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Prevalence of Cyclothymic Disorder Among University Students in the Iraqi and Lebanese Communities: A Cross-Cultural Study

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ABSTRACT

Cyclothymic disorder is classified within the group of bipolar and related disorders in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)* issued by the American Psychiatric Association in 2022. Its prevalence rate is estimated at approximately 0.4%–2.5% of the world population, and no differences have been found between males and females in the likelihood of developing the disorder, although females appear to have a higher predisposition than males. The present study aims to examine the scientific methodology of cross-cultural comparative research, which focuses on systematic comparisons across cultures and seeks to answer questions related to the prevalence, distribution, and determinants of cultural diversity, as well as complex social and psychological issues across broad contexts—often on a global scale. Cross-cultural research strives to develop reliable explanations for why phenomena appear in certain ways. Cultural comparison does not negate cultural uniqueness; cross-cultural scholars do not deny the distinctiveness of cultures, as uniqueness and similarity always coexist. Cross-cultural research, therefore, engages with what is universal or shared among some or all human cultures. Accordingly, this study seeks to identify the prevalence of cyclothymic disorder among university students in both Iraqi and Lebanese societies.

Keywords: Cyclothymic disorder, university students, Iraqi society, Lebanese society, cross-cultural study.

INTRODUCTION

Cyclothymic disorder is defined in the *DSM-5-TR* (American Psychiatric Association, 2022) as "a condition in which brief, relatively mild episodes of elevated mood (hypomania) alternate with brief or mild episodes of depressed mood" (p. 160). Although cyclothymic disorder is not a new condition and has long been recognized within psychological traditions, it has largely been overlooked in recent decades. Research attention has instead focused more heavily on mood disorders such as major depressive disorder and bipolar I and II disorders, which have dominated epidemiological, psychological, biological, and clinical studies (Mainiscalco, 2024, p. 2).

Cyclothymic disorder continues to be neglected within the spectrum of bipolar disorders. In contrast to the DSM's emphasis on recurrent low-grade mood episodes, the condition is better characterized by early onset, complex affective patterns, heightened emotional reactivity, and rapid mood shifts. Current epidemiological and clinical findings show that it represents a distinct and significant form of bipolarity (Hantouch et al., 2012, p. 407).

Important questions remain regarding the patterns of mood episodes among adolescents and young adults, as well as the rate of transition from unipolar to bipolar disorders. Estimated cumulative incidence by age 33 is 2.9% for mania, 4% for hypomania, 29.4% for major depression, and 19% for minor depressive episodes. Overall, 26% of individuals experienced unipolar major depression, 4% bipolar depression, 1.5% unipolar mania, and 3.6%

unipolar hypomania (without major depression). Additionally, 0.6% and 1.8% of individuals experienced unipolar mania or unipolar hypomania, respectively, without any indicators of even mild depressive symptoms. Notably, 3.6% of initial unipolar depressive cases later progressed to mania or hypomania. These fluctuating mood patterns, moving from one state to another, reflect the subtle and often concealed nature of cyclothymic disorder, making it difficult to diagnose in its intermediate stages due to the irregularity and variability of symptoms (Beesdo et al., 2009, p. 637).

Consequently, the cultural dimension of understanding psychological phenomena—particularly mental health and mental disorders—has become increasingly important in contemporary research. Growing awareness suggests that mental-health concepts are not universal or culturally neutral. While it was once assumed that symptoms and determinants of psychological disorders were similar across societies, anthropological and sociological research has demonstrated that perceptions of mental illness, explanatory models, and treatment approaches vary widely across cultural and social contexts.

Within this framework, mental disorders are understood as culturally and socially embedded phenomena as much as they are medical conditions. Some scholars argue that the relationship between the individual and society may become disrupted when traditional cultural values clash with patterns of modernization and social change, generating psychological tension or distress. Thus, mental health and psychological disorder reflect the degree of harmony or conflict between individuals and their cultural environments. Despite significant advances in diagnostic and classificatory systems within psychology and psychiatry, therapeutic practices in many societies still incorporate cultural elements and local belief systems. This underscores the importance of adopting a cross-cultural approach to understanding psychological phenomena—one that moves beyond traditional Western paradigms and recognizes the diversity of human experiences (Hamel, 2020, p. 691).

Given the scarcity of cross-cultural research on mental disorders in Arab countries—and specifically on how cultural contexts influence psychological processes—the researcher found no cross-cultural studies addressing cyclothymic disorder in particular or explaining how cultural factors shape its interpretation. Therefore, this study examines the prevalence of cyclothymic disorder among university students in Iraq and Lebanon.

Research Objectives

This study aims to answer the following research questions:

Objective (1): To identify the prevalence of cyclothymic disorder among university students in both Iraqi and Lebanese societies.

Objective (2): To identify differences in cyclothymic disorder among university students according to:

1. **Gender** (male–female)
2. **Cultural context** (Iraqi – Lebanese)

METHODOLOGY

Sample

The sample of the present study consisted of **2,040 university students** from Iraq and Lebanon, with **1,020 participants from each country**. The sample was distributed evenly across six governorates in the two societies, with **170 participants per governorate** (85 males and 85 females).

Research Instrument

The researcher adopted the **Cyclothymic Disorder Scale** developed by *Kochman et al. (2003)*, which consists of **25 items**. The scale was translated and adapted to both Iraqi and Lebanese contexts. Response options were **Yes** and **No**, measuring individuals' responses to each item.

According to the original scale developed by Kochman et al. (2003), an individual is considered to exhibit cyclothymic disorder if they obtain a score of **12 or higher** out of the total **25** items.

Validity

Validity refers to determining test scores based on the psychological construct the researcher intends to measure or in light of a specific psychological concept (Stanley et al., 1972, p.111). It is the extent to which a scale can be judged as measuring a particular psychological trait (Cronbach, 1964, pp. 120–121).

The researcher relied on two types of validity:

1. **Content Validity**
   Ebel (1972) emphasized that the best method for determining content validity is for a group of expert judges to evaluate the degree to which the items reflect the targeted construct (Ebel, 1972, p.155).

Accordingly, the researcher presented the preliminary version of the scale to a panel of **nine specialized experts** in psychology to review the suitability of the items, instructions, response options, and scoring system, and to provide recommendations for modification or deletion.
A consensus level of **80% agreement** was adopted as a strict criterion for accepting an item. This level provides sufficient confidence for retaining, modifying, or discarding an item.
The items received expert approval rates ranging between **89% and 100%**.

2. **Construct Validity**
Construct validity is considered a precise method for examining the internal consistency of a scale. It determines whether each item follows the same direction as the scale as a whole (Eisawi, 1982, p. 51).
To achieve this, the researcher employed the **point-biserial correlation coefficient** to correlate each item's score with the total test score, given that item responses are dichotomous (Shukair, 2000, p. 96).
When comparing the correlation coefficients with the tabulated critical value of **0.08** at **$\alpha = 0.05$** and **df = 598**, all item–total correlations were found to be statistically significant. Table (1) illustrates these findings.

Table (1) Item–Total Correlation Coefficients for the Cyclothymic Disorder Scale

Item	Correlation Coefficient	Significance	Item	Correlation Coefficient	Significance	Item	Correlation Coefficient	Significance
1	0.51	Significant	10	0.62	Significant	19	0.60	Significant
2	0.60	Significant	11	0.61	Significant	20	0.53	Significant
3	0.56	Significant	12	0.60	Significant	21	0.59	Significant
4	0.55	Significant	13	0.62	Significant	22	0.64	Significant
5	0.55	Significant	14	0.63	Significant	23	0.59	Significant
6	0.56	Significant	15	0.58	Significant	24	0.64	Significant
7	0.55	Significant	16	0.65	Significant	25	0.59	Significant
8	0.56	Significant	17	0.60	Significant			
9	0.55	Significant	18	0.64	Significant			

Reliability

The researcher employed two methods to assess the reliability of the Cyclothymic Mood Disorder Scale:

1. Test–Retest Method

To extract the reliability index using this method, the researcher administered the scale to a reliability sample consisting of (50) male and female students in Iraq, and an equivalent number in Lebanon, selected through simple random sampling. After a two-week interval from the first administration, the scale was re-administered to the same group. Using Pearson's correlation coefficient between the scores of the first and second administrations, the reliability index of the Cyclothymic Mood Disorder Scale was found to be (0.79).

2. Kuder–Richardson Method

To calculate reliability using this method, the researcher used the Kuder–Richardson formula since the scale items are dichotomous. The formula was applied to the responses of the statistical analysis sample consisting of (600) male and female students. The reliability index for the Cyclothymic Mood Disorder Scale was (0.80). According to the criterion of shared explained variance (Lindquist, 1988, p.57), this index indicates a high level of reliability; therefore, the scale demonstrates strong internal consistency.

RESULTS

Objective (1): Identifying the Prevalence of Cyclothymic Mood Disorder among University Students in the Iraqi and Lebanese Communities

To determine the prevalence of cyclothymic mood disorder among the research sample, the raw scores obtained by participants on the scale were converted into T-scores. Tables (2) and (3) present the results.

Table (2) T-scores (standardized) and corresponding raw scores for participants in the Iraqi community

Sample	Mean	SD	Disorder Level	T-score	Raw Score	Frequency	Percentage
1020	7.28	4.25	High	60 and above	12–25	131	12.84%
			Moderate	40–59	4–11	684	67.06%
			Low	39 and below	0–3	205	20.10%

Table (2) shows that the proportion of Iraqi participants with high levels of cyclothymic mood disorder (12.84%) is lower than those with low levels (20.10%) and much lower than those in the moderate category (67.06%). A T-score of 60 or above indicates a value exceeding the sample mean by one standard deviation, while a T-score of 40 or below indicates a value lower than the mean by one standard deviation.

Table (3) T-scores (standardized) and corresponding raw scores for participants in the Lebanese community

Sample	Mean	SD	Disorder Level	T-score	Raw Score	Frequency	Percentage
1020	7.26	4.42	High	60 and above	12–25	146	14.31%
			Moderate	40–59	3–11	711	69.71%
			Low	39 and below	0–2	163	15.98%

Table (3) indicates that the percentage of Lebanese participants with high levels of cyclothymic mood disorder (14.31%) is lower than those with low levels (15.98%) and significantly lower than the moderate category (69.71%).

These percentages in both communities are relatively high compared with the findings of **Quazi et al. (2023)**, who reported a cyclothymic mood disorder prevalence of (0.4%) among university students in India (p. 3). They are also consistent with **Meter et al. (2012)**, who found through longitudinal studies that roughly one-third to one-half of young individuals tend to develop subtypes of bipolar disorders, including cyclothymic disorder (p. 230).

The results also reveal that the majority of the Iraqi sample (67.06%) and the Lebanese sample (69.71%) fall within the moderate category, which indicates cyclical mood symptoms that do not reach full clinical severity. According to **Ellis (1963)**, humans are constructive and enjoy a considerable degree of free will; however, this free will is constrained by strong biological tendencies and by social learning. Individuals' beliefs strongly influence their choices, goals, and values, yet such beliefs are rarely pure. They may include rigid demands: *"I must perform well and gain others' approval; otherwise, it would be terrible, and I would lose my worth."* (Ellis et al., 2010, p. 27).

The findings also align with **Beesdo et al. (2009)** concerning the distribution patterns and concealed nature of cyclothymic disorder, as it is difficult to diagnose in moderate stages due to irregular fluctuation in symptoms and severity (p. 637).

The high-level category (12.84% in Iraq; 14.31% in Lebanon) can be interpreted based on **Ellis (2003)**, who argued that activating events do not directly cause emotional or behavioral outcomes; rather, the beliefs associated with these events are the decisive factor. Ellis explained that irrational beliefs are rigid, extreme, unrealistic, and socially incongruent. They often begin with the word "must," producing fear and devaluation of the self, and represent underlying assumptions that distort self-judgment. Such beliefs become habitual through repetition (Graski, 2012, pp. 67–68).

The low-level category (20.10% in Iraq; 15.98% in Lebanon) may indicate mood responses within normative ranges or subthreshold mood disturbances. Individuals in this group are typically less likely to seek treatment, although symptoms may develop later. Ellis (1963) emphasized that individuals with disorders often hold rigid irrational beliefs that exaggerate daily events during low mood or interpret them idealistically during elevated mood states. Such emotionally charged beliefs disrupt emotional regulation and behavior, negatively affecting psychological and social stability. Ellis further argues that the root cause of mood disorders lies not in the event itself, but in the individual's interpretation of it—those with cyclothymic disorder often interpret daily events through rigid, illogical beliefs (e.g., *"I must always be loved; otherwise, I am worthless"*) (Graski, 2012, p. 76).

The slightly higher percentage in the Lebanese community (14.31%) compared to the Iraqi community (12.84%) may reflect greater psychological sensitivity to social or economic pressures, or the presence of inherited genetic or environmental predispositions, as indicated by studies such as **Akiskal (2002)** and **Goodwin & Jamison (2007)**, which highlight the relationship between biological predisposition and cultural expression of mood disorders (p. 98).

Objective (2): Identifying differences in Cyclothymic Mood Disorder among University Students according to Gender (Male/Female) and Cultural Background (Iraqi/Lebanese)

1. Gender Differences (Males vs. Females)

To achieve this objective, the independent samples t-test was used to determine differences in cyclothymic mood disorder between male and female students in the Iraqi and Lebanese samples. Tables (4) and (5) present these results.

Table (4) Independent Samples t-test for Differences in Cyclothymic Mood Disorder According to Gender in the Iraqi Sample

Sample	Gender	N	Mean	SD	t-calculated	t-tabulated	Sig.
131	Male	63	14.41	3.28	0.73	1.96	Not significant
	Female	68	14.85	3.64			

It is evident from Table (4) that there is **no statistically significant difference** in cyclothymic mood disorder among university students in the Iraqi sample according to gender. This is because the calculated t-value (0.73) is lower than the tabulated t-value (1.96) at the (0.05) significance level and (129) degrees of freedom.

According to the **American Psychiatric Association (2022)** in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5-TR), the prevalence of cyclothymic disorder ranges from **0.4% to 2.5%** of the global population. The manual states that there is **no difference between males and females** in the likelihood of developing Cyclothymic Disorder (CycD), although females may have **somewhat greater predisposition** than males. Furthermore, the **American Psychiatric Association (2022)** reports that the prevalence rate of cyclothymic disorder in mood disorder clinics ranges between **3% and 5%**. Cyclothymic disorder appears to be **equally common among males and females** in the general population. In clinical settings, however, females with cyclothymic disorder may be **more likely to seek treatment** than males (American Psychiatric Association, 2022, p. 161).

Table (5) Independent Samples t-test for Differences in Cyclothymic Mood Disorder According to Gender in the Lebanese Sample

Sample	Gender	N	Mean	SD	t-calculated	t-tabulated	Sig.
146	Male	85	14.42	3.35	0.51	1.96	Not significant
	Female	61	14.69	2.77			

Table (5) shows that there is **no statistically significant difference** in cyclothymic mood disorder among university students in the Lebanese sample according to gender, as the calculated t-value (0.51) is lower than the tabulated t-value (1.96) at the (0.05) significance level and (144) degrees of freedom.

Psychological and social stressors affecting mood may be similar for both genders within the university environment. According to the cognitive-behavioral school, **Ellis (2008)** argues that individuals attempt to understand their environment from early developmental stages and need to organize their experiences coherently to adapt. Their interactions with the world and others—shaped by genetic predispositions—lead to a distinct understanding of their beliefs, which may differ in accuracy and functionality depending on the situation. These underlying beliefs influence an individual's perception, expressed in the form of **automatic thoughts**, especially in different situations. These thoughts subsequently shape the individual's emotional, behavioral, and physiological reactions, **regardless of gender**, whether male or female (Ellis, 2008, p. 128).

2. Differences According to Cultural Background (Iraqi – Lebanese)

To achieve this objective, the independent samples t-test was used to identify differences in cyclothymic mood disorder among university students according to cultural background (Iraqi vs. Lebanese). Table (6) presents the results.

Table (6) Independent Samples t-test for Differences in Cyclothymic Mood Disorder According to Cultural Background (Iraqi – Lebanese)

Sample	Culture	N	Mean	SD	t-calculated	t-tabulated	Sig.
277	Iraqi	131	14.64	3.46	0.27	1.96	Not significant
	Lebanese	146	14.53	3.11			

It is evident from Table (6) that there is **no statistically significant difference** in cyclothymic mood disorder among university students according to cultural background, as the calculated t-value (0.27) is lower than the tabulated t-value (1.96) at the (0.05) significance level and (275) degrees of freedom.

According to the **American Psychiatric Association (2022)**, some individuals may function relatively well during periods of hypomania. However, over the long duration of the disorder, there must be clinically significant distress or impairment in social, occupational, or other important areas of functioning due to mood disturbance, as stated in criterion (G) (American Psychiatric Association, 2022, p. 160).

Cultural patterns interact over time, leading to similarities in characteristics, behavioral patterns, and coping strategies. Salman et al. (1984) emphasize that personality in any civilization or society is influenced by dominant social norms and by the new changes that arise within that civilization and society (Salman et al., 1984, p. 215).

The origins and manifestations of psychological disorders are complex and reflect **biological, psychological, social, and cultural influences**. Psychological disorders cannot be explained solely by brain dysfunction. The environment in which the disorder develops plays a major role, and cultural influences have a clear impact. Culture helps define what is considered "normal" and what constitutes deviation, and it also shapes patterns of adaptation.

CONCLUSIONS

The emotional and cognitive fluctuations and exaggerated perceptions associated with cyclothymic disorder symptoms may adversely affect an individual's social functioning, due to heightened reactivity, emotional sensitivity, and intense responses to triggering situations. According to previous studies and the existing literature, approximately one-third to one-half of young people with subthreshold bipolar conditions (such as cyclothymic disorder or specified bipolar disorder) experience patterns that can significantly impact their daily functioning. The findings highlight the importance of early detection and differential diagnosis of cyclothymic disorder, particularly among adolescents and young adults, in order to prevent the development of long-term social difficulties.

Cyclothymic disorder is, at its core, an atypical reaction to environmental stimuli. Reducing levels of anxiety and stress, and improving mental health, may help diminish these mood fluctuations—especially among emotionally vulnerable adolescents and young adults.

Some societal perspectives conceptualize mood fluctuations in this disorder as purely biological phenomena, which may underestimate the role of cognitive and behavioral factors that are amenable to change through psychotherapy. This perception poses a challenge to the independent application of cognitive-behavioral therapy (CBT) without concurrent pharmacological support.

A common error in cross-cultural studies is the assumption that meaningful differences cannot be detected due to the perceived cultural similarity among Arab societies. This generalization is inaccurate, as each country possesses its own culture and belief systems. Every culture has a unique "spirit"—a constellation of abstract psychological characteristics inferred from its cultural patterns—that shapes the personalities of its members. Accordingly, there is a clear need to develop culturally sensitive measurement tools tailored to the contexts of Arab societies, taking into account familial structures, religious frameworks, and local social norms.

Cultural interaction plays an essential role in shaping psychological and emotional response patterns. The study demonstrated that culture may influence the mechanisms through which emotions are expressed, and how individuals evaluate themselves and others. These findings underscore the importance of adopting a cross-cultural approach to the study of psychological disorders.

Conflict of Interest

The researcher confirms that no conflict of interest occurred with any entity during the execution of this study. No agreements of a commercial or financial nature were made with governmental or non-governmental institutions in Iraq or Lebanon that could be construed as potential conflicts of interest.

Funding

The research expenses were funded exclusively by the researcher. No financial support or funding was received from any entity, organization, or institution within or outside Iraq or Lebanon.

Prior Consent

Prior to data collection, informed consent was obtained from all participants. Additionally, the researcher secured official approvals from the deans of the colleges and heads of departments in all colleges and departments across the six Iraqi and Lebanese provinces in which the study was conducted.

Ethical Approval Statement

Due to the absence of a specialized ethics committee within the Department of Psychology, the College of Arts, or the University of Baghdad responsible for issuing formal ethical approval for research involving human participants, the researcher fulfilled the ethical requirements through official facilitation letters issued by the Graduate Studies Division to the Ministry of Higher Education and Scientific Research (Iraq/Lebanon), and subsequently to all relevant colleges and departments—scientific and humanities—within the research population where the study instruments were administered.

ARABIC REFERENCES

Salman, A. A. M., Mahdi, Q. A., Ibrahim, K. I., & Naji, L. Y. (1984). *The Iraqi Personality: Traits, Attitudes, and Values*. University of Baghdad, Center for Educational and Psychological Research.

Shuqair, F. (2000). *Introduction to Statistics*. Amman: Al-Maseera Publishing and Distribution.

Eissawi, A. R. M. (1982). *Measurement and Experimentation in Psychology and Education*. Beirut: Dar Al-Jama'a.

Graski, M. (2012). *Cognitive Behavioral Therapy*. Cairo: Egyptian Book House.

Hamel, A. (2020). *A Psycho-cultural Reading of Psychological Disorders*. University of Guelma, Algeria. *Journal of Researcher in Humanities and Social Sciences*, 12(01), 12.

FOREIGN REFERENCES

American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., Text Revision). Washington, DC.

Beesdo, K., Holfer, M., Leibenluft, E., & Bauer, M. (2009). Mood episodes and mood disorders: Patterns of incidence and conversion in the first three decades of life. *Bipolar Disorders, 11*(6), 637–649. https://doi.org/10.1111/j.1399-5618.2009.00738.x

Cronbach, L. J. (1964). *Essentials of Psychological Testing*. New York: Harper & Brothers Publishers.

Ebel, R. L. (1972). *Essentials of Educational Measurement*. Englewood Cliffs, New Jersey: Prentice-Hall.

Ellis, A. (2008). Rational emotive behavior therapy. In *The Quick Theory Reference Guide: A Resource for Expert and Novice Mental Health Professionals* (pp. 127–139). Nova Science Publishers.

Ellis, A., Lynn, S. J., & David, D. (2010). *Rational and Irrational Beliefs*. New York: Oxford University Press.

Goodwin, F. K., & Jamison, K. R. (2007). *Manic-Depressive Illness: Bipolar Disorders and Recurrent Depression* (2nd ed.). Oxford University Press.

Hantouch, E., & Perugi, G. (2012). Should cyclothymia be considered a specific and distinct bipolar disorder? *Journal of Neuropsychiatry, 2*(5), 407–414. Paris, France.

Kochman, F. J., Hantouch, E. G., Ferrari, P., Lancrenon, S., Bayart, D., & Akiskal, H. S. (2003). Cyclothymic temperament as a prospective predictor of bipolarity and suicidality in children and adolescents with major depressive disorder. University of California, San Diego.

Lindquist, E. F. (1988). *Educational Measurement*. Washington: American Association.

Maniscalco, I. (2024). A historical overview of cyclothymia. *Cureus*. Springer Nature. https://doi.org/10.13140/RG.2.2.32951.74401

van Meter, A. R., Youngstrom, V. E. A., & Findling, R. L. (2012). Cyclothymic disorder: A critical review. *Clinical Psychology Review, 32*(4), 229–243. https://doi.org/10.1016/j.cpr.2012.02.001

Stanley, C., Hopkins, J., & Kennedy, D. (1972). *Educational and Psychological Measurement and Evaluation*. New York: Prentice-Hall.

Olatundun, O. I. (2009). What is cross-cultural research? *International Journal of Psychological Studies, 1*(2), 82–96. Redeemer's University, Nigeria. https://doi.org/10.5539/ijps.v1n2p82

Quazi, A., Berry, S., Logue, R., Gaidhane, S., & Parve, S. (2023). The prevalence of cyclothymic disorder among first-year students at a health sciences university in Central India. *7MD College of Medicine, University of Vermont Robert Larner College of Medicine*, Burlington, Vermont, USA.

