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

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 AlKhobar 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, 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. 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. 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. In a national survey in 2013, the estimated prevalence of hypertension (HTN) was 15.2% of the Saudi population above 15 years old. Diabetic or hypertensive patients have a high risk to develop mental disorders such as depression and/or anxiety. The co-occurrence and the impact of psychological and psychosocial issues on physical illness, particularly diabetes and HTN, are challenging in diagnosis and management. Almost half (49.6%) of diabetics in hospital out-patient clinics in KSA and two-thirds (66.7%) of hypertensive PHC patients in Makkah Al-Mukarramah, KSA were depressed. Depression and anxiety were proved to have an association with increased risk of dying from several major illnesses. Association between depression and chronic diseases has been explained as cause and effect type. The concept of perceived control is basically related to an individual's expectations whether he/she has any control over the issue under focus. 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. 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) and Generalized Anxiety Disorder-7 (GAD-7) were used as diagnostic tools for depression and anxiety. The WHO Clinical Criteria was used for Metabolic Syndrome (MS) assessment.

Data collection. Two methods were used. First, a self-administered questionnaire, which included socio-demographic information, information regarding the chronic disease, lifestyle, 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   | (%) |
|---------------------------------|-----|-----|
| **Gender**                      |     |     |
| Male                            | 179 | (48.6) |
| Female                          | 189 | (51.4) |
| **Age group**                   |     |     |
| 18-30                           | 23  | (6.4) |
| 31-40                           | 37  | (10.3) |
| 41-60                           | 236 | (65.6) |
| > 60                            | 64  | (17.7) |
| **Body mass index**             |     |     |
| <24                             | 33  | (9.5) |
| 24 - <30                        | 100 | (28.6) |
| ≥ 30                            | 216 | (61.9) |
| **Family history of hypertension** |     |     |
| Yes                             | 237 | (64.9) |
| No                              | 114 | (31.3) |
| Not sure                        | 14  | (3.8) |
| **Family history of diabetes mellitus** |     |     |
| Yes                             | 261 | (71.9) |
| No                              | 94  | (25.9) |
| Not sure                        | 8   | (2.2) |
| **Diagnosed mental health problem** |     |     |
| No                              | 318 | (87.1) |
| Depression                      | 17  | (4.7) |
| Anxiety                         | 29  | (7.9) |
| Other                           | 1   | (0.3) |
| **Physical activity**           |     |     |
| Regular                         | 103 | (29.1) |
| Interrupted                     | 182 | (51.4) |
| No Activity                     | 69  | (19.5) |
| **Diet control**                |     |     |
| No                              | 77  | (21.3) |
| Sometimes                       | 111 | (30.8) |
| Most of time                    | 91  | (25.2) |
| Full                            | 82  | (22.7) |
| **Sleeping disturbance**        |     |     |
| Yes                             | 87  | (24.1) |
| No                              | 274 | (75.9) |
| **Perceived diabetes mellitus control** |     |     |
| Controlled                      | 178 | (64.5) |
| Not controlled                  | 98  | (35.5) |
| **Perceived hypertension control** |     |     |
| Yes                             | 180 | (75.6) |
| No                              | 58  | (24.4) |
| **Diabetes mellitus control**   |     |     |
| Controlled (HbA1c <7)           | 123 | (39.5) |
| Not controlled (HbA1c ≥ 7)      | 188 | (60.5) |
| **Hypertension control (BP >140/90 mm Hg)** |     |     |
| Yes                             | 124 | (53.7) |
| No                              | 107 | (46.3) |

\( BP \) - blood pressure, HbA1c - glycated hemoglobin
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.

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

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

DM - diabetes mellitus, HTN - hypertension

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

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

**Discussion.** In this study, DM and HTN were affecting those early toward the middle age, which is also supported by Suastika et al study. 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.

The percentage of diabetic patients who have adequate glycemic control was 39.5%, higher than what was cited in a 2014 national survey.
### 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 (%)              | OR (95% CI)                    | Had anxiety (%)        | OR (95% CI)            | Had depression & anxiety (%) | OR (95% CI) |
|                                         | P-value                         |                                | P-value                |                         | P-value                     |            |
| Perceived DM control                    |                                 |                                |                        |                         |                             |            |
| Yes                                     | 64 (39.3)                       | 2.684 (1.586 - 4.543)          | 56 (32.4)              | 0.012                   | 1.922 (1.152 - 3.206)       | 37 (21.8)  |
| No                                      | 59 (63.4)                       |                                | 46 (47.9)              |                         | 39 (41.5)                  | 0.001 (1.473 - 4.412)       |
| Diabetes mellitus control test (HbA1c<7) |                                 |                                |                        |                         |                             |            |
| Yes                                     | 50 (45.9)                       | 1.144 (0.690 - 1.800)          | 43 (36.8)              | 0.637                   | 1.122 (0.696 - 1.808)       | 34 (29.3)  |
| No                                      | 85 (48.6)                       | 0.658                          | 73 (39.5)              |                         | 54 (30.2)                  | 0.875 (0.625 - 1.738)       |
| Perceived hypertension control         |                                 |                                |                        |                         |                             |            |
| Yes                                     | 73 (44.0)                       | 4.24 (2.079 - 8.674)           | 61 (35.5)              | 0.008                   | 2.329 (1.266 - 4.284)       | 43 (25.3)  |
| No                                      | 40 (76.9)                       | 0.000                          | 32 (56.1)              |                         | 26 (49.1)                  | 0.002 (1.500 - 5.394)       |
| Measured hypertension control (blood pressure <140/90 mm Hg) | |                                |                        |                         |                             |            |
| Yes                                     | 57 (48.7)                       | 1.00 (0.636 - 1.56)            | 55 (43.3)              | 0.139                   | 0.707 (0.454 - 1.101)       | 41 (33.3)  |
| No                                      | 106 (48.6)                      | 1.00                           | 81 (35.1)              |                         | 61 (27.1)                  | 0.268 (0.462 - 1.198)       |

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                      |                          |
| Sleep disturbance                       |                 |              |                            |                 |              |                            |                          |
| Yes                                     | 80              | 2            | 82                         | 54              | 31           | 85                         | 84                        |
| No                                      | 85              | 172          | 257                        | 84              | 187          | 271                        | 115                       |
| Total                                   | 165             | 174          | 339                        | 138             | 218          | 356                        | 199                       |
| Sensitivity                             | 48.5%           |              |                            | 39.3%           |              |                            | 42.2%                     |
| Specificity                             | 98.9%           |              |                            | 85.8%           |              |                            | 98.7%                     |
| Perceived diabetes control              |                 |              |                            |                 |              |                            |                          |
| Yes                                     | 67              | 101          | 168                        | 58              | 120          | 178                        | 86                        |
| No                                      | 59              | 34           | 93                         | 46              | 50           | 96                         | 66                        |
| Total                                   | 126             | 135          | 261                        | 104             | 170          | 274                        | 152                       |
| Sensitivity                             | 53.2%           |              |                            | 55.8%           |              |                            | 56.6%                     |
| Specificity                             | 25.2%           |              |                            | 29.4%           |              |                            | 25.4%                     |
| Perceived hypertension control         |                 |              |                            |                 |              |                            |                          |
| Yes                                     | 76              | 95           | 171                        | 63              | 114          | 177                        | 94                        |
| No                                      | 40              | 12           | 52                         | 32              | 25           | 57                         | 46                        |
| Total                                   | 116             | 107          | 223                        | 95              | 139          | 234                        | 140                       |
| Sensitivity                             | 65.5%           |              |                            | 66.3%           |              |                            | 67.1%                     |
| Specificity                             | 11.2%           |              |                            | 18%             |              |                            | 11.2%                     |
| Perceived diabetes control              | Controlled (HbA1c <7) | |                            |                 |              |                            |                          |
| Yes                                     | 77              | 101          | 178                        |                 |              |                            |                          |
| No                                      | 29              | 27           | 56                         |                 |              |                            |                          |
| Total                                   | 106             | 128          | 234                        |                 |              |                            |                          |
| Sensitivity                             | 82.14%          |              |                            |                 |              |                            |                          |
| Specificity                             | 41.44%          |              |                            |                 |              |                            |                          |
| Perceived hypertension control         | 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
Approximately 53.7% of participants achieved the target blood pressure, which is slightly better controlled than the 2013 National survey (45%). 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. 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%).

**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%). In this study, 77% of mental health problems were undiagnosed or misdiagnosed in PHC centers. In previous study, it was reported that depression remains undiagnosed in 50%-75% of diabetes cases and most of the mental health problems were misdiagnosed in PHC. This could be explained by the lack of PHC physicians’ awareness and the nature of these problems presenting as physical rather than psychological symptoms. 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.

**Associated variables with depression and anxiety:**

**Depression.** Women are affected more than men by depression in general population and also among people with diabetes 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. This nature of female gender together with hormonal changes related to reproduction play a role in making women more depressed than men. In this study, middle age (31-40 years) had the highest percentage of depression, the same as found by Zhao study. Being a governmental worker, jobless, or housewife, increases the likelihood to have depression; this finding is consistence with Habtewold study but conflicts with Mexican study findings.

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 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. 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, 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, 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. 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. 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. 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. 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. In line with Zelman study, 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.35 Some patients blame themselves for the occurrence of their chronic disease.36 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.37

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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