to the use of different measurement tools so comparing such results should be done with caution.

Research has found that beck depression inventory is a reliable tool in screening depression in non-clinical populations and supported its use in detecting depression in young people (Kumar et al., 2012; Teri, 1982).

These findings suggest that daily mate drinking may be associated with a reduced risk of depressive symptoms. We did not find any that study that reports associations between drinking mate and depression in university students or other populations and that is to be expected as the research on mate health properties does not compare to more highly researched beverages like coffee and tea (10)?. Mate is a Central Nervous System (CNS) stimulant and is a rich source of caffeine (Winkler et al., 2015), which may explain why those who drink mate daily are less depressed than others. Another possible explanation for our results is the high concentration of polyphenolic compounds and the resulting high antioxidant capacity in yerba mate (Baeza et al., 2018). Mate also has a high content of rutin which was found to have an anti-depressant activity (Nöldner & Schötz, 2002). On the other hand, these results might be due to mate drinkers having fewer risk factors for depression and not the drink itself.

We found no recent research on yerba mate consumption patterns among Syrian university students, although Syria is the world's second-largest importer of dried leaves of Ilex paraguariensis A. St.-Hil (Aquifoliaceae) (Sulaiman et al., 2021). The average consumption of mate in our study was consistent with previous research which found that the daily consumption can vary between 1 and 6 Liters per person (Bastos et al., 2007).

5. Conclusion

In summary, we can say that Syrian university students suffer from high rates of depression. We found an inverse relationship between daily mate consumption and the risk of being depressed. Further and more sophisticated studies are needed to confirm this association.

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All authors declare that they have no conflicts of interest.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Afsar, N., & Kulsoom, B. (2015). Stress, Anxiety, and Depression among Medical Students in a Multiethnic Setting. *Neuropsychiatric Disease and Treatment, 11,* 1713-1722. https://doi.org/10.2147/NDT.S83577

Al Saadi, T., Zaher Addeen, S., Turk, T., Abbas, F., & Alkhatib, M. (2017). Psychological Distress among Medical Students in Conflicts: A Cross-Sectional Study from Syria. *BMC Medical Education, 17,* Article No. 173. https://doi.org/10.1186/s12909-017-1012-2

Alshahri, M & Shrim, N. (n.d.). مقياس بيك لالكتئاب [Beck Depression for Depression]. King Saud University. https://faculty.ksu.edu.sa/sites/default/files/mqys_byk_llktyb.pdf

Baeza, G., Sarriá, B., Bravo, L., & Matéos, R. (2018). Polyphenol Content, *in Vitro* Bioac-

cessibility and Antioxidant Capacity of Widely Consumed Beverages. *Journal of the Science of Food and Agriculture, 98,* 1397-1406. https://doi.org/10.1002/jsfa.8607

Bastos, D. H. M., Beltrame, D., Matsumoto, R. L. T., Carvalho, P., & Ribeiro, M. (2007). Yerba Maté: Pharmacological Properties, Research and Biotechnology. *Medicinal and Aromatic Plant Science and Biotechnology, 1,* 37-46.

Belmaker, R. H., & Agam, G. (2008). Major Depressive Disorder. *New England Journal of Medicine, 358,* 55-68. https://doi.org/10.1056/NEJMra073096

Bilici, M., Efe, H., Köroğlu, M. A., Uydu, H. A., Bekaroğlu, M., & Değer, O. (2001). Antioxidative Enzyme Activities and Lipid Peroxidation in Major Depression: Alterations by Antidepressant Treatments. *Journal of Affective Disorders, 64,* 43-51. https://doi.org/10.1016/S0165-0327(00)00199-3

Bostanci, M., Özdel, O., Oguzhanoglu, N. K., Özdel, L., Ergin, A., Ergin, N. et al. (2005). Depressive Symptomatology among University Students in Denizli, Turkey: Prevalence and Sociodemographic Correlates. *Croatian Medical Journal, 46,* 96-100. http://acikerisim.pau.edu.tr:8080/xmlui/handle/11499/4926

Bracesco, N., Sanchez, A. G., Contreras, V., Menini, T., & Gugliucci, A. (2011). Recent Advances on *Ilex paraguariensis* Research: Minireview. *Journal of Ethnopharmacology, 136,* 378-384. https://doi.org/10.1016/j.jep.2010.06.032

Ernst, E. (2007). Herbal Remedies for Depression and Anxiety. *Advances in Psychiatric Treatment, 13,* 312-316. https://doi.org/10.1192/apt.bp.105.001735

Furr, S. R., Westefeld, J. S., McConnell, G. N., & Jenkins, J. M. (2001). Suicide and Depression among College Students: A Decade Later. *Professional Psychology: Research and Practice, 32,* 97-100. https://doi.org/10.1037/0735-7028.32.1.97

Gambero, A., & Ribeiro, M. (2015). The Positive Effects of Yerba Maté (*Ilex paraguariensis*) in Obesity. *Nutrients, 7,* 730-750. https://doi.org/10.3390/nu7020730

Gonçalves, V., Zidan, A., Issa, M., & Barah, F. (2012). A Longitudinal Investigation of Depressive Symptoms in Undergraduate Students of Pharmacy in Syria. *Journal of Nervous & Mental Disease, 200,* 395-400. https://doi.org/10.1097/NMD.0b013e3182532062

Gugliucci, A. (1996). Antioxidant Effects of Ilex Paraguariensis: Induction of Decreased Oxidability of Human LDL *in Vivo*. *Biochemical and Biophysical Research Communications, 224,* 338-344. https://doi.org/10.1006/bbrc.1996.1030

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A Systematic Review of Studies of Depression Prevalence in University students. *Journal of Psychiatric Research, 47,* 391-400. https://doi.org/10.1016/j.jpsychires.2012.11.015

Kathem, S. H., Al-Jumail, A. A., Noor-Aldeen, M., Najah, N., & Ali Khali, D. (2021). Measuring Depression and Anxiety Prevalence among Iraqi Healthcare College Students Using Hospital Anxiety and Depression Scale. *Pharmacy Practice (Granada), 19,* Article No. 2303. https://doi.org/10.18549/PharmPract.2021.2.2303

Khadrawy, Y. A., Sawie, H. G., Hosny, E. N., & Mourad, H. H. (2018). Assessment of the Antidepressant Effect of Caffeine Using Rat Model of Depression Induced by Reserpine. *Bulletin of the National Research Centre, 42,* Article No. 36. https://doi.org/10.1186/s42269-018-0034-1

Kumar, G. S., Jain, A., & Hegde, S. (2012). Prevalence of Depression and Its Associated Factors Using Beck Depression Inventory among Students of a Medical College in Karnataka. *Indian Journal of Psychiatry, 54,* 223-226. https://doi.org/10.4103/0019-5545.102412

Linde, K., Kriston, L., Rücker, G., Jamil, S., Schumann, I., Meissner, K. et al. (2015). Effi-

cacy and Acceptability of Pharmacological Treatments for Depressive Disorders in Primary Care: Systematic Review and Network Meta-Analysis. *Annals of Family Medicine, 13,* 69-79. https://doi.org/10.1370/afm.1687

Loria, D., Barrios, E., & Zanetti, R. (2009). Cancer and Yerba Mate Consumption: A Review of Possible Associations. *Revista Panamericana De Salud Publica = Pan American Journal of Public Health, 25,* 530-539. https://doi.org/10.1590/S1020-49892009000600010

McCann, T. V., Lubman, D. I., & Clark, E. (2012). The Experience of Young People with Depression: A Qualitative Study. *Journal of Psychiatric and Mental Health Nursing, 19,* 334-340. https://doi.org/10.1111/j.1365-2850.2011.01783.x

Mehanna, Z., & Richa, S. (2006). [Prevalence of Anxiety and Depressive Disorders in Medical Students. Transversal Study in Medical Students in the Saint-Joseph University of Beirut]. *L'Encephale, 32,* 976-982. https://doi.org/10.1016/S0013-7006(06)76276-5

NICE [The National Institute for Health and Care Excellence] (2009). *Depression in Adults: Recognition and Management*. The National Institute for Health and Care Excellence. https://www.nice.org.uk/guidance/cg90

Nöldner, M., & Schötz, K. (2002). Rutin Is Essential for the Antidepressant Activity of *Hypericum perforatum* Extracts in the Forced Swimming Test. *Planta Medica, 68,* 577-580. https://doi.org/10.1055/s-2002-32908

Othieno, C. J., Okoth, R. O., Peltzer, K., Pengpid, S., & Malla, L. O. (2014). Depression among University Students in Kenya: Prevalence and Sociodemographic Correlates. *Journal of Affective Disorders, 165,* 120-125. https://doi.org/10.1016/j.jad.2014.04.070

Patel, V., Araya, R., & Bolton, P. (2004). Treating Depression in the Developing World. *Tropical Medicine & International Health, 9,* 539-541. https://doi.org/10.1111/j.1365-3156.2004.01243.x

Reis, E. D. M., Schreiner Neto, F. W., Cattani, V. B., Peroza, L. R., Busanello, A., Leal, C. Q. et al. (2014). Antidepressant-Like Effect of *Ilex paraguariensis* in Rats. *BioMed Research International, 2014,* Article ID: 958209. https://doi.org/10.1155/2014/958209

Silvers, K. M., Woolley, C. C., & Hedderley, D. (2006). Dietary Supplement Use in People Being Treated for Depression. *Asia Pacific Journal of Clinical Nutrition, 15,* 30-34.

Smith, D. J., & Blackwood, D. H. R. (2004). Depression in Young Adults. *Advances in Psychiatric Treatment, 10,* 4-12. https://doi.org/10.1192/apt.10.1.4

Sulaiman, N., Pieroni, A., Sõukand, R., Whitney, C., & Polesny, Z. (2021). Socio–Cultural Significance of Yerba Maté among Syrian Residents and Diaspora. *Economic Botany, 75,* 97-111. https://doi.org/10.1007/s12231-021-09523-6

Teri, L. (1982). The Use of the Beck Depression Inventory with Adolescents. *Journal of Abnormal Child Psychology, 10,* 277-284. https://doi.org/10.1007/BF00915946

Winkler, G., El Damaty, M., & Lachenmeier, D. W. (2015). Maté—A "New" Caffeine-Containing Ingredient for the Food and Beverage Industry. *Ernahrungs Umschau, 61,* 160-163.