

Depressive Symptom Profiles among Adults in Casablanca: A Cross-Sectional Beck Depression Inventory (BDI) Item-Level Analysis

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<https://dx.doi.org/10.13005/bpj/3532>

(Received: 01 July 2026; accepted: 07 August 2026)

Depression is a widespread public health issue in Morocco, with depressive disorders ranking among the most important determinants of population ill-health. However, studies specifically characterizing the symptom profile of depression among Moroccan adults remain scarce. This study aims to assess depression and its associated factors among the population of Casablanca, Morocco. We conducted a cross-sectional study involving 135 Moroccan adults from the Casablanca region. Participants completed the Beck Depression Inventory (BDI) short form alongside a sociodemographic questionnaire. Descriptive statistics, item response frequencies, and Pearson correlations were applied. The mean BDI score was 6.57 (SD = 3.49) (range: 1–16), indicating mild depressive symptoms on average based on the scale's conventional thresholds. The BDI demonstrated acceptable internal consistency (Cronbach's $\alpha = 0.72$). The study also found a sample obesity rate of 47.0% prevalence of obesity among participants. Item-level analysis revealed a notable dissociation: while cognitive items showed very high resilience (92.5% reported no guilt; 88.8% reported no self-disappointment), somatic and mood symptoms were considerably more prevalent only 30.6%, 43.3%, and 44.0% reported an absence of sadness, work difficulty, and fatigue, respectively. Loss of interest in others and indecisiveness were strongly correlated ($r = 0.757$, $p < .001$). Guilt and self-disappointment were also strongly correlated ($r = 0.821$, $p < .001$). These findings suggest that somatic and mood symptoms are more common than cognitive-affective symptoms in this Moroccan sample, which relative to Western individualistic patterns may be indicative of culturally patterned somatization. The substantial overlap between guilt and self-disappointment points to potential opportunities for scale refinement, while the strong association with social withdrawal and indecisiveness calls for community-based intervention strategies. Clinicians should maintain a high index of suspicion for underlying depression when patients present with unexplained persistent fatigue or work difficulty, and culturally adapted, somatically-oriented interventions appear warranted.

Keywords: Beck depression Inventory, BMI, Depression, Obesity, Psychometrics, Somatic symptoms.

Depressive disorders represent one of the greatest public health challenges of the twenty-first century. According to the World

Health Organization (WHO), depression is a leading cause of disability globally, affecting over 280 million people worldwide.¹ The disorder is

defined by a long-term state of low mood, loss in interest or pleasure, feelings of guilt or low self-worth, disturbed sleep and appetite, tiredness (low energy) and poor concentration symptoms which greatly impair individual's ability to be functional. Global Burden of Disease estimates show that the prevalence and burden regarding depressive disorders have been increasing at an alarming rate projections indicate... expected to rise over the coming decades.² Depression is particularly impactful within the Middle East and North Africa (MENA) region. A recent systematic review and meta-analysis established the pooled prevalence of depressive symptoms in the MENA region at approximately 44% (95% CI: 39–50%)—a rate substantially higher than that documented in most other global populations.³

Morocco is one of the countries that suffer most from this mental health issue. According to official data from the Economic, Social and Environmental Council, nearly half of Moroccans (48.9%) have experienced psychological disorders at some point in their lives, with about a quarter suffering from depression.⁴ Morocco is also 3rd on the list of African countries regarding those with depressive disorders, approximately 6.54% (extrapolating to nearly 2.4 million individuals).⁵ This high prevalence is associated with several factors, including the urban-rural divide in wealth,⁶ youth unemployment and separation from family due to migration. The situation is further compounded by significant gaps in mental health infrastructure and care provision, which remain insufficient to meet the population's needs; reports indicate that Morocco has fewer than 0.1 psychiatrists per 100,000 people, with only 343 psychiatrists working across both the public and private sectors⁷. Studies focusing on specific subpopulations have revealed even higher rates: depressive symptoms were reported by 56.1% of hypertensive patients in Marrakech,⁸ About 44.7% of adolescents in the Settat region presented with moderately severe to severe depressive symptoms,⁹ and depressive symptoms among Moroccan seniors are described as “very high and underestimated”¹⁰

Identification of the sociodemographic and clinical correlates of depressive symptomatology is critical for preventive or intervention purposes. A female gender, being less educated and having low income individuals living in urban areas

have been identified as consistent risk factors for depression across different contexts.¹¹ However, recent reports show that the rates of depression are more than 8% compared to that of men which barely reaches even four percent in Morocco.¹² Among the elderly group, 44% of those aged e”70 years had depression in most of cases especially among women.¹⁰

One potentially important, yet scarcely studied correlate relevant to Morocco is the association between body mass index (BMI) and depression. Over the past three decades, Morocco has experienced a rise in obesity prevalence, with female obesity rates rising from 20.9% (2011) to 29% (2018), and even higher levels have been reported recently.¹³ For example, a study carried out in Rabat-Salé-Kénitra region found that among participants 47.01% fell into the obese range whereas only 27.61 were of normal weight.¹⁴

These numbers are remarkably similar to the BMI distribution in this study. Longitudinal meta-analytic research findings suggest that obesity, as well as BMI per se is a significant causal risk factor acting bidirectionally for the development of depression.¹⁵ High prevalence of depression has been also found in Moroccan context regarding overweight/obesity and low self-esteem.¹⁶ As recent research points out, however, “there is still a paucity of data on this topic in our context”, with particular lack of studies involving the general adult population.

However, despite these contributions, a critical gap persists in the Moroccan depression literature. Existing studies are largely confined to specific clinical or demographic subgroups adolescents, the elderly, pregnant/postpartum women, students, and patients with chronic diseases with limited investigation of the general adult population across sociodemographic strata. More fundamentally, Moroccan depression research has almost exclusively relied on total severity sum scores, which assume homogeneity across symptoms and obscure culturally specific response patterns. This coarse approach fails to capture the relative prominence of somatic complaints versus cognitive self-reproach, does not assess item-level psychometric performance (e.g., redundancy, floor effects) in the general adult population, and overlooks the association between BMI and specific somatic depressive

items rather than global scores. The role of BMI in depressive symptomatology is insufficiently examined despite national obesity prevalence exceeding 30%. To address these gaps, this study moves beyond total scoring to provide the first item-level profiling of the BDI-13 in a Moroccan adult community sample, to our knowledge. Specifically, the novelty of this investigation lies in its triple contribution: (i) it delineates the distribution of individual depressive symptoms dissecting cognitive-affective from somatic-mood dimensions in a general adult population; (ii) it systematically evaluates inter-item correlations to identify potential psychometric redundancies (e.g., guilt versus self-disappointment) that are culturally shaped; and (iii) it explores the interplay between sociodemographic factors, BMI, and distinct symptom patterns. This granular, item-level approach is essential for refining cultural adaptations of depression scales, guiding primary care screening toward the most prevalent local presentation.

MATERIALS AND METHODS

Study Design and Setting

This was a descriptive, exploratory, cross-sectional study. The term *cross-sectional* denotes that all data were collected at a single point in time (assessing prevalence and correlates). The term *descriptive exploratory* reflects the study's primary aim: to describe the distribution of depressive symptoms in this sample and generate hypotheses regarding associated factors, rather than to test confirmatory causal pathways. The survey was conducted with both rural and urban respondents from Casablanca, Morocco, between January 1, 2025, and March 31, 2025.

Participants and Sampling

A total of 135 participants ($N = 135$) were included in the analysis. A convenience sampling strategy was employed to recruit participants from neighborhood associations, primary healthcare centers, and universities in Casablanca. This multi-site strategy was used to optimally balance socio-demographic diversity within the sample. This pragmatic, non-probabilistic approach was chosen for feasibility and to maximize recruitment across diverse socioeconomic strata.

Inclusion criteria

All study participants were consenting adults (≥ 18 years of age) who were able to complete the questionnaire in either Arabic or French.

Exclusion criteria

(1) Scoring below 24 on the Folstein Mini-Mental State Examination (MMSE) (the standard Arabic-validated version); (2) Being currently hospitalized due to an exacerbation of another acute medical condition (e.g., heart failure, pneumonia), or having a primary psychotic disorder (e.g., schizophrenia, schizoaffective disorder) or bipolar disorder in an active manic/hypomanic episode that prevents reliable self-reporting (note: a current diagnosis of a depressive disorder was not an exclusion criterion, as this is the primary outcome under investigation); (3) Inability to complete the study questionnaire independently.

Sample size

Given the descriptive and exploratory nature of this study, a formal a priori sample size calculation was not performed. Consequently, we acknowledge that the study may be underpowered to detect small effect sizes or subtle subgroup differences; this limitation is addressed in the Discussion.

Measures

A structured questionnaire was designed for self-reporting sociodemographic information. Variables such as sex (male/female), place of residence (rural/urban), educational level (no formal education, primary/elementary, secondary/middle or high school, or university/tertiary), monthly income in Moroccan dirhams (dichotomized at 3000 MAD as a cutoff threshold for low-income status for analytical purposes), and age (categorized into four groups) were assessed. Body mass index (BMI) was calculated using self-reported weight and height according to the World Health Organization's standard classification: normal ($< 25 \text{ kg/m}^2$), overweight ($25.0\text{--}29.9 \text{ kg/m}^2$), and obesity ($\geq 30 \text{ kg/m}^2$).

Depressive symptoms were assessed using the 13-item short form of the Beck Depression Inventory (BDI-13) (Beck & Beck, 1972). This abbreviated version was chosen for its simplicity and suitability for screening in primary and community healthcare settings. Each of the

thirteen items corresponds to a specific symptom of depression: sadness (D1), pessimism (D2), feelings of failure (D3), dissatisfaction (D4), guilt (D5), self-disappointment (D6), self-harm/suicidal thoughts (D7), loss of interest in others (D8), indecisiveness (D9), dissatisfaction with body image (D10), work difficulty (D11), fatigue (D12), appetite disturbance (D13). For each item, participants select one of four options reflecting increasing symptom severity, with scores ranging from 0 (no symptom) to 3 (maximum severity). The overall score is calculated by summing the scores across all thirteen items, with a theoretical range of 0 to 39. Higher scores indicate greater severity of depressive symptoms. Based on the approved guidelines for the abridged version of the Beck Depression Inventory (BDI 13),¹⁷ scores were interpreted as follows: 0–13 (minimal depression), 14–19 (mild depression), 20–28 (moderate depression), and 29–39 (severe depression).

Statistical analysis

Data were analyzed using SPSS v26.0. Descriptive statistics (frequencies, percentages, means, SD, min/max) described the sample. Coefficient of variation assessed dispersion. Pairwise deletion addressed missing data. Cronbach's alpha ($\alpha = 0.70$) evaluated internal

consistency. Item-level frequencies were calculated for all 13 BDI items. Spearman correlations examined inter-item relationships; Item 7 was excluded due to zero variance (12×12 matrix). BMI was examined in relation to total BDI scores only; item-level BMI correlations were not performed given the exploratory nature of this analysis and the restricted sample size. Significance was set at $p < 0.05$ and $p < 0.01$ (two-tailed).

RESULTS

Sociodemographic Characteristics

The sociodemographic and clinical characteristics of the sample are presented in Table 1. The sample comprised 135 Moroccan adults, of whom the majority were women (62.7%) and urban residents (65.1%). Educational attainment was relatively evenly distributed: 36.3% had completed Primary education, 33.3% had attained middle school, and 31.1% held a university degree. Monthly income was generally low: 30.3% of participants earned less than 1000 MAD, and 35.6% earned between 1000 and 3000 MAD. Regarding weight status, 47.0% of participants were classified as obese and 25.4% as overweight, yielding a combined overweight/

Table 1. Sociodemographic Characteristics of Respondents

Variable	Modality	Frequency (n)	Valid Percentage (%)
Sex	Women	85	62.7
	Men	50	37.3
Place of Residence	Rural	46	34.9
	Urban	89	65.1
Education	Primary	48	36.3
	Middle School	45	33.3
	University	42	31.1
Monthly Income (MAD)	< 1000	41	30.3
	Between 1000 and 3000	48	35.6
	Between 3000 and 5000	11	8.1
	Between 5000 and 10000	6	4.0
	> 10000	29	21.5
BMI (Weight/Height ²)	Normal Build	38	27.6
	Overweight	34	25.4
	Obese	63	47.0
Age Class (Years)	Class 1 (18–29)	69	50.7
	Class 2 (30–44)	38	28.4
	Class 3 (45–59)	22	16.4
	Class 4 (≥ 60)	6	4.5

obesity prevalence of 72.4%. The age distribution was as follows: 50.7% in Class 1 (18–29), 28.4% in Class 2 (30–44), 16.4% in Class 3 (45–59), and 4.5% in Class 4 (≥ 60).

Item Response Frequencies

Item response frequencies are presented in Table 2. The data revealed distinct patterns of symptom endorsement that can be categorised into three tiers based on the percentage of participants selecting the healthiest response option (score = 0). A substantial majority of participants exhibited resilience across several core cognitive and affective dimensions. Critically, all participants (100%, $n = 135$) indicated no self-harm or suicidal ideation (Item 7). An overwhelming majority

reported an absence of guilt (Item 5: 92.5%, $n = 124$) and no self-disappointment (Item 6: 88.8%, $n = 119$). Similarly, 76.1% ($n = 102$) reported no loss of interest in other people (Item 8), and 73.1% ($n = 98$) endorsed no sense of failure (Item 3). These findings suggest that severe negative self-referential cognitions are largely absent in this sample. Approximately half to two-thirds of participants reported intact functioning in certain domains. Specifically, 67.2% ($n = 90$) indicated they were able to make decisions with the same ease as usual (Item 9), while 61.2% ($n = 82$) reported no negative changes in perceived physical appearance (Item 10). Additionally, 50.7% ($n = 68$) stated that their appetite remained

Table 2. Frequency of Responses to Beck Depression Inventory (BDI) Items

Item	Proposal 1 (Most Healthy)	Proposal 2	Proposal 3	Proposal 4 (Most Severe)
D1 (Sadness)	42 (30.6%)	53 (39.6%)	39 (29.1%)	1 (0.7%)
D2 (Pessimism)	65 (47.8%)	61 (45.5%)	9 (6.7%)	–
D3 (Sense of Failure)	99 (73.1%)	36 (26.9%)	–	–
D4 (Dissatisfaction)	37 (26.9%)	94 (70.1%)	4 (3.0%)	–
D5 (Guilt)	125 (92.5%)	8 (6.0%)	2 (1.5%)	–
D6 (Self-Disappointment)	120 (88.8%)	6 (4.5%)	1 (0.7%)	8 (6.0%)
D7 (self-harm/suicidal thoughts)	135 (100%)	–	–	–
D8 (Loss of Interest in Others)	103 (76.1%)	24 (17.9%)	8 (6.0%)	–
D9 (Indecisiveness)	91 (67.2%)	38 (28.4%)	6 (4.5%)	–
D10 (Body Image)	83 (61.2%)	35 (26.1%)	17 (12.7%)	–
D11 (Work Difficulty)	59 (43.3%)	49 (36.6%)	27 (20.1%)	–
D12 (Fatigue)	60 (44.0%)	51 (38.1%)	23 (17.2%)	–
D13 (Appetite Loss)	69 (50.7%)	43 (32.1%)	23 (17.2%)	–

Table 3. Spearman Correlation Matrix Between the 12 BDI Items

Item	D1	D2	D3	D4	D5	D6	D8	D9	D10	D11	D12	D13
D1	1.00											
D2	.184*	1.00										
D3	.024	-.014	1.00									
D4	.102	.124	.166	1.00								
D5	.033	.249**	-.137	.067	1.00							
D6	.108	.214*	-.163	.164	.821**	1.00						
D8	.023	-.102	.070	-.067	.043	.102	1.00					
D9	.032	-.073	.081	-.083	.021	.113	.757**	1.00				
D10	.152	.091	-.130	.140	.170*	.298**	-.105	-.014	1.00			
D11	.247**	.154	-.102	.053	.080	.202*	-.066	.011	.358**	1.00		
D12	.044	.074	-.071	.070	.121	.286**	.073	.084	.178*	.288**	1.00	
D13	.188*	.112	.023	.030	.190*	.316**	.023	.144	.352**	.450**	.295**	1.00

*Correlation is significant at the 0.05 level (2 tailed). *Correlation is significant at the 0.01 level (2 tailed).

unchanged (Item 13). These findings indicate that cognitive decision-making, body image perception, and appetite were relatively preserved for the majority of participants. For several items, the majority of participants endorsed some degree of symptomatology. Only 30.6% ($n = 41$) reported not feeling significantly sad (Item 1), meaning that nearly 70% of participants experienced at least mild sadness. Similarly, only 47.8% ($n = 64$) were not particularly discouraged or pessimistic about the future (Item 2), indicating that over half of the sample exhibited some pessimistic outlook. Furthermore, merely 26.9% ($n = 36$) reported no notable dissatisfaction (Item 4), while 43.3% ($n = 58$) continued to perform their tasks with the same ease as before (Item 11), and 44.0% ($n = 59$) did not feel more tired than usual (Item 12). These results highlight that somatic and mood-related symptoms particularly sadness, dissatisfaction, work difficulty, and fatigue—were the most prevalent concerns within the sample.

The observed total scores on the BDI-13 within this sample ranged from 1 to 16 (out of a theoretical maximum of 39), with a mean score of 6.57 ($SD = 3.49$). This restricted observed range indicates that, on average, the sample exhibited low-to-mild levels of depressive symptomatology. To characterize the shape of the distribution, we calculated measures of central tendency and shape.

The distribution demonstrated moderate positive skewness 0.85 ($SE = 0.209$) and kurtosis of 0.15 ($SE = 0.421$), consistent with the observed floor effect. The median score was 6.00 (IQR: 3.00 – 9.00), with the 25th percentile at 3.00 and the 75th percentile at 9.00. Crucially, Item 7, which assesses suicidal ideation or self-harm, received a score of 0 from all participants (100%, $n = 135$), demonstrating a pronounced floor effect. Consequently, Item 7 exhibited zero variance, which precluded its inclusion in any correlational analyses and renders it uninterpretable as a differentiator within this community-based, non-clinical cohort. This floor effect is addressed in the Discussion as a key limitation regarding the generalizability of our findings to higher-risk clinical populations.

Correlations of Items

Table 3 presents the Spearman correlation matrix examining the inter-relationships among the 12 BDI items (Item 7 was excluded from this analysis due to zero variance, as all respondents provided identical responses). The correlation structure revealed several notable patterns. A remarkably strong positive correlation was observed between Item 5 (guilt) and Item 6 (self-disappointment), with a correlation coefficient of $r = 0.821$ ($p < 0.01$). This exceptionally high correlation ($r > 0.80$) indicates that these two

Table 4. Mean BDI 13 Scores and Statistical Comparisons by Sociodemographic Characteristics

Variable	Modality	n	Mean BDI Score (SD)	Test Statistic	p value
Sex	Males	50	6.00 (3.20)	$t(133) = -1.45$	0.15
	Females	85	6.90 (3.60)		
Age Group	C1 (18–29)	69	6.20 (3.30)	$F(3, 131) = 0.85$	0.47
	C2 (30–44)	38	6.50 (3.50)		
	C3 (45–59)	22	7.00 (3.70)		
	C4 (≥ 60)	6	7.50 (4.00)		
Education	Primary	48	6.70 (3.60)	$F(2, 132) = 0.30$	0.74
	Middle School	45	6.60 (3.50)		
	University	42	6.30 (3.30)		
Income	< 3000 MAD	89	6.80 (3.60)	$t(133) = 0.98$	0.33
	≥ 3000 MAD	46	6.20 (3.30)		
BMI	Normal	38	6.20 (3.20)	$F(2, 132) = 0.70$	0.50
	Overweight	34	6.50 (3.50)		
	Obese	63	6.80 (3.70)		
Residence	Rural	46	6.90 (3.70)	$t(128) = 0.80$	0.42
	Urban	89	6.40 (3.40)		

items are measuring nearly identical psychological constructs in this sample, suggesting potential redundancy. Similarly, a strong positive correlation was found between Item 8 (loss of interest in other people) and Item 9 (indecisiveness), with $r = 0.757$ ($p < 0.01$). This finding indicates that social withdrawal and cognitive dysfunction are tightly linked in this population, such that participants who report diminished interest in others also experience substantial difficulty in making decisions. Item 6 (self-disappointment) demonstrated significant moderate positive correlations with several other items, forming a cohesive cluster of cognitive-somatic symptoms. Specifically, Item 6 correlated positively with Item 2 (pessimism, $r = 0.214$, $p < 0.05$), Item 10 (body image dissatisfaction, $r = 0.298$, $p < 0.01$), Item 11 (work difficulty, $r = 0.202$, $p < 0.05$), Item 12 (fatigue, $r = 0.286$, $p < 0.01$), and Item 13 (appetite disturbance, $r = 0.316$, $p < 0.01$). This pattern suggests that when participants feel disappointed in themselves, they are also more likely to experience pessimism about the future, perceive themselves as less attractive, report greater difficulty working, experience heightened fatigue, and note changes in appetite. Item 13 (appetite) exhibited particularly strong associations with the somatic dimension of depression. It correlated significantly with Item 11 (work difficulty, $r = 0.450$, $p < 0.01$), Item 12 (fatigue, $r = 0.295$, $p < 0.01$), Item 10 (body image, $r = 0.352$, $p < 0.01$), and Item 5 (guilt, $r = 0.190$, $p < 0.05$). The robust correlation between appetite disturbance and work difficulty ($r = 0.450$) is especially noteworthy, indicating that these two somatic symptoms co-occur prominently in the sample.

The total BDI 13 scores ranged from 1 to 16, with a mean of 6.57 ($SD = 3.49$), median of 6.00, skewness of 0.85, kurtosis of 0.15, and percentiles (25th = 3.00, 50th = 6.00, 75th = 9.00). The distribution was positively skewed, indicating that most participants reported minimal to mild depressive symptoms. Descriptive statistics for all sociodemographic subgroups, along with the corresponding inferential test results, are presented in Table 4. We examined six variables: sex, age group, educational attainment, monthly income, BMI category, and place of residence. Across all comparisons, no statistically significant differences emerged at the conventional $\alpha = 0.05$ level (smallest $p = 0.15$). Independent t tests revealed

no significant effects for sex, $t(133) = 1.45$, $p = 0.15$, $d = 0.25$; income, $t(133) = 0.98$, $p = 0.33$, $d = 0.17$; or residence, $t(133) = 0.80$, $p = 0.42$, $d = 0.14$ (with Levene's test confirming homogeneity of variances for residence, $p = 0.31$). One way ANOVAs similarly yielded non significant results for age group, $F(3, 131) = 0.85$, $p = 0.47$, $\eta^2 = 0.02$; education, $F(2, 132) = 0.30$, $p = 0.74$, $\eta^2 = 0.005$; and BMI category, $F(2, 132) = 0.70$, $p = 0.50$, $\eta^2 = 0.01$. A non parametric Kruskal Wallis test corroborated the null finding for age ($H(3) = 0.92$, $p = 0.82$). All effect sizes were negligible, and none of the comparisons survived Bonferroni correction for six tests (critical $\alpha = 0.0083$).

DISCUSSION

Cultural Interpretation of Symptom Patterns

The present study aimed to provide a comprehensive descriptive and correlational analysis of depressive symptomatology in a sample of Moroccan adults, utilizing the 13-item short form of the Beck Depression Inventory (BDI). Our findings reveal a complex pattern: while the overall mean BDI score (6.57 ± 0.30) falls within the mild depressive range, the distribution is highly heterogeneous ($CV > 50\%$), with scores ranging from 1 to 16. This suggests that although the average participant experiences only mild symptoms, a clinically significant subset reports moderate symptomatology. The internal consistency of the scale (Cronbach's $\alpha = 0.72$) was acceptable, confirming its reliability in this population, consistent with previous validations of the BDI in Moroccan samples (Spanish-Moroccan comparison study of BDI-II, 2024; BDI-II reliability and validity in the general Moroccan population, 2024). One of the most striking findings of this study is the paradoxical dissociation observed between specific symptom dimensions. On one hand, participants demonstrated remarkable resilience on core cognitive and self-referential items: 100% denied self-harm ideation (D7), 92.5% reported no guilt (D5), 88.8% expressed no self-disappointment (D6), and 73.1% perceived no sense of failure (D3). These figures indicate that severe negative self-appraisals typically central to clinical depression are largely absent in this sample. Conversely, a substantial proportion of participants endorsed symptoms on the somatic

and mood dimensions. Only 30.6% reported feeling “not significantly sad” (D1), merely 47.8% were “not particularly discouraged” (D2), and notably low percentages reported intact functioning on work difficulty (43.3%) and fatigue (44.0%). This discrepancy is clinically significant. Several explanations may account for this pattern. First, it may reflect a culturally patterned tendency toward somatization, though this interpretation requires validation through qualitative research and clinical assessment. In Morocco and wider North Africa, actual emotional suffering may be taboo or viewed as weakness whereas physical complaints are more likely to draw social acceptance or acknowledgement such as exhaustion, tiredness and work-related difficulties.¹⁸ In their 1999, Al-Krenawi observed that Arab patients with psychological disorders translate or project these feelings onto the body in what may be referred to in English as somatization while rarely complaining of depression directly.¹⁹ Regarding somatic complaints (fatigue and appetite disturbance), our data reveal a clinical conundrum. The correlation between these items and BMI/self-reported physical complaints could plausibly reflect (a) the neurovegetative sequelae of underlying depressive pathology, (b) the metabolic and inflammatory effects of elevated body mass index, or (c) the confounding effects of undiagnosed medical conditions (e.g., thyroid dysfunction, diabetes). Critically, our cross-sectional design precludes us from privileging any single pathway. The most scientifically defensible interpretation is that somatic symptoms in this cohort represent an overlapping, bidirectional interface between physical and mental health a finding consistent with the broader literature on depression in primary care settings.^{20,21} It is important to note that our analysis examined associations between BMI category and total BDI scores (which were non significant); item level BMI correlations were not performed. Therefore, the observed somatic symptom patterns should not be interpreted as evidence of BMI symptom associations. At the item level, fatigue (D12) and work difficulty (D11) are also relatively common symptoms with only 44.0% of participants reporting no difficulty in these domains followed closely by 43.3%. Our results are consistent with the sociodemographic profile of our sample,

composed mainly by an urban working-age population (30.3% earn <1000 MAD per month), subject to everyday life pressures and physical health burden (obesity). Mental health resources are rare in Morocco,^{22,23} where physical complaints predominate in primary care consultation. In this cultural context, these findings imply that healthcare providers need to be alert when patients report having fatigue for more than 6 weeks or show loss of work capacity and appetite as it may reflect underlying depressive symptomatology. The somatic complaints themselves should not be dismissed as purely physical in nature without evaluating for the presence of mood symptoms.

Psychometric Implications and Scale Redundancy

The most salient psychometric finding of this study is the extremely high correspondence between Item 5 (guilt) and Item 6 (self-disappointment), $r = 0.821$ ($p < .01$). According to classical psychometric theory, inter-item correlations above 0.80 indicate redundancy of content and that two items assess the same underlying construct.^{24–26} In the Moroccan context, this redundancy may come from cultural and linguistic fusion of dhanb (guilt) with its synonym khayba which translates as disappointment/failure; both primarily focusing on a negative self-evaluation but integrated more tightly in Arabic than western conceptualisations.²⁴ This makes clinical co-usage of the two items diagnostically inefficient. Thus, researchers using the BDI in Moroccan samples may justifiably choose to exclude one of its two items—thus reducing respondent burden and facilitating administration without considerable reduction of psychometric integrity.²⁷ However, we acknowledge that this finding comes from a single small, non clinical sample and emphasize that confirmatory factor analysis in larger, more diverse samples is necessary before any scale modifications can be recommended. Physiologically, however, it is necessary to confirm in later item method factor analytic studies whether a reduced 12-item version excluding this redundant pair remains psychometrically adequate.²⁸

Social-Cognitive Clusters and Intervention Targets

The strong positive correlation between Item 8 (loss of interest in other people) and Item 9 (indecisiveness), $r = 0.757$ ($p < 0.01$), forms

a distinct social-cognitive cluster. Supported by the high collectivist orientation and family/community ties in Moroccan society, social withdrawal might be especially maladaptive, negatively feeding back on isolation or functional impairment. The health hazards of loneliness are more evident in the context of collectivistic cultures, according to cross-cultural research.²⁹ Social support has specifically been pointed out as an important protective factor against depression in the Moroccan context.³⁰ Item 6 (self-disappointment) showed strong correlations with a large number of symptoms, including pessimism/d2 body image dissatisfaction; d10 work difficulty; d11 fatigue and insomnia D12 appetite disturbance. Self-disappointment here functions as a cognitive crux connecting poor self-reward accumulation to somatic disease. Those participants who had disappointed are also shown to consider their body less appealing, experience more difficulty in completing everyday tasks were sleepier and lost desire. This pathway in turn indicates that cognitive interventions around self-acceptance and self-compassion might be especially effective for this cultural group by breaking the domino effect of somatic symptoms. This latter finding supports calls for culturally adapted cognitive-behavioural therapies that address the particular self-schemas common in North Africans.³¹

Broader Context: Social Determinants and Systemic Factors

In the broader context of mental health in Morocco, depression is not merely an individual clinical condition, but rather the result of a complex interplay of social, economic, cultural, occupational, and systemic health factors. The CESE report emphasizes that public policy remains illness-focused, overlooking the social, cultural, and economic drivers essential to prevention.³² This likely explains the prominent somatic/functional symptoms observed here, reflecting culturally mediated distress compounded by social vulnerability and limited specialized care. Corroborating local data show depression in 33.5% of women (vs. 4% of men), 35% of those earning <1000 MAD, and 36% without formal education.³³ These socioeconomic gradients underscore the need to view our findings through social determinants rather than individual-level

symptomatology alone. Physical comorbidity is similarly relevant; Tahnaout linked depression to chronic diseases (tuberculosis, diabetes, hypertension).³⁴ Given our 47% obesity rate and prevalent fatigue/work difficulty, these symptoms may signify an overlap between depression and chronic metabolic burden, warranting enhanced primary care screening for persistent fatigue or unexplained somatic complaints. Occupational stressors also contribute a Marrakech study found 43% depression among medical residents, associated with female sex, psychiatric history, high night-shift frequency, and >60-hour weekly workloads, highlighting work-related stress as a structural determinant. Systemically, workforce shortages and inadequate training among non-specialists (in communication, diagnosis, and prescribing) foster underdiagnosis and poor primary care integration.³² Addressing this requires a multi-level strategy: early screening, culturally sensitive assessment, robust referral pathways, measurable national indicators, enhanced training, professional regulation, legal revisions, and community-based support.^{31, 32} Such reforms would shift Moroccan mental health policy toward a preventive, biopsychosocial model aligned with SDG 3. Ultimately, this study offers preliminary evidence that depression in Morocco is a confluence of individual, gendered, socioeconomic, physical, occupational, and systemic barriers, reinforcing its relevance to national health reform priorities.

Limitations

Several methodological constraints must inform the interpretation of our findings.

Cross-sectional design

The single time-point data collection prevents any causal or temporal inferences regarding the direction of associations between depressive symptoms and physical complaints. We cannot determine whether somatic symptoms precede, follow, or co-occur with depressive pathology.

Selection bias

Our convenience sampling from neighborhood associations, primary care centers, and universities likely oversampled socially connected, health-literate, and urban-dwelling individuals, thereby limiting generalizability to rural, institutionalized, or severely clinically

depressed populations. This is a significant limitation that must be considered when interpreting the study's findings.

Self-report bias

Reliance on self-reported weight, height, income, and depressive symptoms introduces vulnerability to social desirability bias, recall inaccuracy, and potential underestimation of BMI and symptom severity. Participants may underreport or overreport symptoms based on cultural norms, stigma, or personal beliefs.

Floor effects

The low overall BDI-13 scores and the 100% endorsement of zero on the self-harm item restrict variance and reduce statistical power to detect associations with sociodemographic variables. The restricted range of BDI scores (1–16), the overall mild severity (median = 6.00, IQR = 3.00–9.00), and the modest sample size ($N = 135$) collectively render the study underpowered to detect small-to-moderate effect sizes—which are the most plausible given a non-clinical community cohort. For example, to detect a difference of 1.0 point on the BDI-13 between groups (Cohen's $d = 0.30$) with 80% power at $\alpha = 0.05$, a sample of approximately 350 participants would be required.

Generalizability constraints

The study was conducted exclusively in Casablanca, Morocco's largest city, and may not reflect the experiences of Moroccans in other regions, particularly rural areas with different cultural norms, economic conditions, and healthcare access. Therefore, the findings should not be extrapolated to the broader Moroccan population without further validation.

Subgroup analysis constraints

Although we conducted comprehensive exploratory subgroup comparisons across sex, age, education, income, BMI, and residence, none achieved statistical significance. This absence of significant sociodemographic gradients should not be interpreted as evidence of true equivalence across groups. Rather, the restricted range of BDI scores, the overall mild severity, and the modest sample size collectively render the study underpowered to detect small-to-moderate effect sizes. Therefore, null findings in subgroup comparisons should be interpreted cautiously and do not exclude the possibility of meaningful differences that larger, more representative samples might reveal. Future

studies with adequate power are required to definitively examine socioeconomic and gender gradients in depressive symptomatology within the Moroccan context.

CONCLUSION

This cross-sectional study, conducted among adults in the Casablanca region, offers preliminary insights into the presentation and associated factors of depressive symptoms in this specific community. While the findings represent a useful initial step, they cannot be directly generalized to the broader Moroccan population without further validation. The results reveal a distinct symptom profile, with participants exhibiting relatively low cognitive-affective symptom endorsement (e.g., guilt and self-disappointment) but reporting significantly higher somatic and mood complaints (fatigue, work difficulty, and sadness). This pattern suggests a predisposition toward somatization, which aligns with existing theoretical models rooted in collectivistic cultures where emotional expression is often indirect. The strong intercorrelation among guilt and self-disappointment items indicates potential redundancy within the Beck Depression Inventory (BDI) for this sample; although the BDI is a validated instrument, these findings suggest that further cultural refinement may enhance its specificity and sensitivity in this population. Additionally, the observed link between blame-related feelings and social withdrawal/ indecisiveness highlights a potential pathway of social disengagement that could serve as a target for intervention. The high obesity rate (47.0%) among older adults in this sample also underscores a major public health concern, warranting further exploration of its bidirectional association with depressive symptoms.

These findings carry implications for clinical practice; for example, maintaining a high index of suspicion for depression in the presence of chronic unexplained fatigue or reduced work capacity even without classic cognitive affective symptoms appears clinically prudent. The use of culturally sensitive, somatically-oriented interventions that address tangible presenting complaints while also exploring underlying emotional distress may be beneficial. Future

research should verify these findings using a larger, more nationally representative sample and should explore the interactions between cultural expectations of behaviour and the expression of depressive symptoms. Ultimately, this study provides an initial foundation for developing more effective and culturally tailored approaches to detecting, managing, and preventing depression-related morbidity across communities in Morocco.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to all the participants from the Casablanca region who generously took the time to complete the questionnaires. We also extend our thanks to the neighborhood associations, primary healthcare centers, and universities that facilitated the data collection process. Our appreciation goes to the staff at the Innovation and research laboratory for improving teaching and training professions (LIRAMEF) for their administrative and logistical support.

Funding Sources

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Conflict of Interest

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, [Nihal Abitui], upon reasonable request and subject to institutional ethical approvals.

Ethics Statement

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the relevant institutional review board. Informed consent was obtained from all individual participants included in the study.

Clinical Trial Registration

This research does not involve any clinical trials.

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Not Applicable.

Author Contributions

Nihal Abitui: Conceptualization,

Methodology, Formal Analysis, Writing – Original Draft; Amina Bouziani: Conceptualization, Supervision, Writing – Review & Editing; Zakaria Hemicha: Data Curation, Formal Analysis, Writing – Review & Editing; Adiba Qorchi: Investigation, Data Collection, Writing – Review & Editing; Hefdhallah AL-aizari: Methodology, Visualization, Writing – Review & Editing; Hasnae Benkirane: Supervision, Project Administration, Writing – Review & Editing.

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