Is Self-Report of Erectile Dysfunction Associated with Severity, Cardiovascular Disease Risk Factors, and Depression?

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Purpose: The aim of this study was to evaluate whether cardiovascular disease risk factors and depression are associated with the frequency of self-report in patients with erectile dysfunction (ED).
Materials and Methods: Randomly selected men more then 40 years of age who visited the department of urology between January 2005 and July 2008 were evaluated by clinical examination and questionnaires. Trained doctors assessed the participants by using structured questionnaires that included medical history as well as report of ED. All participants were evaluated for cardiovascular disease risk factors. The group with unreported ED was defined as men with an International Index of Erectile Function-5 (IIEF-5) score of ≤21 who did not self-report ED. The group with self-reported ED was defined as men as above who self-reported ED. Symptoms of depression were assessed by the Center for Epidemiological Studies-Depression Scale (CES-D).
Results: The mean age of a total of 459 enrolled patients was 53.4±7.8 years. The overall frequency of ED was 39.8%. Of the total study group, 25.9% were categorized in the unreported ED group and 13.9% in the self-reported ED group. The men with self-reported ED had significantly severe forms of ED and a higher frequency of cardiovascular disease risk factors than did the men with unreported ED. Moreover, the self-reported ED group had a significantly higher frequency of symptoms of depression.
Conclusions: Our results suggest that men with self-reported ED had a higher frequency of cardiovascular disease risk factors and symptoms associated with depression than did men with unreported ED. Furthermore, men with self-reported ED had more severe ED than did men with unreported ED. **(Korean J Urol 2009;50:902-907)**

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INTRODUCTION

Various types of phosphodiesterase type 5 inhibitors have been commercially available since the introduction of sildenafil in 1998, and these drugs have greatly improved the diagnosis and treatment of erectile dysfunction (ED). The general population can now access information on sexual dysfunction through the mass media and internet without visiting medical doctors, and the number of men who recognize ED as a treatable disease has increased. However, even if a man has ED, unless it exerts serious effects on his personal life, he may be hesitant to reveal it, and even though ED is a medically treatable disease, a large percentage of men do not receive appropriate treatments due to social, cultural, and financial reasons [1].

Cardiovascular diseases and ED share common risk factors such as hypertension, diabetes, hyperlipidemia, obesity, smoking, and a sedentary lifestyle. Cardiovascular diseases are well known to be a major cause of ED, and it has been reported that 40% of patients visiting the hospital for the treatment of ED have coronary artery disease [2,3]. In addition to organic

causes, depression and other psychological problems may also induce ED [4]. It is well known that the severity of such organic and psychological risk factors is closely associated with the severity of ED [4-7]. In addition, as the severity of ED becomes more profound, the discomfort felt by patients may become more severe, and this leads to the presentation of symptoms during the patient's hospital visit. In other words, it could be that the incidence of cardiovascular disease risk factors is high and their level is more severe in the patients presenting with ED symptoms. In addition, psychological factors such as depression are risk factors for ED and simultaneously may mediate effects on the presentation of symptoms.

With this background, we evaluated the severity of ED according to self-report of ED and its association with cardiovascular disease risk factors and depression to assess the effect of the severity of the risk factors on self-reported ED.

MATERIALS AND METHODS

We assessed all male patients older than 40 years who visited our hospital from January 2005 to July 2008. We assessed the patients' disease history, such as the presence or absence of associated diseases, including ED, and the patients underwent a physical examination that included measuring blood pressure, height and weight, and waist circumference. The patients also underwent laboratory tests to measure fasting glucose levels, serum cholesterol values, etc. For all patients, ED was evaluated by using the Korean version of the International Index of Erectile Function-5 (IIEF-5) [8]. The men were divided into two groups as 1) nonreporting patients who visited the department of urology for symptoms other than ED, but their IIEF-5 score was lower than 21 points and so ED was diagnosed, and 2) self-reporting patients who visited the department of urology for ED as the chief complaint and their IIEF-5 was lower than 21 points and so ED was diagnosed. The patients with a past history of surgery or injury of the pelvis, penis, urethra, or prostate or the cases who were unable to perform normal intercourse were excluded from the study; we also excluded patients who took medication for psychological disease such as depression or anxiety. For the normal values for the laboratory tests, the fasting glucose level was based on the standard value of the American Diabetes Association [9], and the normal value of cholesterol was based on the standard value of the American National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP) III [10].

To evaluate the symptoms of depression, we used the Korean version of the questionnaire for the Center for Epidemiological Studies-Depression Scale (CES-D) that was developed by the National Institute of Mental Health (NIMH) in 1971; it was translated by Cho and Kim [11]. In our study, to compare the patients with the general Korean population, the cutoff for the selection of patients with symptoms of depression was determined to be 21 points. SPSS 12 for WINDOWS (SPSS Inc, Chicago, USA) was used for the statistical analysis. Chi-square tests were used for comparisons between the two groups, and p-values less than 0.05 were considered to be statistically significant.

RESULTS

A total of 459 patients were registered, and their average age was 53.4±7.8 years. In 183 patients (39.8%), IIEF-5 was found to be lower than 21 points; among these patients, 119 patients (25.9%) were in the unreported patient group and 64 patients (13.9%) were in the self-reported patient group. Therefore, patients who did not present with subjective ED symptoms were more abundant (Fig. 1).

The average age of the unreported group was 54.9±7.6 years and that of the self-reported group was 51.4±8.1 years; there was no significant difference in age between the two groups. In the comparison according to the age distribution, the older the age, the higher the incidence of ED (score of less than 21 points on the IIEF-5; $p < 0.05$). Nevertheless, the incidence of

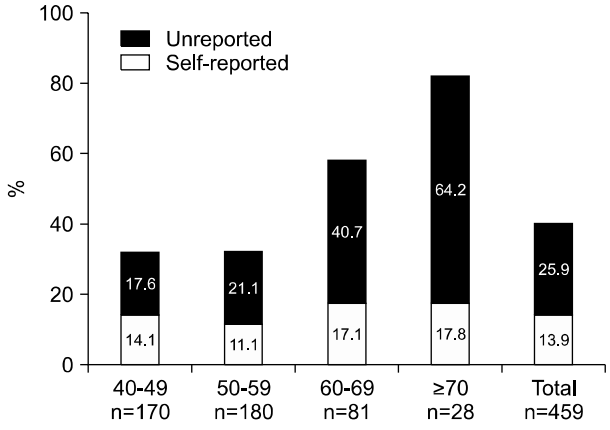

Fig. 1. Prevalence of erectile dysfunction (ED) according to age.

Table 1. Prevalence of cardiovascular disease risk factors

Cardiovascular risk factors	Prevalence (%)		p-value[a]
	Unreported (n=119)	Self-reported (n=64)	
Hypertension	20.2	34.4	0.035
Diabetes	15.1	29.7	0.019
Fasting blood glucose≥126 mg/dl	13.4	26.6	0.028
HDL-cholesterol<40 mg/dl	23.5	42.2	0.042
LDL-cholesterol≥160 mg/dl	3.4	9.4	0.125
Triglyceride≥150 mg/dl	29.4	42.2	0.009
Total cholesterol≥210 mg/dl	12.6	29.7	0.025
Body mass index≥25 kg/m^2	28.6	54.7	0.033

HDL: high density lipoprotein, LDL: low density lipoprotein, [a]: chi-square test

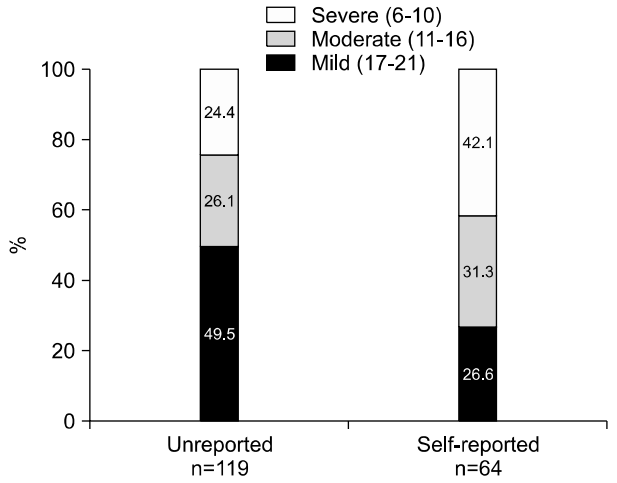

Fig. 2. Severity of erectile dysfunction (ED) according to the International Index of Erectile Function-5.

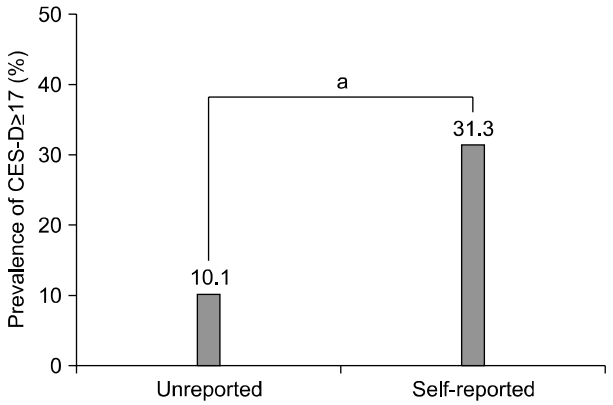

Fig. 3. The prevalence of depression symptoms according to the CES-D. CES-D: Center for Epidemiological Studies-Depression Scale, [a]: $p<0.05$.

presenting subjective ED symptoms was somewhat higher in the younger generation, but this was not statistically significant.

In the two groups, the incidence of patients with the cardiovascular disease risk factor of hypertension, with diabetes, and with a body mass index (BMI) higher than 25 kg/m^2 was significantly higher in the self-reported group ($p<0.05$) (Table 1).

Similarly, the incidence of patients having abnormal fasting glucose, high-density lipoprotein (HDL)-cholesterol, triglyceride, and total cholesterol values in the self-reported group was significantly higher than in the unreported group ($p<0.05$) (Table 1); nonetheless, the low-density lipoprotein (LDL)-cholesterol value did not differ between groups.

In the comparison of the severity of ED according to the IIEF-5, the incidence of severe ED with lower than 10 points on the IIEF-5 was 24.4% and 42.1%, respectively, and was significantly higher in the self-reported group than in the unreported group. The incidence of mild ED between 17 and 21 points on the IIEF-5 was 49.5% and 26.6%, respectively, and was significantly higher in the unreported group ($p<0.05$) (Fig. 2). In the evaluation of depression symptoms based on the CES-D, the incidence of patients with a score higher than 17 points on the CES-D was higher in the self-reported ED group than in the unreported group ($p<0.05$) (Fig. 3).

In the comparison of the prevalence of depression symptoms according to the severity of ED, the prevalence of depression symptoms with a score of higher than 17 points on the CES-D was significantly higher in the self-reported ED group than in the unreported group for each severity of ED ($p<0.05$) (Fig. 4).

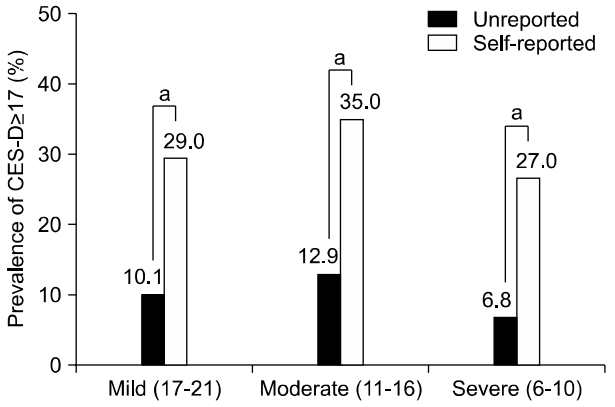

Fig. 4. The prevalence of depression symptoms according to the CES-D in each class of severity of erectile dysfunction (ED). CES-D: Center for Epidemiological Studies-Depression Scale, [a]: $p < 0.05$.

DISCUSSION

The prevalence of ED may show a noticeable difference depending on the evaluation method. The prevalence of ED in 40-80-year-old Koreans has been reported to be 31.9% [1]. According to a report of the Massachusetts Male Aging Study (MMAS), 52% of men aged≥40 years responded that they had ED [4]. However, according to the study reported by Ahn et al, the prevalence of ED among Korean men was 13.4% (self-reported ED) and 32.4% (with an IIEF-5 score≤17) [12], and the prevalence may vary depending on the diagnostic standards for ED. Similarly in our study, we observed that the prevalence of ED in the patients presenting with subjective ED symptoms and in the patients who didn't present with ED symptoms but who were diagnosed by the IIEF-5 evaluation differed, and it is thought that the age of the patient, the level of sexual activity, and the patient's psychological state affect the recognition of ED symptoms and its determination. It can be speculated that there are many patients who do not consult with medical doctors or who do not present with ED symptoms because they conceal their ED or the ED does not greatly affect their personal life. Due to such factors, during the interview by medical doctors with the patients, gaining sufficient understanding of patients' ED is difficult unless the doctor aggressively asks the right questions [13].

In our study, the severity of ED and the incidence of cardiovascular disease risk factors for the patients who visited our hospital with the chief complaint of ED were higher than for the patients who visited our hospital for other diseases and were then classified as having ED by the IIEF-5 evaluation. This is thought to be due to the fact that cardiovascular disease risk factors such as age, hypertension, hyperlipidemia, obesity, and smoking are important factors for the development of coronary artery disease, and at the same time, such risk factors are involved in the vascular ED that has an organic cause [4,7,14].

Cardiovascular diseases and vascular ED are closely associated with each other, which is because they both have common pathophysiologic mechanisms. Atherosclerosis is a systemic disease, so ED patients with atherosclerosis may have the same arterial lesions in their coronary arteries as they have in their penile arteries. Therefore, it is not surprising that many patients with arterial ED have ischemic heart disease. Kawanishi et al reported that in ED patients, the measurement of the arterial blood flow of the corpus cavernosum is useful as a screening test for ischemic heart disease [15]. Roumeguère et al have reported in a clinical study on serum lipid, which is known to be a common risk factor of ED and coronary artery disease [16], that the HDL-cholesterol level and the ratio of total cholesterol to HDL-cholesterol could be a predictive factor for ED.

In our study, obese patients whose BMI was higher than 25 kg/m^2 made up 54.7% of the patients with an IIEF-5 score lower than 21 points and who presented with ED symptoms, whereas obese patients whose BMI was higher than 25 kg/m^2 made up only 28.6% of the ED patients who did not present with ED symptoms. None of the reported studies have shown direct evidence that obesity induces sexual dysfunction; yet, obesity could be a causative factor that induces secondary chronic diseases, cardiovascular diseases, diabetes, and hormonal dysfunction, and such chronic diseases are risk factors that could induce ED. Thus, the close association between obesity and ED could be deduced. Numerous studies on the association of obesity and ED are currently ongoing. According to the study reported by Chung et al, in 225 patients, no significant differences in ED were detected between the obese group and the normal group when cardiovascular disease risk factors were excluded [17]. However, when the cardiovascular disease risk factors are considered, and based on the fact that ED was significantly more abundant in the obese group, it is thought that rather than obesity directly inducing ED, obesity induces vascular ED by inducing chronic vascular disease. In

addition, in a study reported by Bacon et al that was conducted on 31,742 health care workers, it was found that obesity accelerated the deterioration of erection [18], and exercise prevented the deterioration of erection; therefore, it could be deduced that weight control and regular exercise also exert positive effects on sexual function.

The CES-D consists of 20 questions; it is a self-report type of depression scale and is a tool to screen for depression [19]. The CES-D measures depression symptoms according to the frequency of symptoms that are experienced during the past one week. Each question is scored as 0-3 points (the 5th, 10th, and 15th question are scored in a reverse fashion), and the total score is distributed from 0 to 60 points. In our study, with regard to the association of ED with symptoms of depression as assessed by the CES-D self-questionnaire, the number of symptoms of depression for the self-reported ED patients was significantly higher than that for the nonreporting ED patients, and it is thought that depression may mediate effects on ED symptoms. In addition, the psychological effects caused by ED, such the deterioration of the self-confidence of patients, may induce or worsen the depression symptoms. In the previous American Massachusetts Male Aging Study, it was revealed that the CES-D score did not independently predict the incidence of ED [4]. However, according to recent studies, the CES-D score for evaluating symptoms of depression in type 2 diabetes patients has been reported to be an independent predictive factor for ED [20].

In our study, we observed that the incidence of cardiovascular disease risk factors and their severity affected the severity of the self-reported symptoms of ED in the ED patients with symptoms of depression. Yet, the number of subjects in our study was small, and all the factors affecting the level of discomfort of the ED patients, such as the frequency of sexual activity, the quality of sexual activity of their sexual partner, and the serum testosterone value, which mediates effects on libido, could not be examined. Additional studies that include these factors are required in the future.

CONCLUSIONS

Our results suggest that men with self-reported ED had a higher frequency of cardiovascular disease risk factors and symptoms associated with depression than did men with unreported ED. Furthermore, men with self-reported ED had more severe ED than did the men with unreported ED.

REFERENCES

1. Moreira ED Jr, Kim SC, Glasser D, Gingell C. Sexual activity, prevalence of sexual problems, and associated help-seeking patterns in men and women aged 40-80 years in Korea: data from the Global Study of Sexual Attitudes and Behaviors (GSSAB). J Sex Med 2006;3:201-11.
2. Kloner RA. Erectile dysfunction as a predictor of cardiovascular disease. Int J Impot Res 2008;20:460-5.
3. Greenstein A, Chen J, Miller H, Matzkin H, Villa Y, Braf Z. Does severity of ischemic coronary disease correlate with erectile function? Int J Impot Res 1997;9:123-6.
4. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. J Urol 1994;151:54-61.
5. Feldman HA, Johannes CB, Derby CA, Kleinman KP, Mohr BA, Araujo AB, et al. Erectile dysfunction and coronary risk factors: prospective results from the Massachusetts male aging study. Prev Med 2000;30:328-38.
6. Ledda A. Cigarette smoking, hypertension and erectile dysfunction. Curr Med Res Opin 2000;16(Suppl 1):S13-6.
7. Braun M, Wassmer G, Klotz T, Reifenrath B, Mathers M, Engelmann U. Epidemiology of erectile dysfunction: results of the 'Cologne Male Survey'. Int J Impot Res 2000;12:305-11.
8. Ahn TY, Lee DS, Kang W, Hong JH, Kim YS. Validation of an abridged Korean version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. Korean J Urol 2001;42:535-40.
9. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care 2004;27(Suppl 1):S5-10.
10. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive summary of the third report of the national cholesterol education program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III). JAMA 2001;285:2486-97.
11. Cho MJ, Kim KH. Diagnostic validity of the CES-D (Korean version) in the assessment of the DSM-Ⅲ-R major depression. J Korean Neuropsychiatr Assoc 1993;32:381-99.
12. Ahn TY, Park JK, Lee SW, Hong JH, Park NC, Kim JJ, et al. Prevalence and risk factors for erectile dysfunction in Korean men: results of an epidemiological study. J Sex Med 2007;4:1269-76.
13. Analysis of Sexual Behaviour in France (ACSF). A comparison between two modes of investigation: telephone survey and face-to-face survey. ASCF principal investigators and their associates. AIDS 1992;6:315-23.
14. Kim JA, Montagnani M, Koh KK, Quon MJ. Reciprocal

relationships between insulin resistance and endothelial dysfunction: molecular and pathophysiological mechanisms. Circulation 2006;113:1888-904.
15. Kawanishi Y, Lee KS, Kimura K, Koizumi T, Nakatsuji H, Kojima K, et al. Screening of ischemic heart disease with cavernous artery blood flow in erectile dysfunctional patients. Int J Impot Res 2001;13:100-3.
16. Roumeguère T, Wespes E, Carpentier Y, Hoffmann P, Schulman CC. Erectile dysfunction is associated with a high prevalence of hyperlipidemia and coronary heart disease risk. Eur Urol 2003;44:355-9.
17. Chung WS, Sohn JH, Park YY. Is obesity an underlying factor in erectile dysfunction? Eur Urol 1999;36:68-70.
18. Bacon CG, Mittleman MA, Kawachi I, Giovannucci E, Glasser DB, Rimm EB. Sexual function in men older than 50 years of age: results from the health professionals follow-up study. Ann Intern Med 2003;139:161-8.
19. Dicpinigaitis PV, Tso R, Banauch G. Prevalence of depressive symptoms among patients with chronic cough. Chest 2006; 130:1839-43
20. De Berardis G, Pellegrini F, Franciosi M, Belfiglio M, Di Nardo B, Greenfield S, et al. Clinical and psychological predictors of incidence of self-reported erectile dysfunction in patients with type 2 diabetes. J Urol 2007;177:252-7.