Bio-Psychosocial and Spiritual Determinants of Mental Health among Patients Attending a Primary Healthcare Center in Saudi Arabia: Part One - The Case of Depression

Salem Mohammed Barabie[1], Mohammed Musfer Algamdi[2],

Eida Mohammed S Alharthi[3], Abdullah Ghazzai G Alotaibi[4],

Mohammed Anwar AlAlwani[5], Hend Mohammed Al-sheheri[6],

Hassan Ibrahim alasmari[7], Ahmed Amer M Alalawi[8],

Ali Hussein Mohammed ALASMRI[9]

[1]Family Medicine Department, King Abdulaziz University Hospital, Jeddah, Saudi Arabia
[2-9] King Fahad, Jeddah Hospital. Jeddah, Saudi Arabia

Abstract: **A cross-sectional study was conducted to investigate factors and predictors of psychological distress in the bio-social and spiritual model, among 182 patients attending primary healthcare centers in Western Saudi Arabia. A comprehensive questionnaire collected socio-demographic and economic data; biological dimension factors; social dimension factors; and spiritual dimension factors. Psychological distress was assessed using the Depression, Anxiety and Stress Scale (DASS) 21 questionnaire. Assessment of psychological distress using DASS questionnaire showed 10.4% of mild, 6.6% of moderate, 6.6% of severe and 3.3% of extremely severe depressive symptoms. Biological determinants of mental health were overweight, irregular exercise, smoking, history of illicit substance use, and chronic disease all associated with psychological distress. Social determinants were poor social relationships, major family conflict, over-indebtedness, social isolation, and poor intimate life satisfaction all associated with psychological distress; whereas social activities, hobbies, and volunteering in charitable actions were protective factor. Spiritual determinants were compliance with religious duties, diligence with elective religious activities, living satisfactorily in accordance with own beliefs, resilient attitude towards bad life events and regular reliance to spiritual resources in case of stress all being protective factors against psychological distress. The bio-psychosocial and spiritual model showed great significance in application to metal health in the study population. Spirituality and religiousness constituted the most significant dimension, followed by social and biological factors.**

Keywords: **Psychological distress, Depression, Bio-psychosocial, Spiritual, Mental Health.**

1. INTRODUCTION

Mental health problems are influenced by multiple domains of human experience, and may have intricate expressions and various impacts on biological, psychological and social and spiritual health of the patient [1], [2]. The most common forms of these expressions are psychosomatic disorders and stress-induced diseases such as ulcer, irritable bowel, cardiovascular diseases, and skin disorders. Many models have been developed to explain these correlations between psychological suffering and mental and physical disease [3], [4]. Neuro-psychobiology recently provided rational explanatory models for the pathophysiology in a number of diseases advocating central bio-molecular sensitization mechanisms in the genesis of these diseases [5].

Several patients with psychological suffering seek help in primary care either with psychiatric-like or somatic-like complaints [6]. The misdiagnosis of psychological disorders underlying somatic conditions can lead to over treating, physicians' exhaustion, over explorations and over utilization of healthcare resources often with poor therapeutic outcomes [4], [7], [8], [9]. Since its development in the 1970's, the bio-psychosocial model has become a widely used approach in both mental and physical healthcare. By its holistic and integrative approach, this model is based on the assessment of all patients' life components such as bio-physical, psychological, social, cultural and spiritual domains; which allows a global vision on the etiopathogenic mechanisms of the patient's complaint and guide appropriate management. Furthermore, the bio-psychosocial model has allowed developing practical semi structured patient intake frames to guide the physician throughout the patient's interview [10], [11].

2. AIM & RATIONALE

The present study provide an insight on the degree of correlation between different life domains (biophysical, psychological, social, cultural and spiritual) and their further impact on the overall, psychological well-being of a population of patients attending primary healthcare centers in Jeddah for various health problems.

This study will also investigate the prevalence of psychological distress including anxiodepressive syndromes in this population of patients and analyze determinants of the previously exposed domains as risk factors for stress, anxiety, and depression. Furthermore, correlation between healthcare utilization and anxiety and depression will be analyzed in the light of the previously exposed domains as risk factors. Finally, this study is conducted with an intention to promote the good clinical practice of comprehensive patient's interview among participating primary healthcare physicians, to improve patients' care, and healthcare service utilization.

3. METHODS

A cross-sectional study was conducted among adult patients (age >16 years) attending the Al mahjar primary healthcare center, Jeddah, Saudi Arabia during a 2-week period between 13 and 27 November 2016. The aims and objectives of the study were explained to all patients and the study was approved by the Medical Research and Studies Department of the Directorate of Health Affairs, Jeddah. Consenting patients were included through convenience sampling and a semi-structured, anonymous questionnaire was used to collect the following data:

1- Socio-demographic and economic data of the patients such as age, gender, residing area (urban/rural), educational level, etc.

2- Biophysical dimension assessment including physical heath factors such as medical, surgical and psychiatric history, body mass index (BMI), exercise, smoking, history of drug abuse, etc.

3- Social dimension assessment, such as quality of relationships with family members and friends calculated as social relationships quality score (0-100), satisfaction about intimate life (0-100), presence of family conflicts (yes/no), legal issues (yes/no), social isolation (yes/no), social activities (yes/no) etc.

4- Spiritual dimension assessment, such as compliance with religious duties, involvement in elective religious duties, satisfaction about spiritual achievements, and reliance to spiritual resources in case of stressful life events, etc.

5- Screening for psychological distress including anxiodepressive disorders using the Depression, Anxiety and Stress Scale (DASS) 21, a validated tool to measure the severity of a range of symptoms specific to depression, anxiety and stress [12].

6- Self-rated satisfaction scores (0-100) regarding different life domains including overall physical health, intimate life, overall social health and overall spiritual health;

7- Utilization of healthcare including average number annual visits to primary care provider, specialist, emergency room, hospital admissions, and complementary examinations.

This manuscript presented and analyzed DASS questionnaire outcomes in relation with the Depression part. Results regarding Anxiety and Stress parts will be presented and analyzed in a separate paper.

Statistical Methods:

Data was analyzed with the Statistical Package for Social Sciences version 21.0 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics were carried out to provide an insight on socio-demographic, economic and clinical data of the participants. Categorical variables were presented as frequencies (N) and percentages (%) and numerical variables as means (standard deviations [SD]). The different scores including overall physical health, social health, spiritual health, social relationships quality, and intimate life satisfaction scores were calculated as continuous variables. Depressive symptoms, the study primary outcome were categorized according to the DASS-21 scoring system into 5 levels of severity: normal (score 0-4), mild (5-6), moderate (7-10), severe (11-13), and extremely severe symptoms (14+) and presented as such in descriptive analysis. To analyze factors correlated with depressive symptoms, the DASS categories were grouped into three levels of severity as follows: normal (0-4), mild-to-moderate (5-10), and severe+ (11+). Factors calculated as categorical variables were analyzed using chi-square test and those calculated as continuous variables were analyzed using 1-way ANOVA. Binary logistic regression was carried out to analyze significant factors as predictors of psychological distress using the existence of depressive symptoms (DASS score ≥ 5; i.e. mild-to-extremely severe depressive symptoms) as the dependent variable; results were presented as odds-ratios (OR) [95%CI]. Statistical significance was set at p-value <0.05, and at 95% confidence interval (CI).

4. RESULTS

Demographic and clinical characteristics of the study population:

A total 182 patients were included; 71.4% males; mean±SD age=37.76±15.08 years; 58.2% married and 72.0% living in urban area. Majority were employed (61.5%); from low (40.1%) or average (31.3%) economic class, and highly educated (53.3%). Lifestyle and clinical factors showed a population with relatively low physical activity, 36.8% of active smokers, high prevalence of overweight (32.4%), and obesity (19.2%) and frequent comorbidities such as hypertension (32.4%), diabetes (30.8%), dyslipidemia (13.2%), ischemic heart disease (IHD; 7.1%) and 28.6% had ≥ 2 associated chronic conditions. A few reported that they have already tried cannabis (4.4%), alcohol (6.6%) or captagon (2.7%) use, while none declared currently using any of these substances. Demographic and clinical characters of the study population are presented in Table 1.

Table 1: Demographic and clinical characteristics of the population

Parameter	Category	Frequency	Percentage
Age(years)	Mean, SD [range=16; 82]	37.76	15.08
Gender	Male	130	71.4
	Female	52	28.6
Nationality	Saudi	161	87.9
	Non-Saudi	21	11.5
Marital Status	Single	61	33.5
	Married	106	58.2
	Divorced	10	5.5
	Widowed	5	2.7
Number of children	None	65	35.7
	1-3	53	29.1
	4+	60	33.0
Accommodation	Urban	131	72.0
	Rural or Bedouin	40	22.0
Monthly income (SAR)	<5,000	73	40.1
	5,000 – 10,000	57	31.3

Parameter	Category	Frequency	Percentage
	10,000 – 15,000	42	23.1
	>15,000	7	3.8
Occupation	Employed	112	61.5
	Housewife	21	11.5
	Unemployed	18	9.9
	Retired	17	9.3
	Student	14	7.7
Educational level	Illiterate	6	3.3
	Primary	12	6.6
	Secondary	46	25.3
	University+	97	53.3
Eating habits	Normal	128	70.3
	Healthy	26	14.3
	Unhealthy	24	13.2
Physical exercise	None	31	17.0
	Rare (<1/month)	53	29.1
	Moderate (=<1/week)	61	33.5
	Regular (>=2/week)	33	18.1
BMI (3 categories)	Under or normal	70	38.5
	Overweight	59	32.4
	Obese	35	19.2
Medical History	Hypertension	59	32.4
	Diabetes	56	30.8
	Dyslipidemia	24	13.2
	IHD	13	7.1
	Chronic pain	5	2.7
	Other‡	30	16.5
Number of chronic diseases	None	86	47.2
	1	44	24.2
	2+	52	28.6
Surgical history	**Total**	**35**	**19.2**
	Abdominal	9	4.9
	Orthopedic	8	4.4
	Cardiac	3	1.6
	Genital urinary	6	3.3
	Other	11	6.0
Smoking	Non-smoker	93	51.1
	Current smoker	67	36.8
	Ex-smoker	22	12.1
Other substance use (already tried)	Cannabis	8	4.4
	Alcohol	12	6.6
	Captagon	5	2.7
	Cocaine/heroin	0	0
Personal psychiatric history	Depression	17	9.3
	Anxiety	40	22.0

Parameter	Category	Frequency	Percentage
	Mood disorders	7	3.8
	Psychosis	3	1.6
	PTSD	3	1.6
	Other	1	0.5
Family psychiatric history	Depression	15	8.2
	Anxiety	13	7.1
	Mood disorders	1	0.5
	Psychosis	5	2.7
	PTSD	3	1.6
	Other	2	1.1
Some values do not sum up to the total indicated in the column heading because of missing data; ‡ COPD (1), migraine (3), renal failure (6), sickle cell anemia (4), allergy/asthma (5), hyperthyroidism (5), chronic sinusitis (2), unspecified (4); other surgeries: appendectomy (3); cesarean section (2); kidney transplantation (2); tonsillectomy (3); varicocele (1); PTSD: post-traumatic stress disorder;			

Assessment of psychological distress:

Assessment of psychological distress using DASS questionnaire showed 10.4% mild, 6.6% moderate, 6.6% severe, and 3.3% extremely severe depressive symptoms. Assessment of other psychological morbidities showed 13.1% and 5.4% cases of severe-to-extremely severe anxiety and stress, respectively. Parameters assessed during screening for psychological distress are presented in Table 2.

Table 2: Screening for depression, anxiety and stress symptoms using DASS questionnaire

Parameter	Severity (score)	Frequency	Percentage
Depression	Normal (0-4)	133	73.1
	Mild (5-6)	19	10.4
	Moderate (7-10)	12	6.6
	Severe (11-13)	12	6.6
	Extremely severe (14+)	6	3.3
Anxiety	Normal (0-3)	125	68.7
	Mild (4-5)	14	7.7
	Moderate (6-7)	19	10.4
	Severe (8-9)	9	4.9
	Extremely severe (10+)	15	8.2
Stress	Normal (0-7)	138	75.8
	Mild (8-9)	16	8.8
DASS = Depression Anxiety Stress Scale questionnaire.			

Factors associated with prevalence and severity of psychological distress:

Demographic factors associated with depressive symptoms severity were age and accommodation. Regarding age, patients with severe+ symptoms were older (mean±SD age=44.50±17.28 years) than those with mild to moderate symptoms (38.55±12.71 years) and those who had no significant depressive symptoms (36.66±15.13 years); p=0.000. Regarding accommodation, both mild to moderate (22.9% versus 2.5%) and severe to extremely severe (13.0% versus 0.0%) psychological distress were more prevalent among patients living in urban setting versus those living in rural settings (p=0.000). Other demographic factors including gender, marital status, number of children, economic status, occupation, and educational level were not significantly associated with prevalence or severity of psychological distress. Demographic factors correlated with depressive symptoms as screened using DASS questionnaire is presented in Table 3.

In biological dimension, severe depressive symptoms were more prevalent among overweight and obese (p=0.014), the patients who were exercising sometimes (p=0.002), current and ex-smokers (p=0.015), past users of illicit substance (p=0.000), patients with chronic diseases (p=0.000), patients with surgical history (p=0.000), and overall physical health satisfaction score decreased with psychological distress severity from mean±SD=84.17±11.98 to 68.33±14.95 (p=0.000)

(Table 3). Further analysis that are not presented in tables showed that chronic diseases including hypertension (p=0.000) and diabetes (p=0.034) were associated with higher prevalence and more severe cases of depressive symptoms; whereas other comorbidities including dyslipidemia (p=0.057); ischemic heart disease (p=0.612) or chronic pain (p=0.338) did not show any significant association.

In social dimension, severity of depressive symptoms was associated with decreased social relationships quality score (p=0.000) and was more prevalent in patients reporting major family conflicts (p=0.000), over indebtedness (p=0.000) and social isolation (p=0.000); while it was less prevalent in those reporting having regular social activities (p=0.000), hobbies (p=0.000) and those involved in volunteering or charitable actions (p=0.000). In addition, both satisfaction about intimate life (p=0.000) and overall social health satisfaction (p=0.000) scores decreased gradually with severity of depressive symptoms Social factors correlated with depressive symptoms as screened using DASS questionnaire is presented in Table 3.

In spiritual dimension, levels of compliance with religious duties (p=0.000), involvement in elective religious activities (p=0.001), living according to own beliefs (p=0.000), attitude towards bad life events (p=0.000), and reliance to spiritual resources in stressful life events (p=0.000) were significantly associated with decreased prevalence and severity of psychological distress. Overall spiritual health satisfaction score decreased with psychological distress severity from 87.56±9.84 to 65.28±23.73 (p=0.000). Spiritual dimension factors correlated with depressive symptoms as screened using DASS questionnaire in Table 3.

Table 3: Factors correlated with depressive symptoms as screened using DASS questionnaire

Factor	Category	Depressive symptoms severity						p-value
		Normal		Mild to moderate		Severe+		
		F.	%	F.	%	F.	%	
Demographic factors								
Age	Years, Mean (SD)	36.66	15.13	38.55	12.71	44.50	17.28	.000*
Gender	Male	96	73.8	24	18.5	10	7.7	.246
	Female	37	71.2	7	13.5	8	15.4	
Nationality	Saudi	118	73.3	26	16.1	17	10.6	.527
	Non-Saudi	15	71.4	5	23.8	1	4.8	
Marital status	Single	49	80.3	9	14.8	3	4.9	.115
	Married	76	71.7	19	17.9	11	10.4	
	Divorced	4	40.0	3	30.0	3	30.0	
	Widowed	4	80.0	0	0.0	1	20.0	
Number of children	0	52	80.0	10	15.4	3	4.6	.228
	1-3	39	73.6	9	17.0	5	9.4	
	4+	39	65.0	11	18.3	10	16.7	
Accommodation	Urban	84	64.1	30	22.9	17	13.0	.000*
	Rural	39	97.5	1	2.5	0	0.0	
Monthly income (SAR)	<5K	54	74.0	11	15.1	8	11.0	.489
	5K – 10K	37	64.9	13	22.8	7	12.3	
	10K-15K	35	83.3	5	11.9	2	4.8	
	>15K	4	57.1	2	28.6	1	14.3	
Occupation	Employed	80	71.4	23	20.5	9	8.0	.597
	Housewife	15	71.4	2	9.5	4	19.0	
	Unemployed	13	72.2	2	11.1	3	16.7	
	Retired	13	76.5	3	17.6	1	5.9	
	Student	12	85.7	1	7.1	1	7.1	

Factor	Category	Depressive symptoms severity						p-value
		Normal		Mild to moderate		Severe+		
		F.	%	F.	%	F.	%	
Educational level	Illiterate	4	66.7	0	0.0	2	33.3	.298
	Primary	8	66.7	2	16.7	2	16.7	
	Secondary	37	80.4	6	13.0	3	6.5	
	University+	66	68.0	21	21.6	10	10.3	
Biological dimension factors								
BMI	Normal	59	84.3	9	12.9	2	2.9	.014*
	Overweight	36	61.0	13	22.0	10	16.9	
	Obese	21	60.0	8	22.9	6	17.1	
Exercise	None	25	80.6	2	6.5	4	12.9	.002*
	Rarely	44	83.0	7	13.2	2	3.8	
	Sometimes	32	52.5	18	29.5	11	18.0	
	Regularly	28	84.8	4	12.1	1	3.0	
Smoking	Non-smoker	78	83.9	8	8.6	7	7.5	.015*
	Current	41	61.2	18	26.9	8	11.9	
	Ex-smoker	14	63.6	5	22.7	3	13.6	
History of illicit substance use	No	127	75.6	23	13.7	18	10.7	.000*
	Yes	6	42.9	8	57.1	0	0.0	
Eating habits	Normal	91	71.1	23	18.0	14	10.9	.479
	Healthy	21	80.8	2	7.7	3	11.5	
	Unhealthy	17	70.8	6	25.0	1	4.2	
Chronic disease	None	77	89.5	8	9.3	1	1.2	.000*
	1	26	59.1	11	25.0	7	15.9	
	2 or more	30	57.7	12	23.1	10	19.2	
Surgical history	No	127	75.6	23	13.7	18	10.7	.000*
	Yes	6	42.9	8	57.1	0	0.0	
Family psychiatric history	No	121	75.2	26	16.1	14	8.7	.129
	Yes	11	55.0	5	25.0	4	20.0	
Overall physical health satisfaction	Mean, SD	84.17	11.98	75.65	18.15	68.33	14.95	.000*
Social dimension factors								
Social relationships quality score (SRQS)	Mean, SD	86.40	13.51	68.65	11.87	59.20	15.06	.000*
Legal issues	No	125	72.7	30	17.4	17	9.9	.885
	Yes	7	77.8	1	11.1	1	11.1	
Major family conflict	No	112	84.8	17	12.9	3	2.3	.000*
	Yes	20	40.8	14	28.6	15	30.6	
Over-indebtedness	No	127	80.9	22	14.0	8	5.1	.000*
	Yes	5	20.8	9	37.5	10	41.7	
Social isolation	No	131	74.9	30	17.1	14	8.0	.000*
	Yes	1	16.7	1	16.7	4	77.6	
Social activities	No	49	60.5	17	21.0	15	18.5	.000*
	Yes	83	83.0	14	14.0	3	3.0	
Hobbies	No	39	54.2	18	25.0	15	20.8	.000*

Factor	Category	Depressive symptoms severity						p-value
		Normal		Mild to moderate		Severe+		
		F.	%	F.	%	F.	%	
	Yes	93	85.3	13	11.9	3	2.8	
Volunteering/ charitable actions	No	52	59.8	18	20.7	17	19.5	.000*
	Yes	80	85.1	13	13.8	1	1.1	
Intimate life satisfaction	Mean, SD	80.15	22.02	65.00	23.70	49.17	23.02	.000*
Overall social health satisfaction	Mean, SD	86.42	10.87	79.19	15.01	61.94	21.36	.000*
Spiritual dimension factors								
Compliance with religious duties	Poor	1	16.7	2	33.3	3	50.0	.000*
	Moderate	29	55.8	13	25.0	10	19.2	
	Good	103	83.1	16	12.9	5	4.0	
Involvement in elective religious activities	Poor	6	54.5	3	27.3	2	18.2	.001*
	Moderate	34	57.6	13	22.0	12	20.3	
	Good	93	83.8	14	12.6	4	3.6	
Living according to own beliefs (satisfaction)	Unsatisfied	3	42.9	3	42.9	1	14.3	.000*
	Moderate	35	53.0	17	25.8	14	21.2	
	Satisfied	94	87.9	10	9.3	3	2.8	
Attitude towards bad life events	Non-acceptance	19	45.2	12	28.6	11	26.2	.000*
	Relative acceptance	37	66.1	12	21.4	7	12.5	
	Resilience	77	92.8	6	7.2	0	0.0	
Reliance to spiritual resources in stress	Rarely	20	46.5	11	25.6	12	27.9	.000*
	Sometimes	32	62.7	14	27.5	5	9.8	
	Always	81	93.1	5	5.7	1	1.1	
Overall spiritual health satisfaction	Mean, SD	87.56	9.84	76.77	17.01	65.28	23.73	.000*
Self-assessed quality of life dimensions (scores)								
Physical health	Mean, SD	84.17	11.98	75.65	18.15	68.33	14.95	.000*
Psychological health	Mean, SD	83.99	11.22	75.81	16.84	60.0	13.72	.000*
Social life	Mean, SD	86.42	10.87	79.19	15.01	61.94	21.36	.000*
Intimate life	Mean, SD	80.15	22.02	65.00	23.70	49.17	23.02	.000*
Spiritual achievement	Mean, SD	87.56	9.84	76.77	17.01	65.28	23.73	.000*
* Statistically significant result (P<0.05); some values do not sum up to the total indicated in the column heading because of missing data; SRS: social relationships score;								

Predictors of psychological distress:

Living in urban setting (OR=21.82; p=0.003) was the only significant demographic predictor of psychological distress; while being overweight (OR=3.43; p=0.004) or obese (OR=3.58; p=0.007); irregular exercise practicing (OR=5.08; p=0.003); smoking (OR=3.30; p=0.002); having a history of illicit substance use (OR=4.13; p=0.013); having one (5.92; p=0.000) or more chronic diseases (OR=6.27; p=0.000); and lowly rated overall health satisfaction (OR=0.95; p=0.000) are demographic and clinical factors that predicted psychological distress. Predictors of psychological distress depressive symptoms (binary logistic regression; dependent variable=existence of depressive symptoms [DASS-Depression score ≥5]) is presented in Table 4.

Social predictors of psychological distress included poor social relationships quality (OR=0.90; p=0.000); major family conflicts (OR=8.12; 0.000), over-indebtedness (OR=16.09; p=0.000), social isolation (p=14.89; p=0.015); social activities

(OR=0.31; p=0.001); hobbies (OR=0.20; p=0.000) and volunteering in charitable activities (OR=0.26; p=0.000). Both intimate life satisfaction (OR=0.97; p=0.000) and overall social health satisfaction (OR=0.94; p=0.000) scores were predictors of psychological distress. Social predictors of depressive symptoms (binary logistic regression; dependent variable=existence of depressive symptoms [DASS-Depression score ≥5]) is presented in Table 4.

All spiritual factors that were including good compliance with religious duties (OR=0.04; p=0.004); diligence with elective religious activities (OR=0.23; p=0.027); living satisfactorily in accordance with own beliefs (OR=0.10; p=0.006); resilient attitude towards bad life events (OR=0.06; 0.000) and regular reliance to spiritual resources in case of stress (OR=0.006; p=0.000) are significant predictors of psychological distress. Spiritual predictors of depressive symptoms (binary logistic regression; dependent variable=existence of depressive symptoms [DASS-Depression score ≥5]) is presented in Table 4.

Table 4: Demographic, biological, social and spiritual predictors of depressive symptoms (binary logistic regression; dependent variable=existence of depressive symptoms [DASS-Depression score ≥5])

Predictor	Category	OR	95% CI		p-value
			Min.	Max.	
Demographic factors					
Age	(Years)	1.02	1.00	1.04	.108
Accommodation	Urban	21.82	2.90	163.97	.003*
	Rural (*ref*)	-	-	-	-
Biological dimension factors					
BMI	Normal (*ref*)	-	-	-	.006*
	Overweight	3.43	1.50	7.86	.004*
	Obese	3.58	1.41	9.10	.007*
Exercise	None	1.34	.365	4.95	.657
	Rarely	1.15	0.35	3.77	.823
	Sometimes	5.08	1.73	14.89	.003*
	Regularly (*ref*)	-	-	-	.001*
Smoking	Non-smoker (*ref*)	-	-	-	.005*
	Current	3.30	1.57	6.91	.002*
	Ex-smoker	2.97	1.06	8.32	.038*
History of illicit substance use	No (*ref*)	-	-	-	-
	Yes	4.13	1.35	12.60	.013*
Chronic disease	None (*ref*)	-	-	-	.000*
	1	5.92	2.37	14.79	.000*
	2 or more	6.27	2.60	15.17	.000*
Surgical history	No (*ref*)	-	-	-	-
	Yes	2.91	1.35	6.28	.007*
Family psychiatric history	No (*ref*)	-	-	-	-
	Yes	2.48	0.96	6.40	.062
Overall physical health satisfaction	Score (0-100)	0.95	0.92	0.97	.000*
Social dimension factors					
Social relationships quality score (SRQS)	Score (0-100)	0.90	0.86	0.93	.000*
Major family conflict	No (*ref*)	-	-	-	-
	Yes	8.12	3.87	17.06	.000*
Over-indebtedness	No (*ref*)	-	-	-	-
	Yes	16.09	5.56	46.55	.000*
Social isolation	No (*ref*)	-	-	-	-
	Yes	14.89	1.69	130.91	.015*
Social activities	No (*ref*)	-	-	-	-
	Yes	0.31	0.16	0.62	.001*
Hobbies	No (*ref*)	-	-	-	-
	Yes	0.20	0.10	0.41	.000*

Volunteering/ charitable actions	No (*ref*)	-	-	-	-
	Yes	0.26	0.13	0.53	.000*
Intimate life satisfaction	Score (0-100)	0.97	0.95	0.98	.000*
Overall social health satisfaction	Score (0-100)	0.94	0.92	0.96	.000*
OR: Odds-ratio; 95%CI confidence interval; *ref*: reference category; * statistically significant result (p<0.05).					

5.   DISCUSSION

This study is an application of the bio-psychosocial and spiritual model, which highlighted its intricate and intimate correlation with psychological distress among patients attending PHCs. Both the presence and severity of anxiodepressive symptoms were associated with various aspects of physical, social and spiritual life domains emphasizing the role of daily life stressors and coping strategies in determining the mental health of individuals.

Discussing spiritual dimension:

Spiritual dimension had the greatest contribution in psychological distress, with regards to the number of significant factors and within the limit of the factors explored. Compliance with religious duties such as prayer, Ramadan fasting and mandatory alms etc. in addition to diligence with elective religious activities such as reading Quran, voluntary alms, prayer etc. revealed to be protective factors against psychological distress as they showed strongly inversed correlation with the presence of depressive symptoms. Furthermore, living according to own beliefs, which reflects spiritual well-being; having a resilient attitude towards bad life events and reliance to spiritual resources in case of stressful events were all associated with reduced prevalence and severity of depressive symptoms and were predictive of good mental health in regression analysis. The importance of religiousness and spiritual support and their effectiveness in fighting against psychological distress are demonstrated in several cultures and clinical conditions.

A population-based study by Abu-Raiya et al. demonstrated great impact of religiousness on individuals' well-being and mental health, showing differential effects of 4 aspects of spirituality including religious commitments, life sanctification, religious support and religious hope on happiness and depression [13], [14]. Another study by Salmoirago-Blotcher et al. assessed the impact of spiritual well-being on psychological distress among patients with implantable cardioverter defibrillators whose prognosis is particularly compromised by mental condition. Authors used the Functional Assessment of Chronic Illness Therapy-Spiritual Well Being (FACIT-SWB) instrument to measure spiritual well-being and the Hospital Anxiety and Depression Scale (HADS) to measure psychological distress and demonstrated a positive effect of religiousness in reducing psychological distress in these patients [15]. Another study conducted among caregivers of cancer patients showed an inverse relationship between attendance to religious service and depression and concluded that religious services could be used in prevention for depression [16].

On the other hand, other data suggest that deviating from religious standards is associated with psychological distress including depression, anxiety, and stress [17]; which is line with our finding emphasizing that religious achievement is a determinant of good mental health as it protects against psychological distress. Another study conducted in adolescents demonstrated a preventive effect of religious activities attendance against depression along with enhanced self-efficacy [18]. However, some studies reported opposing observations. For example, a study from Taiwan reported data highlighting increased psychological distress in relation with local supernatural religious beliefs and activities, and decreased distress in relation with daily prayer [19]. These conflicting observations may underline cultural specifications that justify differential impact on mental health as they may be the results of methodological differences between the studies. In the local religion and spirituality system, dimension of hope and resilience are based on great certainty on the hereafter and complete acceptance of God's will, a factor that is highly protective against depression, anxiety and stress and consequent psychological disorders [20]. This emphasizes the importance of investigating spiritual distress in patients suffering from depression and may encourage the inclusion of spiritual support in PHCs, especially in a conservative society like Saudi Arabia.

Discussing social dimension:

Social dimension factors were the second most significant determinants of mental health. In the conservative, family-centered society of Saudi Arabia, family constitutes the major social support of patients. This explains the results showing that poor quality of social relationships with relatives, friends, and colleagues and major family conflicts are predictive of psychological distress. Conflictual social relationships both in family and work circle are known to be significant risk factors for depression and poor mental health and are associated with high stress perception and substance use [21], [22], [23]. Other negative factors included social isolation and over-indebtedness. Social isolation and loneliness are not only

known to be independent factors of depression, but are also associated with increased morbidity and mortality by the means of neuroendocrine, neurobiological, and genetic mechanisms [24], [25]. A study from Germany demonstrated a high prevalence of mental disorders among persons experiencing financial issues and over-indebtedness, especially those perceiving it as a threat [26]. Another study reported 4-fold increase in the prevalence of back pain among over-indebted people, by comparison to general population; which is probably associated to psychosomatic mechanism [27]. On the other hand, active social contributions such as hobbies, charitable actions, and various social activities were protective factors against psychological distress. These observations highlight the importance of social assessment especially in patients with depressive symptoms and the implementation of social support to help individual with adverse or impaired social resources.

Discussing biological dimension:

Biological determinants of mental health included BMI, exercise, smoking, history of illicit substance use, chronic diseases and surgical history. Regarding BMI, overweight and obese patients were more prone to psychological distress compared to those with normal BMI. Several studies showed the association between obesity and depression and demonstrated the effect of BMI on depression outcomes and on the efficacy of antidepressant treatments [28]. Furthermore, some data suggest a genetic association between obesity and depression [29]. Regarding exercise, patients who practiced exercise in low frequency were more likely to develop psychological distress (OR=5.08) as compared to rarely exercisers (OR=1.15) or non-exercisers (OR=1.34) with reference to those who perform exercise regularly. This paradoxical effect can be explained by self-induced stress related to high expectations on the effect of exercise [30], which may be particularly observed in obese or diabetic patients who are required to practice exercise as part of their treatment. In addition, depression is generally associated with a sedentary lifestyle with low energy expenditure [31], [32]. On the other hand, regular (3 to 4-time per week) exercise was demonstrated to be a positive factor for psychological well-being among different categories of patients. It is highly recommended for the prevention and treatment of psychological distress including depressive disorders [33], [34], [35]. Patients with chronic conditions such as diabetes and hypertension as well as those with multiple pathological conditions were more prone to psychological distress and severe form of depressive symptoms as demonstrated by our results. In accordance with our results, review of literature shows that depression is associated with all type of chronic diseases; with some evidence of interrelated outcomes where improvement of depressive disorders contributes to better disease outcomes and inversely [36]. Other studies showed that multiple chronic pathology represents an odd risk of psychological distress [37]. Such observations attract the attention of the clinician to the necessity to screen for depressive disorders in patients with burdensome medical and surgical history as the early detection and management of depression are crucial factors of therapeutic success.

The results of this study support the relevance of using the bio-psychosocial and spiritual model in psychological morbidity including depressive symptoms and encourage the applicability of this model in defining preventive and therapeutic measures against depression in a specific population, especially specific social and cultural aspects. In the conservative, religion-oriented and family-centered society of Saudi Arabia, factors related to spiritual and social dimensions were the most significant determinants of mental health. This emphasizes the importance of developing an integrative, population-specific clinical approach in the early screening, prevention and treatment of psychological disorders. Further targeted spiritual and psychosocial intervention could be designed and clinically tested.

Limitations:

The major limitation of this study is demographic results showing obvious underrepresentation of the female gender, which indicates the existence of a selection bias.

6. CONCLUSION

The biopsychosocial and spiritual model showed great significance in application to mental health in the study population. Spirituality and religiousness accounted to be the most significant determinants of mental health. Satisfactory spiritual and religious achievement were inversely associated with psychological distress. Social dimension factors were the second most significant determinants showing the importance of the quality of social environment in the studied population. There is a need to develop an integrative, population-specific clinical approach in the early screening, prevention and treatment of psychological disorders based on biopsychosocial and spiritual model. Further targeted spiritual and psychosocial intervention could be designed and clinically tested.

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