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## MISCELLANEOUS

# Prevalence and Risk Factors of Erectile Dysfunction in Patient Visiting Andropause Clinic, Srinagarind Hospital, Thailand

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## ABSTRACT

**Objective:** To assess the prevalence and risk factors of erectile dysfunction (ED) in male patients visiting andropause clinic, Srinagarind Hospital, Khon Kaen University, Thailand.

**Material and methods:** A retrospective study was conducted in all patients who came to the clinic during 2003-2013. Data were collected from computerized medical records. ED was assessed by a Modified SHIM-IIEF5 questionnaire.

**Results:** Three hundred and sixty patients were reviewed. Mean age was 58.9 year-old (58.9 ± 8.3 year-old) and mean BMI was 24.2 kg/m$^2$ (24.2 ± 3.0 kg/m$^2$). Of these 360 patients, 31.1%, 28.1%, and 17.5% had dyslipidemia, hypertension, and diabetes mellitus, respectively. The prevalence of benign prostatic hyperplasia, chronic kidney disease and malignancy were higher in older patients, especially of an age of more than 60 year-old. The prevalence of ED was 83.3% (95%CI, 79.07%-87.03%). The associated factors for ED were diabetes mellitus (OR 4.75; 95%CI, 1.44-15.69; p=0.005) and renal impairment (OR 1.21; 95% CI, 1.15-1.26; p=0.02).

**Conclusion:** In Andropause Clinic, prevalence of ED is notably high. Significant risk factors among these patients are diabetes mellitus and renal impairment. ED screening should be recommended among andropause men to detect and treat in a timely fashion for improving the quality of life.

**Keywords:** Erectile dysfunction, andropause, risk factor

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## Introduction

The mechanism of erection in sexual arousal is a complex process. There are several related factors in the process including physical and psychological factors. Erectile dysfunction (ED) is defined by a National Institutes of Health consensus panel as the inability to achieve or maintain an erection sufficient for satisfactory sexual performance[1]. Twenty percent of the problems come from psychological factors and 80 percent from physical factors. Risk factors for ED appear to be the same as those for cardiovascular disease[2] such as diabetes mellitus, neurological disease, hyperlipidemia, obesity and smoking[3, 4]. All of them lead to vascular endothelium impairment of penis function, decreasing blood flow causing inability of penile erection.

ED affects millions of men across the globe. The prevalence of ED in several studies is different according to characteristics of study population, racial and cultural, and baseline health problems of the population. Previous study conducted to evaluate prevalence of ED in four countries with age-adjustment found that the prevalence of moderate or complete ED was 34% in Japan, 22% in Malaysia, 17% in Italy, and 15% in Brazil[5]. Thai Erectile Dysfunction Epidemiologic Study Group (TEDES) has investigated the prevalence of erectile dysfunction of 1,250 urban Thai men aged between 40-70 years. Overall prevalence of ED noted in this study was 37.5 %; 19.1% with mild dysfunction, while 13.7% and 4.7% of the study population had moderate and severe dysfunction[6].

The present study was conducted at Andropause Clinic in Srinagarind Hospital which has been established of over 10 years for taking care of male patients. The aim was to assess prevalence and associated factor of ED among patients attending the Andopause Clinic because of andropause symptoms.

## Materials and Methods

This study was a retrospective study conducted at the Andropause Clinic in Srinagarind Hospital, Khon Kaen University, Thailand, which is a tertiary hospital in the North Eastern sector. The data from patients who came to the clinic between 2003-2013 were collected. These data were obtained from medical records and laboratory data from the computer-based system. The data were extracted to the data collection form that one of the authors made, then transferred to Microsoft Excel 2007 and double checked by another author for correctness.

ED was diagnosed from the questionnaire that patients answered in medical records. We used The International Index of Erectile Function (Modified SHIM-IIEF5) questionnaire and ED was diagnosed if the patient had a score of 21 or lower. The severity of ED from the scores were classified as; 17-21: mild, 12-16: mild to moderate, 8-11: moderate, and < 7: severe erectile dysfunction.

The abnormal laboratory values were defined as followed; anemia: hemoglobin level < 13 g/dl, high fasting blood sugar: > 116 mg/dl, renal impairment: creatinine > 1.5 mg/dl, liver impairment: liver enzymes 3 times of normal value.

Statistical analysis was performed using SPSS version 17 (IBM, Armonk, NY, USA). Descriptive statistics including mean (standard deviation), and number (percentage) were used to report the baseline characteristics of the patients. The associations between ED and patients' data including demographic characteristics and laboratory results were determined using the chi-squared test or fisher's exact test, when appropriate. $P < 0.05$ was considered to be statistically significant.

## Results

During the study period, a total of 360 male patients attending the Andropause Clinic, Srinagarind Hospital were reviewed. All relevant demographic data and baseline laboratory values of these men are shown in Table 1. The mean age of the patients in the study

was 58.9 year-old. Smokers comprised 13.1% of the patients. The leading underlying diseases in patients were related to the metabolic syndrome including dyslipidemia (31.1%), hypertension (28.1%), and diabetes mellitus (17.5%). The others in order from high to low prevalence were benign prostatic hyperplasia (11.9%), heart disease (7.5%), gout (4.4%), liver disease (4.2%), old cerebrovascular accident (3.3%), chronic kidney disease (3.1%), and malignancy (1.9%), respectively.

**Table 1.** Demographic data and baseline laboratory values of 360 patients.

| Characteristics | Results |
|---|---|
| Mean age, years (SD) | 58.9 (8.3) |
| BMI, kg/m$^2$ (SD) | 24.2 (3.0) |
| Exercise | 315 (87.5) |
| Smoking | 47 (13.1) |
| Alcohol drinking | 200 (55.6) |
| Caffeine drinking | 241 (66.9) |
| Medical conditions | |
| - Dyslipidemia | 112 (31.1) |
| - Hypertension | 101 (28.1) |
| - Diabetes mellitus | 63 (17.5) |
| - BPH | 43 (11.9) |
| - Heart disease[1] | 27 (7.5) |
| - Gout | 16 (4.4) |
| - Liver disease | 15 (4.2) |
| - Old CVA | 12 (3.3) |
| - Chronic kidney disease | 11 (3.1) |
| - Malignancy[2] | 7 (1.9) |
| Anemia | 80 (22.2) |
| High fasting blood sugar | 92 (25.5) |
| Renal impairment | 8 (2.2) |
| Liver impairment | 52 (14.4) |
| Hypercholesterolemia | 25 (6.9) |

Data are present as number (percentage) unless stated otherwise

Abbreviation: BMI, body mass index; BPH, benign prostatic hyperplasia; CVA, cerebrovascular accident

[1] Including coronary artery disease, arrhythmia

[2] Including prostate cancer (n = 2), colon cancer (n = 2), bladder cancer (n = 1), lung cancer (n = 1), and leukemia (n = 1)

The overall prevalence of ED as per Modified SHIM-IIEF5 was 83.3% (n = 300; 95%CI, 79.07 - 87.03%). Of 300 patients with ED; 112 (31.1%) had mild ED, 87 (24.2%) had mild to moderate ED, 47 (13.1%) and 54 (15.0%) had moderate and severe ED, respectively.

Fig. 1. displays the details of underlying diseases related to age groups. The prevalence of benign prostatic hyperplasia, chronic kidney disease and malignancy were higher in older patients especially in an age of more than 60 years old. Fig. 2. shows the proportion of patients who had abnormal laboratory results stratified by age group. The prevalence of anemia, high fasting blood sugar, renal impairment and osteopenia increased as age rose.

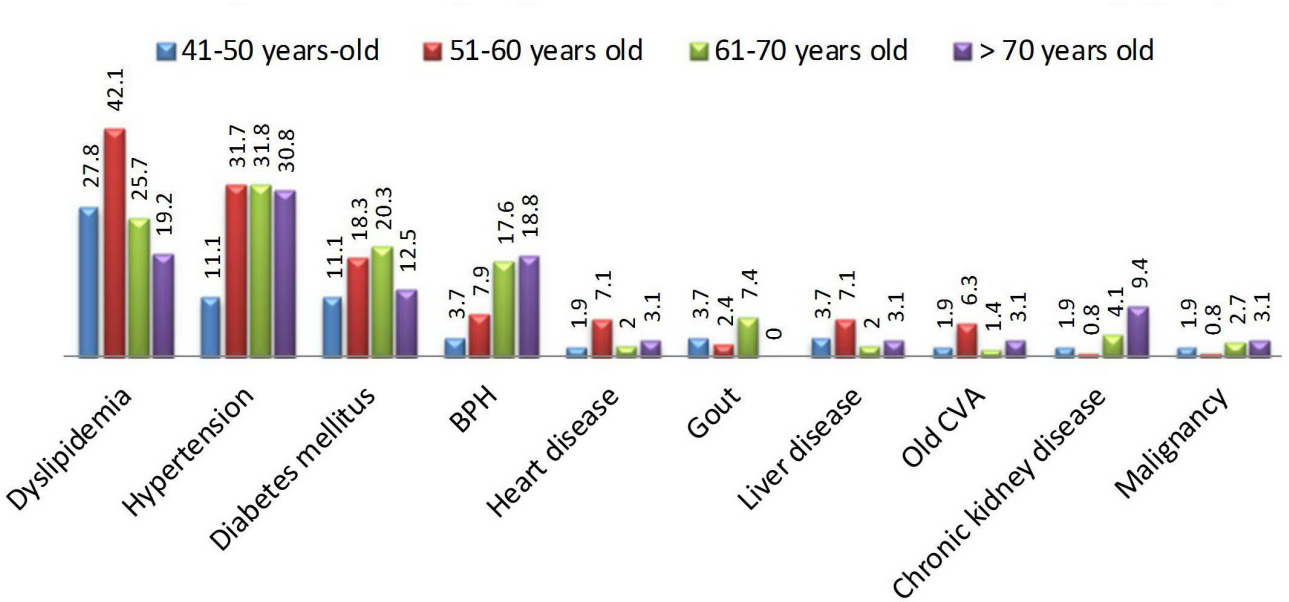


**Fig. 1.** Percentage of patients with medical conditions in each age group.

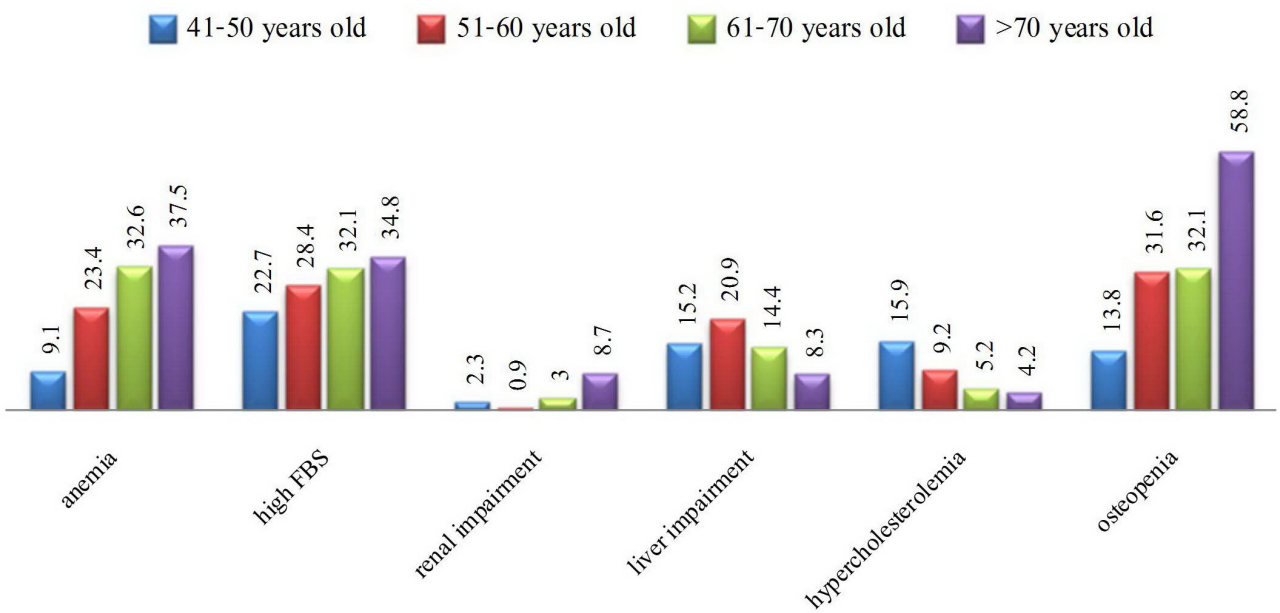


**Fig. 2.** Percentage of patients with abnormal laboratory values in each age group.

The association between ED and patient's characteristics including age, BMI, exercise status, smoking behavior, alcohol intake, caffeine drinking, and underlying diseases are displayed in Table 2. Only diabetes mellitus (DM) was noted to associate with ED. Patients with DM were approximately 5-time more likely than those without DM to have ED (unadjusted odd ratio, 4.75; 95% CI, 1.44-15.69). Table 3. shows the

**Table 2.** Relationship of baseline characteristics of patients with erectile dysfunction.

| Factors | Patients without ED N = 60 | Patients with ED N = 300 | Unadjusted OR (95% CI) | P |
|---|---|---|---|---|
| Age > 60 years | 1 (50) | 173 (48.3) | 0.94 (0.06-15.07) | 0.73 |
| BMI > 30 kg/m$^2$ | 1 (1.7) | 16 (5.3) | 3.32 (0.43-25.5) | 0.22 |
| Exercise | 54 (90.0) | 261 (87.0) | 0.74 (0.30-1.84) | 0.52 |
| Smoking status | 10 (16.7) | 37 (12.3) | 0.70 (0.33-1.50) | 0.36 |
| Alcohol drinking | 39 (65.0) | 161 (53.7) | 0.62 (0.35-1.11) | 0.11 |
| Caffeine drinking | 42 (70.0) | 199 (66.3) | 0.84 (0.46-1.54) | 0.58 |
| Medical conditions | | | | |
| - DM | 3 (5.0) | 60 (20.0) | 4.75 (1.44-15.69) | 0.005 |
| - Dyslipidemia | 16 (26.7) | 96 (32.0) | 1.29 (0.69-2.41) | 0.42 |
| - Hypertension | 12 (20.0) | 89 (29.7) | 1.68 (0.85-3.33) | 0.13 |
| - CKD | 0 (0) | 11 (3.7) | 0.82 (0.79-0.87) | 0.13 |
| - Malignancy | 1 (1.7) | 6 (2.0) | 1.20 (0.14-10.19) | 0.86 |
| - Gout | 2 (3.3) | 14 (4.7) | 1.42 (0.31-6.42) | 0.65 |
| - BPH | 4 (6.7) | 39 (13.0) | 2.09 (0.72-6.09) | 0.17 |
| - Old CVA | 2 (3.3) | 10 (3.3) | 1.00 (0.21-4.68) | 1.00 |
| - Liver disease | 5 (8.3) | 10 (3.3) | 0.38 (0.13-1.15) | 0.08 |
| - Heart disease | 3 (5.0) | 24 (8.0) | 1.65 (0.48-5.67) | 0.42 |

Data are present as number (percentage) unless stated otherwise

Abbreviation: ED, erectile dysfunction; OR, odds ratio; CI, confidence interval; BMI, body mass index; DM, diabetes mellitus; CKD, chronic kidney disease; BPH, benign prostatic hyperplasia; CVA, cerebrovascular accident

**Table 3.** Relationship of baseline laboratory values of patients with erectile dysfunction.

| Laboratory findings | Patients without ED N = 60 | Patients with ED N = 300 | OR (95% CI) | P |
|---|---|---|---|---|
| Anemia | 12 (20.0) | 68 (22.7) | 0.85 (0.43-1.70) | 0.65 |
| High fasting blood sugar | 18 (30.0) | 74 (24.7) | 1.31 (0.71-2.41) | 0.39 |
| Renal impairment | 0 (0) | 8 (2.7) | 1.21 (1.15-1.26) | 0.02 |
| Liver impairment | 11 (18.3) | 41 (13.7) | 1.42 (0.68-2.95) | 0.35 |
| Hypercholesterolemia | 6 (10) | 19 (6.3) | 1.64 (0.63-4.30) | 0.31 |
| Osteopenia and Osteoporosis | 15 (36.6) | 72 (36.5) | 1.00 (0.50-2.00) | 0.21 |

Data are present as number (percentage) unless stated otherwise

Abbreviation: ED, erectile dysfunction; OR, odds ratio; CI, confidence interval

## Discussion

This study demonstrates that 83.3% of male patients attending to the Andropause Clinic at Srinagarind Hospital had ED which was remarkably high. The data from the andropause patients collected were males with the mean age of 58.9. This is a more advanced age than previous studies which could be the cause of high prevalence of ED in the present study. Approximately half of them had mild to moderate ED. Significant factors predicting risk of having ED include

DM and renal impairment. To our knowledge, our study is the first study in Thailand to investigate the prevalence and associated factors of ED among andropause male.

Several studies have consistently reported a strong association between ED and DM[7, 8]. In the Massachusetts Male Aging Study (MMAS), diabetic men showed a threefold increased risk of having ED than men without diabetes[7]. In a study of Sasaki, et al[8], the prevalence and risk factors for ED among Japanese men with type 2 DM was extremely high at a rate of 90%. In addition, risk of ED was directly correlated with the severity of DM control. Patient who had HbA1c level of 8% or more were 1.39-times higher risk of ED than those with lower HbA1c level[8]. Recently, a study conducted among Chinese men with DM also observed a remarkably high prevalence of ED among such population[9]. DM seems to cause ED by a certained number of pathophysiological changes including neuropathy, vascular endothelial damage, smooth muscle dysfunction, and sexual hormone disturbances[10]. In the present study, patients who reported to experience ED were approximately 4.8-time higher risk of having DM as compared to those without DM. As mentioned earlier, a well control of DM appeared to lower risk of ED among men with DM[8]. Thus, ED patients should be screened for DM. Additionally, intensive treatment of men with DM should be provided in order to prevent and lower the risk of ED.

Some urinary conditions have been noted to be related to ED[11-14]. In case-control study evaluating the association between urinary calculi and ED noted a higher of proportion of ED patients had been diagnosed with urinary calculi prior to the index date than that in the control group. ED patients were approximately 1.5 fold the risk of having urinary calculi when compared with controls. The authors proposed that ED was prevalent among patient with a prior diagnosis of urinary calculi[13].

ED is commonly noted among patients with impair renal function. Previous study noted that ED was associated with albuminuria and low level of estimated glomerular filtration rate (eGFR)[11, 12]. The prevalence of ED is apparently high (86%) among patients with end-stage renal disease[14]. ED therefore seems to be an indicator of severe impairment of renal function[15]. The underlying mechanisms for developing ED among patients with renal impairment are the changes of sexual hormone, psychologic factors, and organic function. Bellinghieri et al[16,17] noted vascular endothelial damage and ultrastructure changes of corpora cavernosas characterized by thickening of basement membrane, a reduction of cell contact secondary to an increase of interstitial collagen among ED men with chronic renal failure which might be the major organic cause of ED among this population[16]. In our study, patients who reported to experience ED were 1.2 - fold higher risk of having renal impairment as compared with those who had normal renal function. Thus urinary causes including renal calculi, albuminuria, and eGFR should be screened among patients with ED.

This study has some limitations. Firstly, the study design of the present study was retrospective. Therefore, some informative data were unavailable i.e. psychological factors, details of exercise and drinking behavior, cultural and social beliefs. Secondly, the present study contained a considerably small sample size of patients without ED and this could be a factor precluding prognostic significance of some patient characteristics i.e. patients' age, BMI, and other cardiovascular diseases.

In conclusion, ED was highly prevalent among andropause men with a rate of 83.3% in the present study. Factors associated with ED included a prior diagnosis of DM and renal impairment. ED screening should be recommended for all andropause men to improve the quality of life.

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## ข้อมูลทั่วไปและปัจจัยที่เกี่ยวข้องกับภาวะเสื่อมสมรรถภาพทางเพศของชายไทย ที่มารับบริการที่คลินิกชายวัยทอง ในโรงพยาบาลศรีนครินทร์ มหาวิทยาลัยขอนแก่น

**นันทสิริ เอี่ยมอุดมกาล, โกวิท คำพิทักษ์, เจน โสธรวิทย์, คัชรินทร์ ภูนิคม, นันทยา คุณาธิปพงษ์, เตือนจิต คำพิทักษ์, พรรณวดี ชาติวิเศษ**

***วัตถุประสงค์:*** *เพื่อศึกษาความชุกและปัจจัยเสี่ยงของภาวะเสื่อมสมรรถภาพทางเพศของชายที่มารับบริการที่คลินิกชายวัยทอง โรงพยาบาลศรีนครินทร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น*

***วัสดุและวิธีการ:*** *การศึกษานี้เป็นการศึกษาย้อนหลัง (Retrospective study) โดยเก็บรวบรวมข้อมูลผู้ป่วยที่เคยมารับบริการที่คลินิกชายวัยทองในช่วง พ.ศ. 2546-2556 โดยสืบค้นข้อมูลจากเวชระเบียนของโรงพยาบาล และจากระบบฐานข้อมูลโรงพยาบาล ภาวะเสื่อมสมรรถภาพทางเพศ วินิจฉัยโดยใช้คะแนนแบบสอบถามเรื่อง สมรรถภาพทางเพศ (Modified SHIM-IIEF5 questionnaire)*

***ผลการศึกษาวิจัย:*** *ชายไทย 360 รายที่มีภาวะชายวัยทอง อายุเฉลี่ย 58.9 ปี (58.9 ± 8.3 ปี) ดัชนีมวลกายเฉลี่ย 24.2 kg/m$^2$ (24.2 ± 3.0 kg/m$^2$) ในผู้ป่วย 360 รายพบโรคประจำตัวส่วนใหญ่อยู่ในกลุ่ม metabolic syndrome กล่าวคือ 31.1% มีภาวะไขมันในเส้นเลือดผิดปกติ, 28.1 % มีโรคความดันโลหิตสูง และ 17.5% มีโรคเบาหวาน ความชุกของโรคต่อมลูกหมากโต,ไตเสื่อมเรื้อรัง และมะเร็งพบมากขึ้นตามอายุ โดยเฉพาะในกลุ่มอายุมากกว่า 60 ปี ผู้ป่วย 300 รายจาก 360 รายมีภาวะเสื่อมสมรรถภาพทางเพศ คิดเป็นความชุก 83.3% (95%CI, 79.07%-87.03%) ปัจจัยสำคัญที่สัมพันธ์กับภาวะเสื่อมสมรรถภาพทางเพศอย่างมีนัยสำคัญทางสถิติคือ โรคประจำตัวเป็นเบาหวาน (OR 4.75; 95%CI, 1.44-15.69; p=0.005) และการทำงานของไตผิดปกติ (OR 1.21; 95% CI, 1.15-1.26; p=0.02)*

***สรุปผล:*** *ความชุกของภาวะเสื่อมสมรรถภาพทางเพศในคลินิกชายวัยทองพบได้มาก ปัจจัยเสี่ยงที่สำคัญต่อภาวะเสื่อมสมรรถภาพทางเพศในชายวัยทองคือ โรคประจำตัวเป็นเบาหวานและการทำงานของไตผิดปกติ ดังนั้นควรมีการคัดกรองหาภาวะเสื่อมสมรรถภาพทางเพศในชายวัยทองเพื่อเพิ่มคุณภาพชีวิตในประชากรกลุ่มนี้*