RESEARCH

The Arabic Hospital Anxiety and Depression Scale: validation in a sample of Lebanese patients with cancer

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Abstract

Background Depression and anxiety are common comorbid psychological disorders among patients with cancer. Despite the wide use of the Arabic Hospital and Anxiety Scale (HADS) in oncological settings, it has not been yet validated among Lebanese patients with cancer. We aimed to assess the reliability and validity of the HADS in a sample of Lebanese patients with cancer. One-hundred one Lebanese patients diagnosed with cancer presenting to the Ambulatory Care Center in the Hematology Oncology Department at the American University of Beirut Medial Center filled the Arabic version of the HADS. The Generalized Anxiety Disorder 7-Item Scale (GAD-7) and the Patient Health Questionnaire 9-Item Scale (PHQ-9) were used to assess its concurrent validity in capturing anxiety and depression, respectively.

Results Reliability analysis using Cronbach's alpha (α) coefficient revealed good internal consistency for the Arabic HADS ($\alpha = 0.89$) and both subscales ($\alpha = 0.86$ for depression and $\alpha = 0.78$ for anxiety). Correlations between HADS with both GAD-7 and PHQ-9 were statistically significant and strong for both depression ($r = 0.795$; $p < 0.0001$) and anxiety ($r = 0.727$; $p < 0.0001$). Confirmatory factor analysis revealed that the observed data fits the two-factor model of depression and anxiety (Kaiser–Meyer–Olkin = 0.86; Tucker Lewis Index = 0.879; root-mean-square error of approximation = 0.08). Depression and anxiety rates were approximately 52% and 25%, respectively.

Conclusion We conclude that the Arabic version of the HADS is a credible and valid tool for clinical assessment of psychological distress (anxious and depressive states) among Lebanese patients with cancer.

Keywords Psycho-oncology, Psychological distress, Neoplasms, Anxiety, Depression

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Introduction

Despite advancements in cancer treatments all over the world, cancer continues to maintain its rank as the second most frequent cause of mortality globally, following cardiovascular-related deaths [1–3].

In Lebanon, cancer incidence (169.8 per 100,000 people) is quite high with breast cancer accounting for 20% of cases, followed closely by lung (9%) and colorectal (8%) cancers [1, 4, 5]. These numbers are projected to further increase by 2025 [2].

Both cancer and its treatment lead to inevitable physical, psychological, and behavioral challenges, with evidence that psychological distress leads to poorer prognosis in patients with cancer [6, 7]. Fortunately,

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integrating psychosocial care within oncological and primary care of these patients has been shown to improve both physical and psychological outcomes [8, 9]. In such context, national organizations and institutions, particularly the National Comprehensive Cancer Network, recommended the use of routine universal distress screening for all patients with cancer [9, 10]. Despite the wide implementation of psychosocial care in high-income countries, particularly in the West, it is still underdeveloped and lagging behind in other regions, specifically those in the Arab Middle East and North Africa (MENA) [11]. Psycho-oncology research in Lebanon and the MENA region remains scarce due to the limited available services. Psycho-oncology services remain poorly implemented in the region due to healthcare-related and sociocultural barriers. Primarily, there is a relatively limited number of trained psychiatrists, psychologists, and palliative care specialists. On the other hand, the collectivistic culture in Lebanon occasionally restricts patients to seek psycho-oncology services. Given these limitations, research in psycho-oncology has been limited over the years [11]. However, in 2020, an important collaboration emerged between the Naef K. Basile Cancer Institute and the Department of Psychiatry at the American University of Beirut Medical Center (AUBMC). This partnership led to the founding of the psycho-oncology program, an initiative that serves as the first integrative and collaborative psycho-oncology program in both Lebanon and its surrounding region. Consequently, more research is currently being done in psycho-oncology in Lebanon.

Screening via reliable and valid psychosocial instruments has been the gold standard in assessing the mental wellbeing of patients with cancer [12]. Many international psychometric tools, translated to Arabic, are widely used in the Arab world, including the Beck Depression Inventory (BDI), the Hamilton Depression Rating Scale (HDRS), the Hamilton Anxiety Rating Scale (HARS), the Patient Health Questionnaire-9 (PHQ-9), and the Generalized Anxiety Disorder-7 Questionnaire (GAD-7) [13–16]. Still, in regional psycho-oncology settings, the adoption of these tools remains challenging. On one hand, most of the existing Arabic-translated tools have been researched in a general psychiatric population and not in patients with cancer. On the other hand, somatic symptoms of depression and anxiety such as insomnia, decreased appetite, and fatigue in oncology patients are frequently misidentified as characteristic symptoms of cancer [17]. This decreases the specificity of the above instruments when screening as they likely confound the latter somatic symptoms with those related to the cancer course and its treatment [17]. Patients diagnosed with cancer often suffer from comorbid psychological disorders such as anxiety and depression. These issues can compound the difficulties they face during therapy, impeding cancer treatment and monitoring, adherence to the prescribed treatments, length of hospitalization, and survival outcomes [18–20]. Validated Arabic assessments of psychological distress among cancer patients are crucial in order to recognize patients who need further assessment and subsequent intervention. Early identification and management of depressive and anxiety symptoms by psychological screening and intervention play an important role in improving patients' adherence to cancer therapy and the overall control of the illness [21]. Hence, the use of valid, reliable, and culturally adapted instruments particular to this population is essential.

The Hospital Anxiety and Depression Scale (HADS) [22] is an emotional distress self-report questionnaire that is most frequently used in oncology [23–25] and in other medical and hospital settings. Conceptually, the HADS is designed to screen for emotional distress in nonpsychiatric patients by effectively identifying depression and anxiety. Most importantly, it excludes physical symptoms of distress such as headache and weight loss, often encountered in medical conditions [22, 24]. This differentiates it from the classic all-inclusive diagnostic screening tools for depression such as the PHQ-9 [26]. For heightened sensitivity to depression and anxiety in medical illnesses, severely psychopathological symptoms are not included in the HADS [22]. It inherently captures a prolonged state rather than a trait and therefore is not recommended in diagnosing mental disorders [23].

The HADS, widely used since 1987, is ideal to compare global rates of psychological distress among patients with cancer. Although it has been translated to Arabic and validated in Saudi Arabia [27], Kuwait [28], and the United Arab Emirates [29], both in primary care settings and in hospitalized surgical patients [30], it has yet to be validated in Lebanon, particularly in oncology settings. This study aims to validate the Arabic version of the HADS for assessing depression and anxiety in a sample of Lebanese patients with cancer admitted to the Ambulatory Care Center (outpatient service) at the Naef K. Basile Cancer Institute at the AUBMC.

Materials and methods
Study design and participants
This was a cross-sectional, single-center study conducted at the AUBMC among Lebanese patients with cancer presenting to the Ambulatory Care Center (ACC) in the Hematology Oncology Department between November and December 2021. Using a convenience sampling method, recruitment took place at different hospital shifts, including morning and evening shifts, to cover different types of patients as much as possible. All Lebanese patients aged between 18 and 80 years of age and

diagnosed with any type of cancer presenting to the ACC in the Hematology and Oncology Department were eligible for participation in the study. Criteria for exclusion included patients who were not Lebanese, were either under 18 years or over 80 years of age, had a comorbid mental disorder, were suffering from an existing cognitive impairment, or declined to be part of the study. As per the institutional review board regulations at the hospital, illiterate people had the researcher read the items for them and fill with their responses.

Minimal sample size calculation

As reported in a study by Montazeri et al. [31], 18% of patients with cancer scored as positive cases on the depression subscale of the HADS. Assuming a significance level at $p < 0.05$, a type 1 error of 5%, and an absolute error of precision of 5%, the minimum sample size needed was 97 participants.

Measures
Sociodemographic data

Sociodemographic and medical factors were collected using a short questionnaire that included recording of age, gender, marital status, educational level, monthly salary, cancer type, and treatment.

Hospital Anxiety and Depression Scale (HADS)

A previously translated Arabic version of the HADS and validated among hospitalized patients in Saudi Arabia was used after obtaining permission from original authors [30]. It consists of a 14-item self-reporting scale measuring anxiety (7-item subscale) and depression (7-item subscale). Each item is scored on a 4-level Likert type scale ranging from 0 to 3. Mean subscale scores are either normal (0–7), borderline (8–10), or positive for anxiety or depression (11–21). This translates into a maximal score of 21 on each subscale and a total of 42 on the scale.

Generalized Anxiety Disorder 7-Item Scale (GAD-7)

The GAD-7 is a 7-item self-reported scale that screens for symptoms of anxiety concordant with the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-IV) over 2 weeks. Response options were scored as 0 (not at all), 1 (several days), 2 (more than half the days), and 3 (nearly every day). The total GAD-7 score is the sum of scores on the seven items, with higher scores indicating more severe anxiety symptoms. The used Arabic version of GAD-7 had been previously translated and validated in a psychiatric community sample in Lebanon and had shown an excellent internal consistency (Cronbach's alpha = 0.95) [16].

Patient Health Questionnaire 9-Item Scale (PHQ-9)

PHQ-9 consists of a 9-item self-reported scale that measures the severity of depression by asking the patients how often they were bothered by nine symptoms as indicated in DSM-IV during the last 2 weeks. The severity of each symptom is rated on a score from 0 (not at all) to 3 (nearly every day). A score of 0–27 is computed by adding the responses of the 9 items. Higher scores denote greater depressive symptoms. We used a previously translated and validated Arabic version of PHQ-9 in a Lebanese psychiatric sample [16]. Internal consistency was good in the original study (Cronbach's alpha = 0.88) [16].

Clinical interview

A clinical interview was conducted by an experienced clinician with each patient to validate the diagnoses of emotional distress revealed by the self-reported instruments.

Data collection and statistical analyses

The Institutional Review Board of the American University of Beirut granted ethical approval for this study (SBS-2021–0255). Every participant was thoroughly educated on the objectives of the research and provided a written consent to participate in the study. An experienced clinician administered the questionnaires to each patient individually. Participants were randomly selected from the admitted adult patients receiving chemotherapy at the ACC (outpatient service) at the Naef K. Basile Cancer Institute at the AUBMC, until reaching the minimal sample size required.

Descriptive statistics analyses (mean, standard deviation, and range) for the characteristics of the patients, their HADS anxiety and depression scores, and GAD-7 and PHQ-9 total scores were performed using SPSS 25 statistical software package (IBM, USA). Internal consistency of the HADS was examined using Cronbach's alpha (α) and Guttman's lambda. Alpha equal to or greater than 0.70 was considered satisfactory. After verifying the normality of the HADS subscales, convergent validity of the HADS was assessed by using Pearson's correlation coefficients to evaluate the strength of correlation between the subscales of the HADS (anxiety and depression) with other validated measures of depression (PHQ-9) and anxiety (GAD-7). Statistical significance was designated by a *p*-value below 0.05. Further factor analysis was executed using R Foundation for Statistical Computing version 4.1.1/RStudio version 1.4.17 with "psych" package to verify the dimensionality of the HADS subscales. Adjustment indices included root-mean-square error of approximation (*RMSEA* < 0.1), Tucker-Lewis index (*TLI* > 0.9), and Kaiser-Meyer-Olkin (*KMO* > 0.8) [32, 33].

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Results

A total of 101 patients (69 females, and 32 males) diagnosed with cancer and receiving chemotherapy participated in the validation of the Arabic version of the HADS questionnaire in a sample of Lebanese patients with cancer. The average age was 53.3 ($SD = 14.1$). The descriptive characteristics of the sample population are presented in Table 1. The most prevalent type of cancer reported in the sample of patients was breast cancer (29.7%), followed by hematological cancer (24.8%). The type of treatment patients underwent varied with most patients undergoing chemotherapy (49.5%), followed by chemotherapy and surgery (32.7%). The mean scores for the HADS-depression and anxiety subscales were shown to be 6.5 ($SD = 4.3$) with a range between 0 and 16 and 4.7 ($SD = 3.3$) with a range between 0 and 15, respectively. Among the 101 participants, the rate was 52% for depression and 25% for anxiety (both borderline and caseness of the two subscales).

Internal consistency

The reliability analysis as measured by Cronbach alpha's coefficient showed good internal consistency of the HADS with alpha values of 0.89 (and Guttman lambda of 0.91), 0.86, and 0.78 for the total 14 items, depression subscale, and anxiety subscale, respectively.

Convergent validity

The correlation coefficients between the scores for anxiety and depression subscales of the HADS and of GAD-7 and PHQ-9, respectively, are strong, positive, and significant for each of depression ($r = 0.795$; $p < 0.001$) and anxiety ($r = 0.727$; $p < 0.001$).

Concurrent validity

Confirmatory analysis with a two-factor model showed very good fit to the observed data [Kaiser–Meyer–Olkin (KMO) = 0.86; Tucker-Lewis index (TLI) = 0.879; root-mean-square error of approximation (RMSEA) = 0.08]. All questions exhibited satisfactory factor loadings for each separate dimension based on a Pearson correlation matrix with Varimax rotation, except for question 8 and question 14 in the second (anxiety) dimension (factor loadings of 0.15 and 0.25, respectively) which seemed to better fit in the depression dimension (with loadings of 0.4 and 0.7, respectively).

Receiver operating characteristic (ROC) curve analysis

ROC analysis showed an area under the curve (AUC) for depression and anxiety subscales of the HADS of 0.891 (95% $CI = 0.827$–0.955) and 0.901 (95% $CI = 0.833$–0.969), respectively.

A cut-off score of > 6, maximizing Youden index, yielded a sensitivity of 97.6% and a specificity of 76.7% of the depression subscale of the HADS. Similarly, a ROC curve achieved a maximum Youden's index at a cut-off score of > 5 of the anxiety subscale of the HADS with a sensitivity of 87.5% and a specificity of 76.5% (Table 2).

Discussion

The HADS is the most widely used instrument to measure depression and anxiety in oncology patients, yet its Arabic version had never been validated in Lebanese oncology patients. The psychometric properties of our analysis reveal that, in its Arabic version, it is adequate for depression and anxiety screening in Lebanese patients with cancer.

The results of the confirmatory factor analysis showed that the Arabic HADS has a very adequate fit as a bidimensional test for the Lebanese patients with cancer. As such, we confirm that the structure of the scale is similar to that reported among patients with cancer in other countries [34, 35]. That said, all but two factors 8 "I feel tense or wound up" and 14 "I can sit at ease and feel relaxed" belonging to the anxiety subscale of the HADS were adequately loaded on the appropriate factor. In fact, Bjelland et al. reported a similar finding for question 14 in a systematic review which had relatively low loadings on the anxiety factor [24].

Our results showed good internal consistency for the Arabic version of the HADS questionnaire with Cronbach's α values of 0.89, 0.86, and 0.78 for the 14 items, depression subscale, and anxiety subscale, respectively. Comparable internal consistencies were shown in previous studies reporting Cronbach's αs of 0.77 and 0.83 for the depression and anxiety subscales in a sample of patients admitted for surgical procedures [30]. Similarly, in a study assessing the adaptation and validity of the Chilean version of the HADS in a sample of patients with cancer, Cronbach's α was reported to be 0.87 for the total 14 items, 0.76 for the anxiety subscale, and 0.84 for the depression subscale [35]. Moreover, in an older study conducted by Montazeri et al. (2003) on patients with breast cancer, the internal consistency of the Iranian version of the HADS was shown to be 0.78 for the anxiety subscale and 0.86 for the depression subscale [31].

Concurrent validity analysis was applied using the correlation between both subscales of the HADS, the GAD-7, and the PHQ-9. The correlation coefficient between the anxiety subscale of the HADS and the GAD-7 was shown to be strong and positively significant ($r = 0.727$; $p < 0.001$). Similar results were shown between the HADS depression subscale and the PHQ-9 ($r = 0.795$; $p < 0.001$).

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Table 1 Descriptive characteristics of the sample population

		N (total = 101)	%
Age	Mean ± standard deviation	53.3 ± 14.1	
Sex	Female	69	68.3
	Male	32	31.7
Marital status	Single	13	12.9
	In a relationship	1	1.0
	Married	82	81.2
	Widowed	1	1.0
	Divorced	4	4.0
Educational status	Elementary	8	7.9
	Middle school	29	28.7
	High school	32	31.7
	Bachelor's degree	22	21.8
	Master's degree	9	8.9
	Doctorate degree	1	1.0
Monthly salary (LL)	Unemployed	66	65.3
	0–750,000	2	2.0
	751,000–1,500,000	7	6.9
	1,501,000–3,000,000	11	10.9
	3,001,000–4,500,000	5	5.0
	> 4,500,000	10	9.9
Type of cancer	Breast cancer	30	29.7
	Hematologic cancer	25	24.8
	Gastrointestinal cancer	18	17.8
	Gynecologic cancer	10	9.9
	Genitourinary cancer	4	4.0
	Bone cancer	2	2.0
	Nasopharyngeal cancer	1	1.0
	Skin cancer	1	1.0
Type of treatment	Chemotherapy	50	49.5
	Chemotherapy and surgery	33	32.7
	Chemotherapy and radiotherapy	9	8.9
	Chemotherapy, surgery, and radiotherapy	9	8.9
HADS-depression score	Normal (0–7)	49	48.5
	Borderline (8–10)	32	31.7
	Caseness (11–21)	20	19.8
	Mean ± standard deviation	6.5 ± 4.3	
	Range	0–16	
HADS-anxiety score	Normal (0–7)	76	75.2
	Borderline (8–10)	18	17.8
	Caseness (11–21)	7	6.9
	Mean ± standard deviation	4.7 ± 3.3	
	Range	0–15	
PHQ-9 score	No to low risk (0–4)	53	52.5
	Mild risk (5–9)	26	25.7
	Moderate risk (10–14)	16	15.8
	Severe risk (15–27)	6	5.9
	Mean ± standard deviation	5.7 ± 4.8	
	Range	0–22	

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Table 1 (continued)

		N (total = 101)	%
GAD-7 score	No to low risk (0–4)	74	73.3
	Mild risk (5–9)	21	20.8
	Moderate risk (10–14)	5	5.0
	Severe risk (15–27)	1	1.0
	Mean ± standard deviation	3.6 ± 3.0	
	Range	0–15	

Table 2 ROC and diagnostic efficiency of the HADS for the screening of depression and anxiety among patients with cancer

	Cut-off scores	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	YI	AUC	95% CI	SE	*p*-value
Depression subscale	>6	97.6	76.7	74.4	95.5	0.743	0.891	0.827–0.955	0.033	<0.001
	>7	95.1	78.3	75.3	91.4	0.734				
	>8	73.2	99.9	99.8	71.3	0.731				
	>9	43.9	99.8	99.4	54.3	0.437				
Anxiety subscale	>4	93.8	64.7	33.6	64.8	0.585	0.901	0.833–0.969	0.035	<0.001
	>5	87.5	76.5	41.5	51.9	0.640				
	>6	81.3	82.4	46.8	43.7	0.637				
	>7	75.0	84.7	48.3	37.4	0.567				

HADS Hospital Anxiety and Depression Scale, *ROC* Receiver operating characteristic, *PPV* Positive predictive value, *NPV* Negative predictive value, *YI* Youden index, *AUC* Area under the curve, *95% CI* 95% Confidence interval, *SE* Standard error

Consistent with our results, Terkawi et al. (2017)'s validation of the Arabic version of the HADS showed that anxiety scores were strongly correlated with GAD-7 [30].

With respect to the HADS depression subscale, our sample had a 31.7% score lying within the "borderline" range, and 19.8% lying within the "caseness" range, while that of HADS anxiety subscale scores was shown to be 17.8% within the "borderline" range and 6.9% within the "caseness" range. This indicates heightened distress among our sample population and may point to higher likelihood of depression and anxiety levels in comparison to those reported in other sample populations [31, 35, 36]. For example, in a validation study of the Spanish version of the HADS, 12% of Chilean adult patients with cancer undergoing treatment were found to have positive cases on the depression subscale, along with 23% of possible cases. In contrast, only 7% of the sample scored as positive cases on the anxiety subscale, with an additional 8% of possible cases [35]. Moreover, in comparison with Western populations, our data was more positive for depression. For instance, a validation study of 575 patients with mixed cancer diagnoses from the UK demonstrated clinically relevant levels of depression and anxiety around 9% and 27%, respectively (cutoff above 8) [37]. Similarly, in a Canadian study of 3035 patients with

newly diagnosed cancer completing the HADS subscales on an outpatient visit, 9% of Canadian patients exceeded the cut-off point for depression, and 19% of them were likely to endorse anxiety symptoms (cutoff above 10) [38]. In the USA, a cross-sectional study on distress screening (using the HADS) of 529 patients with different types of malignancies revealed that anxiety was more prominent at 41% of patients meeting the cutoff above 8, versus only 20% for depression [39]. It is worth mentioning that given the limited size of our sample and the nature of our study, our results are not indicative of prevalence estimates, thus making the comparison limited and more of a snapshot rather than a strictly valid one.

We speculate that the repeated exposure to traumatic events within the past 2 years, starting with the October 2019 revolution and the global pandemic, to the August 4th, 2020, explosion and economic crisis [40], has created a significant toll on people's mental health in Lebanon. This is compounded by a rampant shortage in and lack of access to medications nationally among patients with cancer [41]. This national disillusionment and its status quo may indicate a possible higher prevalence of depression and similar-to-lower rate of anxiety compared to global rates. Another explanation might be the learned ability of the Lebanese people to adapt in times of distress

and hardship [42]. Resilience, as a double-edged sword perpetuating the status quo, has been suggested as inherent to the Lebanese identity transmitted through generations [43, 44].

Study limitations

Several factors may have influenced the levels of anxiety and depression within our sample. Critical moments of the disease, such as type of diagnosis, reoccurrence, prognosis, and palliative care, may have an impact on patients' mental health state. Notably, our patient population was actively taking chemotherapy at the time of interviewing, and acute adverse effects may have worsened perceptions of distress. Additionally, the variables mentioned and, more importantly, the type of study used do not allow us to draw conclusions about causality. Therefore, actual prevalence studies are warranted, with adequate sample size and longitudinal assessment taking into consideration relevant factors. Moreover, the characteristics of our sample population were mostly females (69%), married (82%), and unemployed (66%). Results may vary among patients with cancer with other demographic characteristics.

Furthermore, as already established by previous studies, inconsistencies exist regarding cut-off scores for identifying the presence of anxiety and/or depression [24, 45]. In a review by Terol et al. (2015), a suggestion was made to adapt the cut-off scores according to the sample to circumvent any underestimation of distress [46]. This is particularly significant in our Lebanese population due to the unique and rapidly changing economic, social, and political situation.

Study implications

Overall, the findings of this study suggest that the HADS and its subscales are useful in capturing distress in patients with cancer. As a step forward towards the implementation of a well-established psychosocial plan in Lebanon, the validated Arabic HADS would be crucial and useful to screen and identify psychological distress in oncologic settings, especially in patients who may benefit from psychotherapeutic interventions. Moreover, the validated Arabic HADS would serve as an important psychological measure of distress in clinical trials and original studies on psychosocial care conducted in this region. In the MENA region, there are a small number of psycho-oncology programs offering a multidisciplinary treatment approach, and psychological care continues to be an underdeveloped area within healthcare settings [11]. Having a validated Arabic version of the HADS can aid in assessing cancer patients in the region and therefore improving the quality of psychotherapeutic

intervention. This, in turn, could ultimately fill the gap in psycho-oncology research in the MENA region and lead to the development of culturally sensitive psycho-oncology programs in hospitals, clinics, and other health care settings. Having validated Arabic instruments to assess psychological difficulties in cancer patients will prove to be a step forward in implementation and research in this field.

Conclusion

The present work provides sufficient positive results to indicate that the Arabic HADS is a useful brief assessment tool for possible anxious and depressive states as it was originally designed to be. The HADS in Arabic proves to be a reliable and valid instrument that can be implemented among Lebanese patients with cancer. The availability of a psychometrically robust and culturally sensitive tool for Lebanese patients with cancer is of great importance for healthcare physicians to screen for distress and, hence, provide timely management.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

All procedures were revised and approved by the Institutional Review Board of the American University of Beirut (SBS-2021–0255).

Consent for publication

Not applicable.

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