WILEY | Hindawi

Research Article

The Indirect Effect of Depression between Nightmares and Well-Being in Lebanese Patients with Schizophrenia

Daniella Mahfoud,[1] Jad El Ahdab,[2] Sami Helwe,[2] Michael Topalian,[2] Christina Tarabay,[2] Karim Rifi,[2] Georges Haddad ⓘ,[1,2] Sahar Obeid ⓘ,[3] and Souheil Hallit ⓘ[1,2,4]

[1]*Research Department, Psychiatric Hospital of the Cross, Jal Eddib, Lebanon*
[2]*School of Medicine and Medical Sciences, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon*
[3]*Social and Education Sciences Department, School of Arts and Sciences, Lebanese American University, Jbeil, Lebanon*
[4]*Applied Science Research Center, Applied Science Private University, Amman, Jordan*

Correspondence should be addressed to Georges Haddad; georgeshaddad.hpc@gmail.com, Sahar Obeid; saharobeid23@hotmail.com, and Souheil Hallit; souheilhallit@hotmail.com

Background. Because nightmares seem to be associated with depression in schizophrenia, detecting them early in therapeutic practice might be critical to ensuring effective avoidance of the development of depressive symptomatology. This helps promote well-being and improve the patient's quality of life and illness prognosis. Therefore, the aim of this study was to examine the indirect effect of depression between nightmares and well-being in a Lebanese sample of patients with schizophrenia. *Method.* This monocentric cross-sectional study, conducted in July 2022, enrolled patients with chronic schizophrenia admitted to the Psychiatric Hospital of the Cross. Data were collected from a total of 148 participants through face-to-face interviews. The questionnaire included a nightmares measure, PSYRATS, Calgary depression scale for schizophrenia, PTSD checklist for DSM-5, the digit span subset, and WHO-5 Well-Being Index. *Results.* The presence of nightmares was significantly associated with more depression, whereas higher depression was significantly associated with lower well-being. It is noteworthy that the presence of nightmares was not directly associated with well-being. *Conclusion.* Nightmares lead indirectly to lower well-being in schizophrenia patients, with depression serving as a mediating factor in this association. This suggests that interventions aiming at improving dream content may also have a beneficial effect in reducing depression in schizophrenia leading therefore to better well-being of the patients.

1. Background

Schizophrenia is one of the most severe mental disorders when it comes to its detrimental effects on various psychosocial areas and the overall quality of life of the patient [1]. Because schizophrenia causes misery and incapacity, the majority of attention has been focused on understanding and mitigating its negative effects on daily life functioning, with a rising focus on broad positive variables such as life satisfaction and subjective well-being [2]. Well-being has been widely acknowledged to entail both functioning effectively and feeling well [3]. Therefore, it is important to note that suffering from mental disorders does not imply poor well-being, and the lack of psychopathology does not guarantee a productive lifestyle [4]. Promoting well-being, on the other hand, can greatly aid recovery and improve the patient's quality of life and illness prognosis [5]. Therefore, it is important to study factors that may affect the well-being of patients diagnosed with schizophrenia for better functioning and recovery. A variety of psychological and biological factors, such as long-term environmental influences and ongoing stressors, general cognitive abilities and personality traits, exposure to transiently traumatic life events, mental health interventions, and coping, affect the functioning and well-being of schizophrenia patients [6]. Trauma and posttraumatic stress disorder (PTSD), which are commonly

prevalent among individuals with schizophrenia [7], are linked to personal well-being, which can be optimized following PTSD treatment [8]. However, the diagnosis of depression is likely the one most closely associated with a lack of well-being [4]. Patients with mental disorders, particularly those with schizophrenia, commonly experience depression [9]. Comorbid depressive symptoms, estimated in 30–75% of schizophrenia patients [10], have been linked to worse long-term functioning [11] and a lower level of life quality and well-being [12]. The World Health Organization has reported that schizophrenia is the fourth most prominent cause of disability globally [13]. Individuals with schizophrenia who also suffer from depression experience a substantial level of disability [14], which impairs their ability to manage their mental and physical health, leading to a vicious cycle of deteriorating disability [15]. Moreover, it has been discovered that depression plays a partial mediator role in the connection between the severity of schizophrenia and disability [16]. Given the magnitude of negative symptoms, the impairments in functioning and well-being, and the risk of suicidality, schizophrenia patients with depressive symptoms should be monitored closely [17]. This occurrence of depressive symptoms in schizophrenia may be caused by overlapping risk factors, thereby having an impact on these patients' general well-being.

Early diagnosis and treatment of comorbid depression are essential to improving functioning in schizophrenia; therefore, assessing the components that contribute to their depressive symptoms is critical [18]. Besides demographic and psychosocial factors [19], sleep disorders and nightmares could also be implicated in the clinical course of psychiatric disorders and are very commonly associated with increased psychological distress [20]. Nightmares, in particular, can lead to depression, which may indirectly increase the risk of suicide [21, 22]. Therefore, it is essential to address nightmares in the context of schizophrenia since they are associated with hopelessness [23], depression [24], and suicidal ideations and behaviors [25]. Depression may be linked to an increased risk of suicide attributable to recurring and terrifying nightmares [26] typically relating to negative self-image [27]. Secondly, schizophrenia patients experience nightmares more frequently than the normal population. This can worsen daytime psychotic symptoms and impair their day-to-day functioning [28], which demands serious attention due to its implications for the patient's overall well-being. Dream anxiety, which refers to distressing experiences during frightening dreams or nightmares, plays a significant intermediary role in the link between sleep disruption and suicide attempts [29]. The presence and frequency of nightmares have been shown to be associated with an increased risk of suicide [30].

Since the start of the COVID-19 pandemic, there has been an increase in the frequency of dreams and nightmares, and dream content has been linked to an increase in the symptoms of mental disorders [31]. The prevalence and severity of nightmares were linked to higher levels of anxiety, depersonalization, hallucinogenic experiences, and paranoia in the general population [32]. Regularly experiencing nightmares has been associated with other sleep difficulties,

particularly insomnia, and mental health concerns, notably depressive symptoms, as well as reduced overall quality of life [33, 34]. However, the relationship between nightmares, depressive symptoms, and well-being in patients diagnosed with schizophrenia is poorly known. Because nightmares seem to be associated with depression in schizophrenia, detecting them early in therapeutic practice might be critical to ensuring effective avoidance of the development of depressive symptomatology and for designing effective psychosocial intervention strategies. Therefore, examining well-being and its associated psychological variables among schizophrenia patients is most valuable and beneficial for interventions. Previous findings revealed that improvements in PTSD and depression symptoms were independent predictors of personal well-being over time [8], whereas other studies have found a link between well-being and depression [35–37]. Since sleep disturbances and the occurrence of nightmares were linked to higher levels of suicidal ideation as well as more symptoms of depression, it is important to study the possible pathway that links nightmares to well-being through depression. Hence, in this study, the aim was to examine the indirect effect of depression between nightmares and well-being in a Lebanese sample of patients with schizophrenia. We hypothesize that depression has an indirect effect in the association between nightmares and well-being: among patients with schizophrenia, more nightmares would be correlated with lower well-being, mediated by higher depression.

2. Methods

2.1. Study Design.
This monocentric cross-sectional study, conducted in July 2022, enrolled patients with chronic schizophrenia disorder diagnosed by a psychiatrist (according to the Diagnostic and Statistical Manual, Fifth Edition, DSM-5 criteria) and admitted to the "Psychiatric Hospital of the Cross," one of the largest psychiatric hospitals in the Middle East where psychiatric patients receive the necessary treatment, handling, or support. Inclusion criteria were as follows: participants had to be 18 years old or older, have a documented and confirmed schizophrenia diagnosis, and have a competent linguistic and educational level in Arabic to complete and consent to the questionnaire. As for exclusion criteria, we have performed psychiatric examinations according to DSM-5 and excluded patients with alcohol and substance use disorder, learning disabilities, or dementia.

A total of 148 patients were included in this study after the exclusion of patients who were diagnosed with schizoaffective disorder, and those who were for any reason not available for the questionnaire: on a holiday or assigned to extracurricular activities outside the floors (not present on the floor during the data collection), or patients who refused or were unable to finish the entire questionnaire (Figure 1).

2.2. Minimal Sample Size Calculation.
A minimal sample of 125 was deemed necessary using the formula suggested by Fritz and MacKinnon [38] to estimate the sample size:
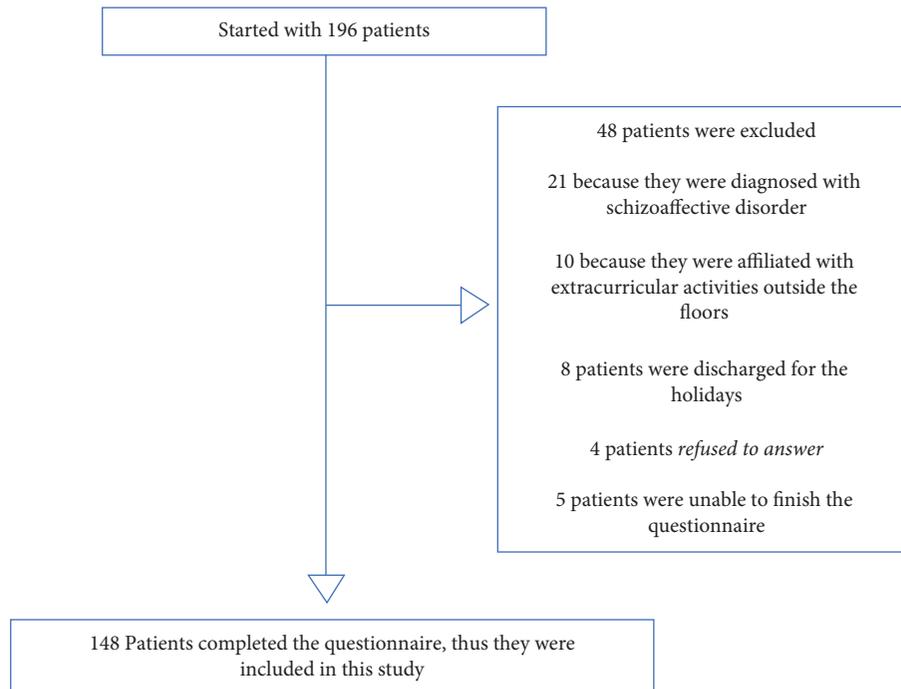
FIGURE 1: Flowchart of patient's enrollment in the study.

$n = (L/f^2) + k + 1$, where $f = 0.26$ for medium effect size, $L = 7.85$ for an α error of 5% and power $\beta = 80\%$, and $k = 8$ variables to be entered in the model.

2.3. Data Collection and Measurement.

Data were collected from each participant through face-to-face personal interviews after obtaining their oral consent. These interviews were conducted by trained third year medical (MED3) students; each student participated in two training sessions to explain and understand the research objectives and interview questions. Additionally, each student was requested to complete two practice runs to demonstrate their questioning approach to the patients.

2.4. Questionnaire.

The questionnaire used was prepared in Arabic, Lebanon's native language, and required around 10 to 15 minutes for completion. In the first section, the age, main diagnosis, and patient ID were collected from the medical files available at the hospital. In the second part of the questionnaire, five different scales were incorporated.

2.4.1. Nightmare Measure.

Patients were asked to indicate how many nightmares they estimated experiencing during the past 2 weeks (14 nights). If a participant had at least one nightmare, they were asked to choose their worst nightmare and rate it on a 7-point Likert scale for intensity, vividness, and distress, as well as whether it was recurring (yes or no). Retrospective nightmare logs measuring up to 1 month in the past are known to yield similar results to prospective measures [39].

2.4.2. Calgary Depression Scale for Schizophrenia.

The Calgary Depression Scale for Schizophrenia (CDSS) is a nine-item, clinician-rated outcome measure used to assess depression in patients suffering from schizophrenia. It consists of nine items, including eight questions and one observation item, that measure various aspects of depression such as hopelessness, guilt, and suicidal thoughts. The score ranges from 0 to 27, with higher scores indicating more severe depression. It is the first depression scale developed specifically for adults with schizophrenia spectrum disorder. Previous studies demonstrated good interrater validity and reliability of the questionnaire [40]. The Arabic version of the CDSS was validated in the Arab population and showed high internal consistency with Cronbach's alpha of 0.82 [41] (Cronbach's alpha in this study = 0.78).

2.4.3. PTSD Checklist for DSM-5 (PCL-5).

The Post-traumatic Stress Disorder Checklist (PCL-5) is a 20-item self-report measure that assesses the presence and severity of PTSD symptoms; the questions on the PCL-5 correspond with DSM-5 diagnosis criteria. The PCL-5 has a variety of purposes, including quantifying and monitoring symptoms over time, screening individuals for PTSD, and assisting in making a provisional diagnosis of PTSD. Respondents are required to indicate how much they have been disturbed by symptoms during the previous month. Respondents rate how much they have been affected by each symptom in the past month on a scale from 0 to 4. A total score can be calculated by adding up the scores for each item, with higher scores indicating more severe symptoms [42]. The PCL-5 has been shown to have strong reliability and validity ($\alpha = 0.94$ to

0.96) [42, 43]. It is also recommended to use in the Arab populations with internal consistency of 0.85 for the translated version [44] (Cronbach's alpha in this study = 0.96).

2.4.4. Psychotic Symptom Rating Scale. The PSYRATS are semistructured interviews designed to assess the subjective characteristics of hallucinations and delusions. It measures, through a 5-point scale, the severity of multiple dimensions regarding auditory hallucinations and delusions. The six dimensions of delusions are amount and duration of preoccupation, conviction, amount and intensity of distress, and disruption of life caused by beliefs. The 11 dimensions of auditory hallucinations are frequency, duration, location, loudness, beliefs about origin of the voices, amount and intensity of negative content, amount and intensity of distress, disruption of life, and controllability. The total score for each subscale is calculated by adding the scores of each item in the scale with higher scores indicating more severe symptoms. The two scales were found to have excellent interrater reliability (0.795–0.9 for auditory hallucinations and 0.9 for delusions) [45] (Cronbach's alpha in this study = 0.98 for both hallucinations and delusions).

2.4.5. The Digit Span Subtest. This questionnaire is a subtest from the third edition of the Wechsler Memory Scale [46]. The WMS is a test that assesses verbal and figurative memory, memory for significant and abstract information, and immediate and delayed recall. The digit span subtest reliably estimates the working memory of each participant using a consistent score. This subtest consists of the forward and backward tests. The subject is prompted to recall the numerals in the order in which they were presented in the forward version of the test. In contrast, the subject is encouraged to recall the stimuli in the reverse order in which they were delivered in the backward form of the digit span test. The internal inconsistency reliability has been originally reported at 0.93 [47]. In this study, the digit span subtest holds a high reliability coefficient of 0.81 for the backward scale and 0.86 for the forward scale.

2.4.6. The World Health Organization-Five Well-Being Index (WHO-5). The 5-item World Health Organization Well-Being Index (WHO-5) is a brief self-report questionnaire used in research and clinical settings to assess subjective psychological well-being. The WHO-5 focuses on subjective quality of life based on optimism (having a pleasant attitude, relaxing), vitality (being active and waking up refreshed), and general interest (being interested in things). Higher total scores indicate better well-being [48]. The WHO-5 has been translated into more than 30 languages, and it was validated in Arabic in Lebanon. Cronbach's alpha coefficient for the Arabic translated version was found to be 0.877 [49] (Cronbach's alpha = 0.91).

2.5. Statistical Analysis. The SPSS software version 23 was used for the statistical analysis. The well-being score was considered normally distributed according to the skewness and kurtosis values varying between −1 and +1. The Student-t test was used to compare two means, whereas the Pearson test was used to correlate two continuous variables. PROCESS version 3.4 model 4 was used to conduct the mediation analysis, taking the presence of nightmares as the independent variable, depression as the mediator, and well-being as the dependent variable. Pathway A determined the regression coefficient for the effect of nightmares on depression, pathway B that of depression on well-being, whereas pathways C and C' estimated the total and direct effect of nightmares on well-being, respectively. Pathway AB calculated the indirect intervention effects. The indirect effect was deemed significant if the macro generated bias-corrected bootstrapped 95% confidence intervals did not include zero [50]. Model 1 was adjusted over sociodemographic variables that showed $p < 0.25$ in the bivariate analysis only, whereas model 2 was adjusted over all variables that showed $p < 0.25$ in the bivariate analysis. SPSS AMOS version 29 was used to test the indirect effect of nightmares in the association between depression and well-being (this hypothesis could not be tested using PROCESS Macro since the mediating variable (=the presence of nightmares) is dichotomous). $p < 0.05$ was deemed statistically significant.

3. Results

A total of 148 patients were enrolled in the study (mean age = 54.53; SD = 13.10; 66.2% males). One-third (34.5%) experienced nightmares in the last 2 weeks, with 49% of them experiencing recurrent nightmares (Table 1).

3.1. Bivariate Analysis of Factors Associated with Hallucinations/Delusions. The results of the bivariate analysis are summarized in Tables 2 and 3. Higher well-being scores were seen in males compared to females. Higher depression and higher PTSD were significantly associated with lower well-being.

3.2. Mediation Analysis. In the first model adjusted over sex, depression fully mediated the association between the presence of nightmares and well-being; the presence of nightmares was significantly associated with more depression, whereas higher depression was significantly associated with lower well-being. It is noteworthy that the presence of nightmares was not directly associated with well-being (Table 4; Figure 2). When adjusting over all variables in the second model, the mediation effect of depression between the presence of nightmares and well-being was not significant anymore.

Finally, since this is a cross-sectional study with the occurrence of symptoms/events not known through time, we thought about evaluating the indirect effect of nightmares between depression and well-being; the results showed that the presence of nightmares did not have an indirect effect in the association between depression and well-being (beta = 0.015; 95% CI −0.01; 0.06; $p = 0.192$).

Table 1: Sociodemographic and other characteristics of the patients ($N = 148$).

	N (%)
Sex	
Male	98 (66.2%)
Female	50 (33.8%)
Nightmares in the last 2 weeks	
No	97 (65.5%)
Yes	51 (34.5%)
*Nightmare recurrence**	
No	26 (51.0%)
Yes	25 (49.0%)
Mean ± SD	
Age (in years)	54.53 ± 13.10
Nightmare intensity*	3.57 ± 1.06
Depression	6.33 ± 5.41
Hallucinations	8.59 ± 12.15
Delusions	3.64 ± 6.07
Digit span test forward	7.30 ± 3.19
Digit span test backward	3.16 ± 2.37

*Numbers calculated in patients who have nightmares only.

Table 2: Bivariate analysis of factors associated with well-being.

Variable	Well-being (mean ± SD)	p
Sex		**0.011**
Male	14.72 ± 6.20	
Female	11.98 ± 5.88	
Nightmares in the last 2 weeks		0.963
No	13.81 ± 6.34	
Yes	13.76 ± 6.03	
Nightmare recurrence*		0.085
No	15.19 ± 5.46	
Yes	12.28 ± 6.34	

SD = standard deviation. *Numbers calculated in patients who have nightmares only. Number in bold indicates significant p value.

4. Discussion

An evaluation of depression's mediating effect is necessary to comprehend the unclear relationship between nightmares and well-being. According to this study, depression mediates the negative association between nightmares and well-being. Previous studies focused on low subjective well-being as a predictor of depressive symptoms [51]. However, this study takes well-being as the dependent variable with the other variables as predictors. According to earlier research, depressed people have a persistently pessimistic view and a propensity to misattribute unpleasant occurrences and experiences to internal causes [52], which may impair how well they assess their own well-being. Concerning schizophrenia patients, in particular, several studies have found that individuals with schizophrenia who also have comorbid depression experience a lower quality of life compared to those who do not have depression [53–55]. Less depressive symptoms and a higher quality of life in schizophrenia patients can indicate an earlier recovery and improved well-being [56]. Our results demonstrate how co-occurring depressive symptoms in schizophrenia patients significantly impact their well-being, leading to unfavorable outcomes.

4.1. The Mediating Effect of Depression between Nightmares and Well-Being. While higher depression was significantly associated with lower well-being, the presence of nightmares was significantly associated with more depression, even when adjusted over sex. Nightmares are common in people suffering from psychosis [57] and have been linked to worsening daytime and nocturnal impairment [58]. In our sample, a third of schizophrenia patients reported having nightmares recently, with around half of them experiencing recurrent nightmares. These frequent nightmares correlated with the presence of more depressive symptoms, per previous studies showing that depression was more common among patients experiencing nightmares [22, 59]. The mediating role of depressive symptoms in the association between nightmares and suicide risk was already studied [22, 60], but its role as a mediator in the association between nightmares and well-being in schizophrenia patients had never been studied before. Prior research indicates that nightmares were related to suicidal ideation, but this link became insignificant after controlling for the severity of PTSD, depression, and anxiety symptoms. Notably, only the severity of depressive symptoms remained significantly associated with suicidal ideation [22]. In our study, the occurrence of nightmares was not directly related to well-being, but it was associated with higher depression, which, in turn, was associated with worse well-being. As a result, depression played a role in mediating this negative relationship. This can be explained by the fact that the relation between our daily life experiences and dreams are reciprocal; daily life experiences can be put into effect in our dreams but also, the content of dreams may affect our life when being awake. [61]. Therefore, dreams can impact our lived reality heavily and may cause distress when they are unpleasant. Furthermore, dream assessment can be utilized to determine the quality of the preceding or upcoming day since the distress experienced during the day carries over to the night and vice versa. There is a proven association between nightmare frequency and the general level of psychopathology, mood and anxiety disorders, and other sleep disorders [62]. Both psychache and dream anxiety have full mediator roles in the relationship between sleep disturbance and suicide attempts [29]. Research also suggests that the severity of the psychiatric disorder is more closely related to the distress associated with nightmares [63] than to their frequency [64]. Nightmares have been shown to be a major predictor of depressive symptoms and suicidal ideation [65]. They cause great suffering to the person experiencing them and must be addressed seriously due to their close association with suicidal behavior [66]. Previous studies support the association between nightmares and both depressive disorder and schizophrenia symptoms [57, 58]. Consequently, depressive symptoms in schizophrenia have many negative repercussions on the patients, including a higher risk of suicide, a worse prognosis, and personal suffering [67–69], all of which implicate lower levels of well-being. However, when adjusted over all variables, we lost the mediating effect, suggesting that other variables may be influencing the indirect effect found. At this stage, we do not have

TABLE 3: Correlations between continuous variables.

	1	2	3	4	5	6	7	8
(1) Well-being	1							
(2) Hallucinations	−0.12	1						
(3) Delusions	−0.13	0.81***	1					
(4) Depression	−0.46***	0.39***	0.38***	1				
(5) Memory forward	0.14	0.16	0.07	−0.04	1			
(6) Memory backward	0.14	0.15	0.03	−0.09	0.67***	1		
(7) PTSD	−0.61*	0.51***	0.48***	0.61***	0.09	0.03*	1	
(8) Age	−0.02	−0.15	−0.10	−0.12	−0.01	−0.05	−0.03	1

$^* p < 0.05$; $^{***} p < 0.001$.

TABLE 4: Indirect effect analyses results, taking the presence/absence of nightmares as the independent variable, depression as the mediator, and the well-being score as the dependent variable.

	Direct effect			Indirect effect		
	Beta	SE	p	Beta	Boot SE	Boot CI
Model 1: adjustment over sex	0.88	0.96	0.357	−1.03	0.52	−2.07; −0.06*
Model 2: adjustment over all variables	0.25	0.93	0.785	−0.06	0.44	−0.90; 0.82

*Significant indirect effect. Model 2 is adjusted over hallucinations, delusions, memory forward, memory backward, and posttraumatic stress disorder.
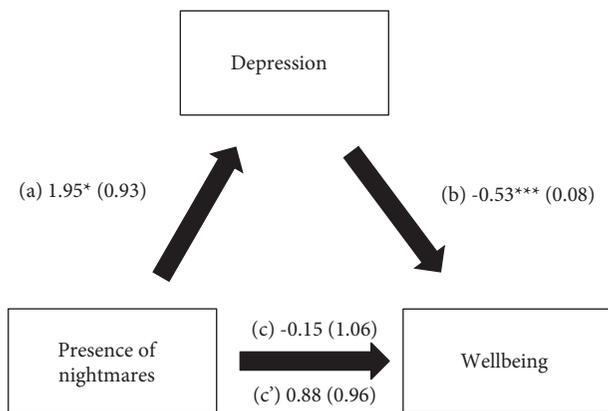

FIGURE 2: (a) Relation between presence of nightmares and depression ($R^2 = 3.53\%$). (b) Relation between depression and well-being ($R^2 = 24.86\%$). (c) Total effect of the relation between the presence of nightmares and well-being ($R^2 = 4.41\%$). (c′) Direct effect of the relation between the presence of nightmares and well-being. Numbers are displayed as regression coefficients (standard error). $^{***} p < 0.001$; $^* p < 0.05$.

enough evidence to make a conclusion about the presence or absence of a mediating effect. Future studies are needed to consolidate or refute those results.

Sleep problems and common mental disorders have a reciprocal relationship, where each can worsen the other, and it is important to address both to achieve the best results for patients [70]. Therefore, we evaluated as well the indirect effect between depression and well-being since this is a cross-sectional study with the occurrence of events not known through time. However, we found that nightmares did not have an indirect effect on the association between depression and well-being. This finding is consistent with previous research suggesting that nightmares may be a symptom of depression rather than a distinct contributor to poor mental health outcomes or suicide [59]. Future

research could use longitudinal designs to better understand the temporal relationships between depression, nightmares, and well-being. Additionally, incorporating measures of other factors that may impact the relationship between depression, nightmares, and well-being, such as sleep quality or trauma exposure, could provide a more nuanced understanding of these complex associations.

5. Clinical Implications

Clinical healthcare professionals treating people with mental illnesses have shifted their focus from treating symptoms alone to focusing on overall functional improvement [71]. Since well-being is affected directly by depression and indirectly by nightmares, interventions targeting both problems may provide significant functional therapeutic benefits in schizophrenia patients. As a result, putting more emphasis on the distress associated with frequent nightmares, which are rarely addressed in therapy, may have a significant clinical effect on reducing the risk of depression. Additionally, if nightmares can be treated effectively, this may help patients feel less distress from their psychotic symptoms throughout the day, which will improve their quality of life and well-being.

6. Limitations

First, the results of this cross-sectional study reflect correlational associations among the variables, making it difficult to establish causation. This could be prevented in future studies by replicating the study longitudinally. Second, the scales are subjectively reported by the patients suffering from mental illness, which could lead to information bias, and not all of the scales are validated in Arabic. Third, not all the factors (physical, psychological, and social such as cognitive impairment or affective blunting or residual positive symptoms) that may be associated with well-being were taken into consideration, predisposing us to a residual confounding bias.

7. Conclusion

Our findings demonstrate that nightmares lead to lower well-being in schizophrenia patients, with depression serving as a mediating factor in this association. As a result, the outcomes of this research may represent a first step towards emphasizing the importance of addressing patients' distressing dreams during therapy in order to alleviate their depressive symptoms, which in turn promotes improved well-being. We support further investigation into nightmares as a potential indirect causal component of decreased well-being in schizophrenia to improve the quality of life and general subjective well-being among schizophrenia patients.

Data Availability

The datasets generated and/or analysed during the current study are not publicly available due to restrictions from the Ethics Committee but are available from the corresponding author on reasonable request.

Ethical Approval

The Psychiatric Hospital of the Cross Ethics Committee approved the study protocol (HPC-017-2022). All methods were carried out in accordance with relevant guidelines and regulations.

Consent

Written informed consent was obtained from each participant.

Disclosure

This paper is submitted on behalf of the Psychiatric Hospital of the Cross research committee: Marouan Zoghbi, Chadia Haddad, Dory Hachem, Oussama Dahdouh, Gisele Kazour, and Waad Bsaibes.

Conflicts of Interest

The authors have no conflicts of interest to report.

Authors' Contributions

Georges Haddad, Sahar Obeid and Souheil Hallit are last coauthors. SO, SH, and GH conceived and designed the survey. SH was involved in the statistical analysis and data interpretation. DM wrote the manuscript. JEA and SHe assisted in the writing. MT, CT, and KR were involved in the data collection. All authors have read the manuscript, critically revised it for intellectual content, and approved the final version.

Acknowledgments

References

[1] P. Świtaj, M. Anczewska, A. Chrostek et al., "Disability and schizophrenia: a systematic review of experienced psychosocial difficulties," *BMC Psychiatry*, vol. 12, no. 1, p. 193, 2012.

[2] M. E. P. Seligman and M. Csikszentmihalyi, "Positive psychology. An introduction," *American Psychologist*, vol. 55, no. 1, pp. 5–14, 2000.

[3] F. A. Huppert, "The state of wellbeing science: concepts, measures, interventions, and policies," in *Wellbeing*, C. L. Cooper, Ed., John Wiley & Sons, Ltd, Chichester, UK, 2014.

[4] S. M. A. Lamers, G. J. Westerhof, E. T. Bohlmeijer, P. M. ten Klooster, and C. L. M. Keyes, "Evaluating the psychometric properties of the mental health Continuum-Short Form (MHC-SF)," *Journal of Clinical Psychology*, vol. 67, no. 1, pp. 99–110, 2011.

[5] M. Slade, "The contribution of mental health services to recovery," *Journal of Mental Health*, vol. 18, no. 5, pp. 367–371, 2009.

[6] P. T. Yanos and R. H. Moos, "Determinants of functioning and well-being among individuals with schizophrenia: an integrated model," *Clinical Psychology Review*, vol. 27, no. 1, pp. 58–77, 2007.

[7] M. J. J. Lommen and K. Restifo, "Trauma and posttraumatic stress disorder (PTSD) in patients with schizophrenia or schizoaffective disorder," *Community Mental Health Journal*, vol. 45, no. 6, pp. 485–496, 2009.

[8] D. Berle, D. Hilbrink, C. Russell-Williams et al., "Personal wellbeing in posttraumatic stress disorder (PTSD): association with PTSD symptoms during and following treatment," *BMC Psychol*, vol. 6, no. 1, p. 7, 2018.

[9] S. G. Siris, "Depression in schizophrenia: perspective in the era of 'atypical' antipsychotic agents," *The Australian Journal of Pharmacy*, vol. 157, no. 9, pp. 1379–1389, 2000.

[10] T. H. McGlashan and W. T. Carpenter, "Postpsychotic depression in schizophrenia," *Archives of General Psychiatry*, vol. 33, no. 2, pp. 231–239, 1976.

[11] R. R. Conley, H. Ascher-Svanum, B. Zhu, D. Faries, and B. J. Kinon, "The burden of depressive symptoms in the long-term treatment of patients with schizophrenia," *Schizophrenia Research*, vol. 90, no. 1–3, pp. 186–197, 2007.

[12] G. Reine, C. Lançon, S. Di Tucci, C. Sapin, and P. Auquier, "Depression and subjective quality of life in chronic phase schizophrenic patients," *Acta Psychiatrica Scandinavica*, vol. 108, no. 4, pp. 297–303, 2003.

[13] S. Ezhumalai, S. Praharaj, and M. Ranganathan, "Pattern of disability among persons who availed half-way home-care services for psychosocial rehabilitation," *Industrial Psychiatry Journal*, vol. 21, no. 2, pp. 173–177, 2012.

[14] S. Sabbag, E. W. Twamley, L. Vella, R. K. Heaton, T. L. Patterson, and P. D. Harvey, "Predictors of the accuracy of self assessment of everyday functioning in people with schizophrenia," *Schizophrenia Research*, vol. 137, no. 1–3, pp. 190–195, 2012.

[15] T. M. I. Shihabuddeen, H. Mehar, and D. A. Pinto, "Disability in schizophrenia and bipolar mood disorder at general hospital psychiatry unit," 2011, http://imsear.searo.who.int/handle/123456789/159448.

[16] M. E. Demirkol, L. Tamam, Z. Namlı, K. Uğur, and M. O. Karaytuğ, "The mediating effect of depression and disability in the relationship between schizophreniaand self-esteem," *Psychiatric Quarterly*, vol. 91, no. 2, pp. 363–378, 2020.

[17] R. Schennach-Wolff, M. Obermeier, F. Seemuller et al., "Evaluating depressive symptoms and their impact on outcome in schizophrenia applying the Calgary Depression Scale," *Acta Psychiatrica Scandinavica*, vol. 123, no. 3, pp. 228–238, 2011.

[18] H. Ertekin, M. Er, H. Yardim Ozayhan, S. Yayla, E. Akyol, and B. S. Sahin, "Bakımevinde kalan şizofreni hastalarında yaşam kalitesi ve depresyon," *Düşünen Adam: The Journal of Psychiatry and Neurological Sciences*, vol. 28, no. 3, pp. 213–221, 2015.

[19] L. Hölzel, M. Härter, C. Reese, and L. Kriston, "Risk factors for chronic depression--a systematic review," *Journal of Affective Disorders*, vol. 129, no. 1–3, pp. 1–13, 2011.

[20] P. A. Geoffroy, S. Tebeka, C. Blanco, C. Dubertret, and Y. Le Strat, "Shorter and longer durations of sleep are associated with an increased twelve-month prevalence of psychiatric and substance use disorders: findings from a nationally representative survey of US adults (NESARC-III)," *Journal of Psychiatric Research*, vol. 124, pp. 34–41, 2020.

[21] C. J. Bryan, J. Gonzales, M. D. Rudd et al., "Depression mediates the relation of insomnia severity with suicide risk in three clinical samples of U.S. Military personnel," *Depression and Anxiety*, vol. 32, no. 9, pp. 647–655, 2015.

[22] J. Don Richardson, L. King, K. St Cyr et al., "Depression and the relationship between sleep disturbances, nightmares, and suicidal ideation in treatment-seeking Canadian Armed Forces members and veterans," *BMC Psychiatry*, vol. 18, no. 1, 2018.

[23] D. L. Littlewood, P. A. Gooding, M. Panagioti, and S. D. Kyle, "Nightmares and suicide in posttraumatic stress disorder: the mediating role of defeat, entrapment, and hopelessness," *Journal of Clinical Sleep Medicine*, vol. 12, no. 3, pp. 393–399, 2016.

[24] P. Marinova, I. Koychev, L. Laleva et al., "Nightmares and suicide: predicting risk in depression," *Psychiatria Danubina*, vol. 26, no. 2, pp. 159–164, 2014.

[25] A. Tanskanen, J. Tuomilehto, H. Viinamäki, E. Vartiainen, J. Lehtonen, and P. Puska, "Nightmares as predictors of suicide," *Sleep*, vol. 24, no. 7, pp. 845–848, 2001.

[26] M. Y. Agargun, L. Besiroglu, A. S. Cilli et al., "Nightmares, suicide attempts, and melancholic features in patients with unipolar major depression," *Journal of Affective Disorders*, vol. 98, no. 3, pp. 267–270, 2007.

[27] K. M. Beauchemin and P. Hays, "Dreaming away depression: the role of REM sleep and dreaming in affective disorders," *Journal of Affective Disorders*, vol. 41, no. 2, pp. 125–133, 1996.

[28] M. V. Seeman, "Successful treatment of nightmares may reduce psychotic symptoms in schizophrenia," *World Journal of Psychiatry*, vol. 8, no. 3, pp. 75–78, 2018.

[29] K. Uğur, M. E. Demirkol, and L. Tamam, "The mediating roles of psychological pain and dream anxiety in the relationship between sleep disturbance and suicide," *Archives of Suicide Research*, vol. 25, no. 3, pp. 512–528, 2021.

[30] N. Sandman, K. Valli, E. Kronholm, E. Vartiainen, T. Laatikainen, and T. Paunio, "Nightmares as predictors of suicide: an extension study including war veterans," *Scientific Reports*, vol. 7, no. 1, p. 44756, 2017.

[31] E. Solomonova, C. Picard-Deland, I. L. Rapoport et al., "Stuck in a lockdown: dreams, bad dreams, nightmares, and their relationship to stress, depression and anxiety during the COVID-19 pandemic," *PLoS One*, vol. 16, no. 11, Article ID e0259040, 2021.

[32] S. Rek, B. Sheaves, and D. Freeman, "Nightmares in the general population: identifying potential causal factors," *Social Psychiatry and Psychiatric Epidemiology*, vol. 52, no. 9, pp. 1123–1133, 2017.

[33] M. M. Ohayon, P. L. Morselli, and C. Guilleminault, "Prevalence of nightmares and their relationship to psychopathology and daytime functioning in insomnia subjects," *Sleep*, vol. 20, no. 5, pp. 340–348, 1997.

[34] R. Levin and G. Fireman, "Nightmare prevalence, nightmare distress, and self-reported psychological disturbance," *Sleep*, vol. 25, no. 2, pp. 205–212, 2002.

[35] L. N. Dyrbye, W. Harper, C. Moutier et al., "A multi-institutional study exploring the impact of positive mental health on medical students' professionalism in an era of high burnout," *Academic Medicine*, vol. 87, no. 8, pp. 1024–1031, 2012.

[36] D. Watson and K. Naragon-Gainey, "On the specificity of positive emotional dysfunction in psychopathology: evidence from the mood and anxiety disorders and schizophrenia/schizotypy," *Clinical Psychology Review*, vol. 30, no. 7, pp. 839–848, 2010.

[37] C. D. Ryff and C. L. M. Keyes, "The structure of psychological well-being revisited," *Journal of Personality and Social Psychology*, vol. 69, no. 4, pp. 719–727, 1995.

[38] M. S. Fritz and D. P. MacKinnon, "Required sample size to detect the mediated effect," *Psychological Science*, vol. 18, no. 3, pp. 233–239, 2007.

[39] G. Robert and A. Zadra, "Measuring nightmare and bad dream frequency: impact of retrospective and prospective instruments," *Journal of Sleep Research*, vol. 17, no. 2, pp. 132–139, 2008.

[40] D. Addington, J. Addington, and E. Maticka-Tyndale, "Assessing depression in schizophrenia: the calgary depression scale," *British Journal of Psychiatry*, vol. 163, no. S22, pp. 39–44, 1993.

[41] Y. Hani, S. Ghuloum, Z. Mahfoud et al., "Validation of the Arabic version of calgary depression scale for schizophrenia," *PLoS One*, vol. 11, no. 9, Article ID e0162304, 2016.

[42] C. A. Blevins, F. W. Weathers, M. T. Davis, T. K. Witte, and J. L. Domino, "The posttraumatic stress disorder checklist for DSM-5 (PCL-5): development and initial psychometric evaluation," *Journal of Traumatic Stress*, vol. 28, no. 6, pp. 489–498, 2015.

[43] M. J. Bovin, B. P. Marx, F. W. Weathers et al., "Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders-fifth edition (PCL-5) in veterans," *Psychological Assessment*, vol. 28, no. 11, pp. 1379–1391, 2016.

[44] H. Ibrahim, V. Ertl, C. Catani, A. A. Ismail, and F. Neuner, "The validity of Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) as screening instrument with Kurdish and Arab displaced populations living in the Kurdistan region of Iraq," *BMC Psychiatry*, vol. 18, no. 1, p. 259, 2018.

[45] G. Haddock, J. McCarron, N. Tarrier, and E. B. Faragher, "Scales to measure dimensions of hallucinations and delusions: the psychotic symptom rating scales (PSYRATS)," *Psychological Medicine*, vol. 29, no. 4, pp. 879–889, 1999.

[46] D. Wechsler, *WMS-III: Wechsler Memory Scale Administration and Scoring Manual*, Psychological Corp, San Antonio, Tex, 3rd ed edition, 1997.

[47] G. E. Gignac, M. R. Reynolds, and K. Kovacs, "Digit span subscale scores may Be insufficiently reliable for clinical interpretation: distinguishing between stratified coefficient alpha and omega hierarchical," *Assessment*, vol. 26, no. 8, pp. 1554–1563, 2019.

[48] C. W. Topp, S. D. Østergaard, S. Søndergaard, and P. Bech, "The WHO-5well-being index: a systematic review of the

literature," *Psychotherapy and Psychosomatics*, vol. 84, no. 3, pp. 167–176, 2015.

[49] A. M. Sibai, M. Chaaya, R. A. Tohme, Z. Mahfoud, and H. Al-Amin, "Validation of the Arabic version of the 5-item WHO well being index in elderly population," *International Journal of Geriatric Psychiatry*, vol. 24, no. 1, pp. 106-107, 2009.

[50] A. F. Hayes, *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, Guilford Press, New York, NY, USA, 2013.

[51] F. Grant, C. Guille, and S. Sen, "Well-being and the risk of depression under stress," *PLoS One*, vol. 8, no. 7, Article ID e67395, 2013.

[52] G. M. Watson and D. G. Dyck, "Depressive attributional style in psychiatric inpatients: effects of reinforcement level and assessment procedure," *Journal of Abnormal Psychology*, vol. 93, no. 3, pp. 312–320, 1984.

[53] N. Abedi Shargh, B. Rostami, B. Kosari, Z. Toosi, and G. A. Majelan, "Study of relationship between depression and quality of life in patients with chronic schizophrenia," *Global Journal of Health Science*, vol. 8, no. 3, pp. 224–229, 2015.

[54] J. Bobes, M. P. Garcia-Portilla, M. T. Bascaran, P. A. Saiz, and M. Bouzoño, "Quality of life in schizophrenic patients," *Dialogues in Clinical Neuroscience*, vol. 9, no. 2, pp. 215–226, 2007.

[55] T. Fanta, D. Bekele, and G. Ayano, "The prevalence and associated factors of depression among patients with schizophrenia in Addis Ababa, Ethiopia, cross-sectional study," *BMC Psychiatry*, vol. 20, no. 1, p. 3, 2020.

[56] D. Naber, S. Kollack-Walker, J. Chen et al., "Predicting a 'combined treatment outcome' in chronic schizophrenia: the role of demographics, symptomatology, functioning and subjective well-being," *Pharmacopsychiatry*, vol. 46, no. 3, pp. 114–119, 2013.

[57] C. Okorome Mume, "Nightmare in schizophrenic and depressed patients," *The European Journal of Psychiatry*, vol. 23, no. 3, pp. 177–183, 2009.

[58] B. Sheaves, J. Onwumere, N. Keen, D. Stahl, and E. Kuipers, "Nightmares in patients with psychosis: the relation with sleep, psychotic, affective, and cognitive symptoms," *Canadian Journal of Psychiatry*, vol. 60, no. 8, pp. 354–361, Aug 2015.

[59] A. K. Hedström, R. Bellocco, O. Hössjer, W. Ye, Y. Trolle Lagerros, and T. Åkerstedt, "The relationship between nightmares, depression and suicide," *Sleep Medicine*, vol. 77, pp. 1–6, 2021.

[60] J. Don Richardson, K. S. Cyr, C. Nelson, J. D. Elhai, and J. Sareen, "Sleep disturbances and suicidal ideation in a sample of treatment-seeking Canadian Forces members and veterans," *Psychiatry Research*, vol. 218, no. 1-2, pp. 118–123, 2014.

[61] M. Schredl, "Factors affecting the continuity between waking and dreaming: emotional intensity and emotional tone of the waking-life event," *Sleep and Hypnosis*, vol. 8, pp. 1–5, 2006.

[62] R. Levin and T. A. Nielsen, "Disturbed dreaming, posttraumatic stress disorder, and affect distress: a review and neurocognitive model," *Psychological Bulletin*, vol. 133, no. 3, pp. 482–528, 2007.

[63] M. A. Akkaoui, M. Lejoyeux, M.-P. d'Ortho, and P. A. Geoffroy, "Nightmares in patients with major depressive disorder, bipolar disorder, and psychotic disorders: a systematic review," *Journal of Clinical Medicine*, vol. 9, no. 12, p. 3990, 2020.

[64] S. M. Y. Wong, C. L. M. Hui, V. K. W. Cheung et al., "Prevalence of frequent nightmares and their prospective associations with 1-year psychiatric symptoms and disorders and functioning in young adults: a large-scale epidemiological study in Hong Kong," *Sleep*, Article ID zsac296, 2022.

[65] K. C. Cukrowicz, A. Otamendi, J. V. Pinto, R. A. Bernert, B. Krakow, and T. E. Joiner, "The impact of insomnia and sleep disturbances on depression and suicidality," *Dreaming*, vol. 16, pp. 1–10, 2006.

[66] X.-F. Yang, Z.-Z. Liu, S.-J. Liu, C.-X. Jia, and X. Liu, "Nightmare distress as a mediator between frequent nightmares and depressive symptoms in Chinese adolescents," *Journal of Affective Disorders*, vol. 296, pp. 363–369, 2022.

[67] C. Mulholland and S. Cooper, "The symptom of depression in schizophrenia and its management," *Advances in Psychiatric Treatment*, vol. 6, no. 3, pp. 169–177, 2000.

[68] M. Tariku, T. Ali, T. Misgana, M. Hajure, and H. Asfaw, "Depression among patients with schizophrenia in Ethiopian mental health hospital: association with sociodemographic and clinical variables: a cross-sectional study," *Depression Research and Treatment*, vol. 2021, Article ID 6697339, pp. 1–7, 2021.

[69] C. G. Kohler and E. A. Lallart, "Postpsychotic depression in schizophrenia patients," *Current Psychiatry Reports*, vol. 4, no. 4, pp. 273–278, 2002.

[70] C. F. Reynolds and R. O'Hara, "DSM-5 sleep-wake disorders classification: overview for use in clinical practice," *American Journal of Psychiatry*, vol. 170, no. 10, pp. 1099–1101, 2013.

[71] X. W. Tan, E. Seow, E. Abdin et al., "Subjective quality of life among patients with schizophrenia spectrum disorder and patients with major depressive disorder," *BMC Psychiatry*, vol. 19, no. 1, p. 267, 2019.