

# Depression and anxiety among hypertensive and diabetic primary health care patients

## Could patients' perception of their diseases control be used as a screening tool?

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### ABSTRACT

**الأهداف:** قياس وتيرة وتحديد عوامل الخطر من الاكتئاب والقلق بين مرضى السكري وارتفاع ضغط الدم لدى مرضى الرعاية الصحية الأولية. ولتقييم ما إذا كان تصور المرضى في السيطرة على امراضهم المزمنة واضطرابات النوم يمكن أن تكون بمثابة أدوات فحص للاكتئاب والقلق.

**الطريقة:** أجريت هذه الدراسة المستعرضة على 368 مريضاً من مرضى الرعاية الصحية الأولية في مدينة الخبر بالمملكة العربية السعودية في الفترة الممتدة ما بين أبريل ومايو 2015. واستُخدم استبيان صحة المريض 9 واضطراب القلق العام 7 كأدوات تشخيصية للاكتئاب والقلق.

**النتائج:** تم إجراء الترددات والتبويب المتقاطع واختبارات الانحدار اللوجستي. كان تصور المريض عن السيطرة على الأمراض المزمنة مرتبطاً بشكل كبير مع وجود الاكتئاب والقلق في حين لم يظهر في الأمراض المتخبره (اختبار الهيموغلوبين الغليكوزيلاتي >7% و ضغط الدم >140/90 ملم زئبق) لاضطراب النوم خصوصية عالية (98.9%) في الكشف عن الاكتئاب وكان الانتشار الكلي للاكتئاب أو القلق 57.3% وكانت الحالات التي كُشف عنها 23%. ويشكل الاكتئاب 48.7% (25.1% خفيف، 7.1% معتدل، 1.8% شديد). ويشكل القلق 38.4% (25.1% خفيف، 8.8% معتدل، 4.4% شديد). وكان تواجد كلا من الاضطرابات 29.5%. كان لاضطراب النوم وتغير الوزن وانخفاض الدخل تأثير كبير مستقل على الاكتئاب والقلق.

**الخاتمة:** يمكن استبعاد 98.9% من حالات الاكتئاب والقلق عند غياب وجود اضطرابات في النوم. ينبغي النظر في مشاعر المريض في خطط الرعاية الصحية للأمراض المزمنة. الاكتئاب أو القلق لدى مرضى السكري وارتفاع ضغط الدم لديهم معدلات اعتلال عالية ولكن مع انخفاض معدل الكشف.

**Objectives:** To measure the frequency and identify risk factors of depression and anxiety among diabetic and hypertensive primary health care (PHC) patients. Also to assess whether patients' perception of their chronic diseases control and sleep disturbance could serve as screening tools for depression and anxiety.

**Methods:** This cross-sectional study of 368 PHC patients was conducted in AlKhubar city, Kingdom of Saudi Arabia between April and May 2015. Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7 were used as diagnostic tools for depression and anxiety.

**Results:** Frequencies, cross-tabulations and logistic regression tests were performed. Patient's perception of chronic diseases control was significantly associated with the presence of depression and anxiety, while it was not seen in the tested disease control (glycated hemoglobin <7% and blood pressure <140/90 mm Hg). Sleep disturbance has a high specificity (98.9%) in screening for depression. Overall prevalence of depression or anxiety was 57.3% and detected cases was 23%. Depression comprise 48.7% (39.8% mild, 7.1% moderate, 1.8% severe). Anxiety comprise 38.4% (25.1% mild, 8.8% moderate, 4.4% severe). Co-existence of both disorders was 29.5%. Sleep disturbance, weight change, and low income had an independent significant effect on depression and anxiety.

**Conclusion:** Having no sleep disturbance can rule out 98.9% of depression and anxiety cases. Patient's feelings should be considered in chronic diseases health care plans. Depression or anxiety among diabetic and hypertensive patients have a high morbidity, but with low detection rate.

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Mental health problems including depression and anxiety have high prevalence worldwide. According to a World Health Organization (WHO) and World Organisation of Family Doctors (WONCA) report in 2008;<sup>1</sup> the prevalence rate is 60% among primary health care (PHC) patients with a marked defect in detection of these disorders by PHC doctors. In Saudi Arabia, the prevalence of depression reaches up to 50% in outpatient clinics.<sup>2</sup> The burden of chronic diseases is rising globally. The prevalence of diabetes has doubled during the last 3 decades from 4.7% in 1980 to 8.5% in 2014.<sup>3</sup> In Kingdom of Saudi Arabia (KSA), according to a community-based survey in Jeddah 2015, type 2 diabetes mellitus (T2DM) increased to 18.3% in the general population and reached 46% among males aged 50 years and above.<sup>4</sup> In a national survey in 2013, the estimated prevalence of hypertension (HTN) was 15.2% of the Saudi population above 15 years old.<sup>5</sup> Diabetic or hypertensive patients have a high risk to develop mental disorders such as depression and/or anxiety.<sup>6</sup> The co-occurrence and the impact of psychological and psychosocial issues on physical illness, particularly diabetes and HTN, are challenging in diagnosis and management.<sup>6</sup> Almost half (49.6%) of diabetics in hospital out-patient clinics in KSA<sup>7</sup> and two-thirds (66.7%) of hypertensive PHC patients in Makkah Al-Mukarramah, KSA<sup>8</sup> were depressed. Depression and anxiety were proved to have an association with increased risk of dying from several major illnesses.<sup>9</sup> Association between depression and chronic diseases has been explained as cause and effect type.<sup>10</sup> The concept of perceived control is basically related to an individual's expectations whether he/she has any control over the issue under focus.<sup>11</sup> Patients' perceptions of their disease control in this study means the patient's feelings and internal belief as to whether their disease is under control or not. A patient's acceptance of his/her illness has a positive impact. It helps in playing an active role in disease control and decreases the burden on emotions. A good perception of the disease depends on its severity and strong feelings of a good outcome.<sup>12</sup> This study aimed to assess the frequency and severity of depression and anxiety and identify the risk factors among chronic disease patients. The study also tests whether sleep disturbance and

patients' perception of their chronic diseases control could serve as simple screening tools for depression and anxiety.

### **Methods.** *Study setting and sampling procedure.*

This cross-sectional study targeted all diabetic and/or hypertensive patients registered at all Ministry of Health's chronic diseases clinics (n=10) in Alkhobar city, KSA. Data was collected between April and May 2015. The inclusion criteria were hypertensive and diabetic adult patients 18 years and above, all diabetic patients regardless of their diabetes type, whether type I or type II. Based on the proportion of registered patients in each clinic, a random sample of 388 patients was invited to participate.

*Assessment of depression and anxiety.* Patient Health Questionnaire-9 (PHQ-9)<sup>13</sup> and Generalized Anxiety Disorder-7 (GAD-7)<sup>14</sup> were used as diagnostic tools for depression and anxiety. The WHO Clinical Criteria was used for Metabolic Syndrome (MS) assessment.<sup>15</sup>

*Data collection.* Two methods were used. First, a self-administered questionnaire, which included socio-demographic information, information regarding the chronic disease, life style, PHQ-9, and GAD-7. Second; medical records/files review for patients who filled out the questionnaire to gather general information regarding respondents (weight, height, blood pressure [BP]), laboratory tests profile (during last 6 months), complications and treatments. Administrative permission as well as Institutional Review Board approvals were obtained from the Ministry of Health, Eastern Province, Al-Khobar, KSA. Informed consent was obtained from all participants.

*Statistical analysis.* The collected data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) version 17. Univariate analysis to test the associated factors was performed. Crude odds ratios (OR), 95% confidence interval (CI) were mentioned and *p*-values of 0.05 was used as a level of statistical significance. Multiple logistic regressions were performed to evaluate the combined effect of factors associated with depression, anxiety, and the co-morbidity of both. For variables found to be associated in the Univariate analysis, the independent associations of each variable when controlling for others were evaluated.

**Results.** Out of the 388 patients invited, 368 patients completed the questionnaire with a response rate of 94.8%. Females comprised 51.4% (n=189). Most of them were from the upper middle age

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group (41-60 years) constituting 65.6%. The mean age was 50.9 ± 11.7 years. More than one third of responding patients (36.1%) have diabetes mellitus (DM) without HTN, 22.6% have HTN without DM; while the rest (41.3%) have both DM and HTN.

Socio-demographic characteristics and clinical information are illustrated in Table 1. Most of the diabetic and hypertensive patients felt that their blood sugar and blood pressure were controlled.

Table 2 illustrates the frequencies of chronic illnesses and co-morbidities. Depression and/or anxiety was found in 57.3% (n=200). Of this, 46 (23%) were previously diagnosed, 17 (4.7%) have depression, and 29 (7.9%) have anxiety. The prevalence of depression was 48.7% (mild 81.2%, moderate 14.5%, severe 4.3%). The prevalence of anxiety was 38.4% (mild 65.5%, moderate 23%, severe 11.5%). Patients with co-morbidity of both disorders were 104 (29.5%).

Table 3 summarized the association of several sociodemographic and clinical factors with depression, anxiety, and comorbidity. The prevalence of depression was high with significant difference between women and men ( $p>0.001$ ). Age group showed more in age of 30-40 years (66.7%), 41-60 years (50.9%), and other age groups (33.3%) ( $p=0.018$ ). Depression has high prevalence with significant differences among those who have: sleep disturbance, increased weight, compared with decreased, interrupted or no regular physical activity ( $p=0.013$ ); not complying with their diet ( $p=0.012$ ), obesity ( $p=0.033$ ), family history of DM, HTN, or psychological disorders.

Table 4 summarized the results of perceived and tested control of DM and HTN associated with depression, anxiety, and comorbidity. Patients with perceive or feel that their DM is uncontrolled had a significantly higher prevalence rate of depression than those who feel controlled cases. While no significant difference was found between those who have tested blood sugar levels controlled 50 (45.9%), or not 84 (48.6%) ( $p=0.658$ ). In the same manner, those who feel their BP is uncontrolled have a significantly higher prevalence rate of depression 40 (76.9%) as compared with those who feel their BP is controlled 73 (44.0%) ( $p>0.000$ , OR: 4.24). No significant difference was found between those who have a measured BP as being controlled or not, 106 (48.6%), 57 (48.7%), ( $p= 1.0$ ) as shown in Table 4.

Multiple logistic regression analysis was performed for variables significantly associated with depression, anxiety and the coexistence of both. For depression, sleep disturbance and weight change have significant

effect ( $p=0.012$ , .011,  $R^2 = 0.475$ ). Approximately 47.5% of the variation on depression disorder has been explained by sleep disturbance and change in weight.

For anxiety, low income has a significant effect ( $p=0.045$ ,  $R^2: 0.295$ ); we found, that approximately

**Table 1 -** Socio-demographic and clinical features of 388 diabetic and/or hypertensive patients.

Characteristics	n (%)
<b>Gender</b>	
Male	179 (48.6)
Female	189 (51.4)
<b>Age group</b>	
18-30	23 (6.4)
31-40	37 (10.3)
41-60	236 (65.6)
> 60	64 (17.7)
<b>Body mass index</b>	
<24	33 (9.5)
24 - <30	100 (28.6)
≥ 30	216 (61.9)
<b>Family history of hypertension</b>	
Yes	237 (64.9)
No	114 (31.3)
Not sure	14 (3.8)
<b>Family history of diabetes mellitus</b>	
Yes	261 (71.9)
No	94 (25.9)
Not sure	8 (2.2)
<b>Diagnosed mental health problem</b>	
No	318 (87.1)
Depression	17 (4.7)
Anxiety	29 (7.9)
Other	1(3)
<b>Physical activity</b>	
Regular	103 (29.1)
Interrupted	182 (51.4)
No Activity	69 (19.5)
<b>Diet control</b>	
No	77 (21.3)
Sometimes	111 (30.8)
Most of time	91 (25.2)
Full	82 (22.7)
<b>Sleeping disturbance</b>	
Yes	87 (24.1)
No	274 (75.9)
<b>Perceived diabetes mellitus control</b>	
Controlled	178 (64.5)
Not controlled	98 (35.5)
<b>Perceived hypertension control</b>	
Yes	180 (75.6)
No	58 (24.4)
<b>Diabetes mellitus control</b>	
Controlled (HbA1c <7)	123 (39.5)
Not controlled (HbA1c ≥ 7)	188 (60.5)
<b>Hypertension control (BP &gt;140/90 mm Hg)</b>	
Yes	124 (53.7)
No	107 (46.3)

BP - blood pressure, HbA1c - glycated hemoglobin

**Table 2** - Frequencies of chronic illnesses and co-morbidities.

Characteristics (disease)	Frequency (%)
<i>DM without HTN</i>	
Yes	133 (36.1)
No	235 (63.9)
<i>HTN without DM</i>	
Yes	83 (22.6)
No	285 (77.4)
<i>DM and HTN</i>	
Yes	152 (41.3)
No	216 (58.7)
<i>Metabolic syndrome</i>	
Yes	140 (38.8)
No	221 (61.2)
<i>Depression</i>	
Yes	165 (48.7)
No	174 (51.3)
<i>Anxiety</i>	
Yes	139 (38.4)
No	223 (61.6)
<i>Depression and Anxiety</i>	
Yes	104 (29.5)
No	248 (70.5)
<i>Depression and/or Anxiety</i>	
Yes	200 (57.3)
No	149 (42.7)

DM - diabetes mellitus, HTN - hypertension

29.5% of the variation in anxiety has been explained by low income. For the co-existence of depression and anxiety, also sleep difficulty and weight change have a significant effect ( $p=0.039$ ,  $p=0.026$ ,  $R^2: 0.46$ ), that means approximately 46.3% of the comorbidity can be explained by sleep difficulty and increased weight.

Table 5 summarized the sensitivity and specificity of sleep disturbance and chronic diseases control perception in detecting depression and anxiety.

**Discussion.** In this study, DM and HTN were affecting those early toward the middle age, which is also supported by Suastika et al study.<sup>16</sup> This finding is an alarming sign and reflects the demographic shift of the problem towards younger people. Family history of psychological problems among study participants is low (11.3%) comparing with DM (71.9%) and HTN (64.9%). A plausible explanation could be the social stigma which makes health providers avoid asking patients on their family history of mental illnesses.<sup>17</sup>

The percentage of diabetic patients who have adequate glycemic control was 39.5%, higher than what was cited in a 2014 national survey

**Table 3** - Factors associated with depression, anxiety, and comorbidity of depression and anxiety.

Characteristics	Had depression n (%)	Depression		Had anxiety n (%)	Anxiety		Depression and anxiety		
		P-value	OR (95% CI)		P-value	OR (95% CI)	Had depression & anxiety n (%)	P-value	OR (95% CI)
<i>Gender</i>									
Male	63 (37.3)	0.000	2.56 (1.65 - 3.99)	57 (32.2)	0.010	1.70 (1.11 - 2.62)	41 (23.6)	0.010	1.78 (1.12 - 2.850)
Female	99 (60.4)			80 (44.7)			61 (35.5)		
<i>Physical activity</i>									
Regular	34 (37.0)	0.013		32 (31.7)	0.165		21 (21.4)	0.074	
Interrupted	88 (53.0)			74 (42.0)			58 (33.9)		
No Activity	37 (58.7)			29 (43.9)			22 (34.4)		
<i>Sleep disturbance</i>									
Yes	80 (97.6)	0.000	2.95 (2.47 - 3.52)	54 (63.5)	0.000	2.05 (1.61 - 2.61)	84 (97.7)	0.000	2.23 (1.93 - 2.56)
No	85 (33.1)			84 (31.0)			115 (78.2)		
<i>Weight change</i>									
No	56 (36.4)	0.000		47 (28.7)	0.002		32 (19.9)	0.001	
Increase	77 (63.1)			63 (48.5)			51 (40.5)		
Decrease	26 (51.0)			24 (43.6)			17 (32.1)		
<i>Diabetes mellitus family history</i>									
Yes	132 (55.2)	0.001		107 (42.1)	0.040		85 (34.3)	0.003	
No	25 (30.5)			24 (27.0)			13 (15.1)		
Not sure	4 (50.0)			3 (37.5)			3 (37.5)		
<i>Hypertension family history</i>									
Yes	119 (55.1)	0.000		97 (42.4)	0.029		74 (33.2)	0.004	
No	33 (32.7)			32 (28.8)			20 (18.7)		
Not sure	9 (69.2)			7 (53.8)			7 (53.8)		

OR - odds ratio, 95% CI - confidence interval

**Table 4 -** Results of perceived and tested control of diabetes mellitus (DM) & hypertension association with depression, anxiety and their comorbidity.

variables	Depression			Anxiety			Depression and anxiety		
	Had depression n (%)	P-value	OR (95% CI)	Had anxiety n (%)	P-value	OR (95% CI)	Had depression & anxiety n (%)	P-value	OR (95% CI)
<i>Perceived DM control</i>									
Yes	64 (39.3)	0.000	2.684 (1.586 - 4.543)	56 (32.4)	0.012	1.922 (1.152 - 3.206)	37 (21.8)	0.001	2.549 (1.473 - 4.412)
No	59 (63.4)			46 (47.9)			39 (41.5)		
<i>Diabetes mellitus control test (HbA1c&lt;7)</i>									
Yes	50 (45.9)	0.658	1.114 (0.690 - 1.800)	43 (36.8)	0.637	1.122 (0.696 - 1.808)	34 (29.3)	0.875	1.042 (0.625 - 1.738)
No	85 (48.6)			73 (39.5)			54 (30.2)		
<i>Perceived hypertension control</i>									
Yes	73 (44.0)	0.000	4.24 (2.079 - 8.674)	61 (35.5)	0.008	2.329 (1.266 - 4.284)	43 (25.3)	0.002	2.844 (1.500 - 5.394)
No	40 (76.9)			32 (56.1)			26 (49.1)		
<i>Measured hypertension control (blood pressure &lt;140/90 mm Hg)</i>									
Yes	57 (48.7)	1.00	0.996 (0.636 - 1.56)	55 (43.3)	0.139	0.707 (0.454 - 1.101)	41 (33.3)	0.268	0.744 (0.462 - 1.198)
No	106 (48.6)			81 (35.1)			61 (27.1)		

OR - odds ratio, 95% CI - 95% confidence interval, HbA1c - glycated hemoglobin

**Table 5 -** Sensitivity and specificity of sleep disturbance and chronic diseases control perception in detecting depression and anxiety.

Variables	Have depression			Have anxiety			Depression and/or anxiety		
	Yes	No	Total	Yes	No	Total	Yes	No	Total
<i>Sleep disturbance</i>									
Yes	80	2	82	54	31	85	84	2	86
No	85	172	257	84	187	271	115	147	262
Total	165	174	339	138	218	356	199	149	348
Sensitivity		48.5%			39.3%			42.2%	
Specificity		98.9%			85.8%			98.7%	
<i>Perceived diabetes control</i>									
Yes	67	101	168	58	120	178	86	85	171
No	59	34	93	46	50	96	66	29	95
Total	126	135	261	104	170	274	152	114	266
Sensitivity		53.2%			55.8%			56.6%	
Specificity		25.2%			29.4%			25.4%	
<i>Perceived hypertension control</i>									
Yes	76	95	171	63	114	177	94	79	173
No	40	12	52	32	25	57	46	10	56
Total	116	107	223	95	139	234	140	89	229
Sensitivity		65.5%			66.3%			67.1%	
Specificity		11.2%			18%			11.2%	
<i>Perceived diabetes control</i>									
	Controlled (HbA1c <7)								
Yes	77	101	178						
No	29	27	56						
Total	106	128	234						
Sensitivity		82.14%							
Specificity		41.44%							
<i>Perceived hypertension control</i>									
	Controlled (BP <140/90 mm Hg)								
Yes	77	101	178						
No	29	27	56						
Total	106	128	234						
Sensitivity		72.64%							
Specificity		21.09%							

\*Glycated hemoglobin, BP - blood pressure, HbA1c - glycated hemoglobin



(31.6%).<sup>18</sup> Approximately 53.7% of participants achieved the target blood pressure, which is slightly better controlled than the 2013 National survey (45%).<sup>19</sup> This could be attributed to the presence of family medicine specialists in the PHC clinics. Two thirds of the study population were not practicing physical exercise.<sup>20</sup> Thus, this area should be considered as an important topic for health education and promotion. The metabolic syndrome prevalence rate among the study population was 38.8 %, which is similar to the Saudi community based survey (39.3%).<sup>21</sup>

**Prevalence of depression and anxiety.** This study shows high prevalence of mental disorders (depression and/or anxiety) among chronically ill patients (diabetic and/or hypertensive), (57.3%). This percentage is agreeing with what WHO/WONCA reported regarding the prevalence of mental health problems in PHC (60%).<sup>1</sup> In this study, 77% of mental health problems were undiagnosed or misdiagnosed in PHC centers. In previous study,<sup>1</sup> it was reported that depression remains undiagnosed in 50%-75% of diabetes cases and most of the mental health problems were misdiagnosed in PHC.<sup>1</sup> This could be explained by the lack of PHC physicians' awareness and the nature of these problems presenting as physical rather than psychological symptoms.<sup>1</sup> Mild cases of depression and anxiety are more dominant in PHC and mostly misdiagnosed. However, these types of disturbances can be easily managed in PHC and consequently enhance the patients' satisfaction, if health providers are aware and well prepared.<sup>1</sup>

**Associated variables with depression and anxiety: Depression.** Women are affected more than men by depression in general population and also among people with diabetes<sup>22-25</sup> a fact that is supported by this study. Stressful roles related to female gender which overburden them with more responsibilities could provide a possible explanation. Women were stereotyped as emotional and extroversive due to the social role assigned to them.<sup>26</sup> This nature of female gender together with hormonal changes related to reproduction play a role in making women more depressed than men.<sup>27</sup> In this study, middle age (31-40 years) had the highest percentage of depression, the same as found by Zhao study.<sup>28</sup> Being a governmental worker, jobless, or housewife, increases the likelihood to have depression; this finding is consistence with Habtewold study<sup>29</sup> but conflicts with Mexican study findings.<sup>23</sup>

Obesity has a significant association with depression in this study, but unfortunately the study did not assess which one had preceded the other. As cited

by Rouba<sup>30</sup> obesity leads to depression. This could be explained by the association between physical inactivity and low mood status. This association could also be explained the other way around as depression leads to obesity. Not caring to control body weight among depressed people consequently results in obesity. Thus, obesity could be a consequence of depression not a cause, which is supported by a study carried out in the Eastern Province, KSA.<sup>7</sup> This study revealed significant association between depression and sleep disturbance which worsens the stress status and affects negatively the control of BP and blood sugar levels. As proved by Koyanagi study,<sup>31</sup> controlling DM and HTN is difficult without considering the sleep quality in the management plan.

**Anxiety.** As in depression, being a female increases the likelihood of being anxious in the general population and people with diabetes,<sup>25</sup> which is supported by this study ( $p=0.010$ ). The same factors explained in the depression section could also explain this gender association with anxiety. Higher socioeconomic status was found to be a protective factor for anxiety.<sup>24</sup> This study showed high prevalence of anxiety among those with low income (<3000 Saudi Riyals/month), which is similar to the finding of El Mahalli's study.<sup>7</sup> It might be related to the economic instability and increased health care expenditure of chronic disease or co-morbidity conditions. In this study, patients with family history of DM or HTN were at more risk of having anxiety, which is consistent with Ströhle study.<sup>32</sup> This might be attributed to experience of family members who suffer from comorbid complications. There was no significant association between anxiety and positive family history of mental health; a finding that was supported by Kaur study.<sup>33</sup> However, a patient's denial of mental disorders in family history due to social stigma might have affected this finding. Participants with increased weight were having a high prevalence of anxiety. This finding could be related to negative influence of anxiety on behavioral management of diabetes and HTN.<sup>22</sup> In line with Zelman study,<sup>34</sup> anxiety was found to be high among patients with sleep disturbance.

**Sleep disturbance and depression/anxiety.** No sleep disturbance can rule out mental disorders by 98.9%. This study finding generated a new contribution to what was already known in this field. Developing this simple, one question and practical screening tool could provide a breakthrough in improving mental disorders detection rate by PHC doctors. However, this cannot be assured by a single research finding, further studies are recommended.

**Patient's perception.** By asking patients whether they think their DM or HTN were controlled or not, the study revealed a significant association of uncontrolled feeling with depression, anxiety, and comorbidity of depression and anxiety. On the other hand, controlled DM and HTN by measuring HbA1c and BP were found to be not associated. Worries regarding uncertain future among chronic disease patients who feel their illness is uncontrolled provide a possible explanation. Absence of the uncontrolled disease feeling eliminates these worries regardless of the real disease control measures. These worries are often reflected as anxiety and depression.<sup>35</sup> Some patients blame themselves for the occurrence of their chronic disease.<sup>36</sup> Patients' perception regarding their DM and HTN control when used as a screening tool is able to identify 82.1% of those who have a measured blood sugar and 72.6% of those who have a measured BP as controlled".

**Study limitations.** The cross-sectional design by nature limits the study's ability to assess the temporal relationship between associated variables. Explanation of some associations revealed by the study, such as obesity and depression, depends basically on knowing the preceding factor, which had not been tested by the study. The study included both type 1 and type 2 diabetes with no discrimination between them in the questionnaire. This has limited the ability of the study to assess the association between different factors and diabetes type.

In conclusion, patients' perception of their chronic disease control could help in suspecting depression and anxiety. This study proves that, having no sleep disturbance is an effective ruling-out tool for depression and anxiety. This finding if supported by further focused studies will have a great impact on improving mental disorders detection in PHC. Depression and anxiety have a high morbidity and low detection rate among Saudi PHC diabetic and hypertensive patients. The patient's feeling is an important element that should be considered in the health care plan for chronic diseases, and needs further study. We recommend further focused studies to assess the effectiveness of "no sleep disturbance" as a ruling-out tool for depression and anxiety. Also integration of psychological illness screening and management programs with PHC services. We recommend conducting further research in patient's perception on their chronic illness, as well as coordination of clinical care of depression and anxiety with chronic disease management guidelines and application of health education and promotion

programs that encourage healthy life style of diabetic and hypertensive patient

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