

Screening for Erectile Dysfunction and Associated Cardiovascular Risk Factors in Israeli Men

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Abstract

Background: Erectile dysfunction is associated with treatable cardiovascular risk factors; therefore, screening for erectile dysfunction and its cardiovascular risk factors is of clinical importance.

Objectives: To detect erectile dysfunction cases and assess their severity among military personnel.

Methods: The Sexual Health Inventory for Men questionnaire was handed out to military personnel aged 25–55 years during routine examinations.

Results: A total of 19,131 men with a mean age of 34.0 ± 7.1 years participated in routine physical examinations during the years 2001–2005. More than half of them ($n=9956$, 52%) completed the SHIM questionnaire. No significant differences were found between those who completed the SHIM questionnaire and those who did not, in terms of mean age, mean body mass index, and prevalence of cardiovascular risk factors. One out of every four men (25.2%) suffered from erectile dysfunction, which was mild in 18.9%, mild to moderate in 4.4%, moderate in 1.1%, and severe in 0.7%. Even though treatable cardiovascular risk factors were quite prevalent in the study group (45.2% of them suffered from dyslipidemia, 25.6% smoked, 4.2% suffered from essential hypertension, and 1.6% from diabetes mellitus), erectile dysfunction was significantly associated with age and diabetes mellitus alone ($P < 0.0001$).

Conclusions: There is a high prevalence of erectile dysfunction and associated treatable cardiovascular risk factors in Israeli men aged 25–55, especially those with diabetes.

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Erectile dysfunction is defined as the inability to attain and/or maintain penile erection sufficient for satisfactory sexual performance [1]. According to the Massachusetts Male Aging Study, the prevalence of erectile dysfunction in men aged 40–70 is 52% [2]. It is associated with treatable cardiovascular risk factors such as diabetes mellitus, dyslipidemia, essential hypertension and smoking [2–4], most likely due to the fact that systemic atherosclerosis and endothelial dysfunction not only involve the coronary arteries but affect the penile vasculature as well [5]. Early treatment of these cardiovascular risk factors could result in a significant reduction in cardiovascular morbidity and mortality [6], and could theoretically alleviate erectile dysfunction [7]. This highlights the importance of early detection and treatment of individuals with erectile dysfunction and associated cardiovascular risk factors.

SHIM = Sexual Health Inventory for Men

We present data collected during 5 years of erectile dysfunction and associated treatable cardiovascular risk factor screening in 9956 Israeli men aged 25–55 years. To the best of our knowledge, this is the largest survey on the prevalence of this disorder and associated treatable cardiovascular risk factors ever conducted in Israel.

Subjects and Methods

All Israel Defense Forces personnel aged 25 years and older are required to undergo medical screening examinations every 3–5 years at the Staff Periodic Examination Center. Each patient completes a detailed questionnaire surveying his medical history, smoking habits and physical activity habits. Blood samples for fasting plasma glucose and lipid profile are drawn first thing in the morning following a 12 hour night fast. A complete physical examination, including height and weight measurements, is also performed. Finally, a detailed medical summary is mailed to the patients as well as to their military primary care physicians with relevant findings and recommendations. IDF primary care physicians are responsible for implementing the recommendations set forth in the medical summary.

Cardiovascular risk factors

We examined four treatable cardiovascular risk factors: current smoking, diabetes mellitus, dyslipidemia, and essential hypertension. The diagnosis of diabetes mellitus was consistent with the guidelines of the American Diabetic Association. Diabetic patients were those with fasting plasma glucose of 126 mg/dl or higher, or those consuming hypoglycemic agents [8]. The diagnosis of dyslipidemia was consistent with the third report of the expert panel on detection, evaluation and treatment of high blood cholesterol in adults (ATP III). Dyslipidemic patients were defined as those consuming lipid-lowering agents or those who had at least one of the following: total cholesterol levels ≥ 240 mg/dl, low density lipoprotein-cholesterol levels ≥ 160 mg/dl, high density lipoprotein-cholesterol levels ≥ 40 mg/dl (as defined for men only), and triglycerides levels ≥ 150 mg/dl [9]. Fasting plasma glucose and cholesterol levels were measured using the BM/Hitachi 917 machine (Boehringer Mannheim GmbH, Germany).

IDF = Israel Defense Force

The diagnosis of essential hypertension was consistent with the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7). Hypertensive patients were defined as those having systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg on repeated blood pressure measurements, or as those consuming antihypertensive agents [10]. Smoking habits were self-reported. Current smoking was defined as having smoked at least one cigarette, cigar or pipe tobacco, during the previous 3 months [11].

The Sexual Health Inventory for Men questionnaire

The Sexual Health Inventory for Men questionnaire consists of five items, each rated on a 6-point scale from 0 to 5, except for one item which is rated on a 5-point scale from 1 to 5. The final score, ranging from 1 to 25, is calculated by summing up individual question scores [see Appendix]. Men who scored below 22 on the SHIM questionnaire were labeled as suffering from erectile dysfunction and were further classified into four separate categories: severe – those scoring between 1 and 7, moderate – scoring between 8 and 11, mild to moderate – scoring between 12 and 16, and mild – scoring between 17 and 21 [12]. It is important to note that completion of the SHIM questionnaire was not a mandatory part of the routine physical exam of IDF personnel.

Statistical analysis

Continuous variables were expressed as mean \pm SD. Student's *t*-test was used to compare the mean continuous variables for SHIM responders with the mean continuous variables for non-responders. The chi-square test was used to compare prevalence of treatable cardiovascular risk factors for SHIM responders with prevalence of treatable cardiovascular risk factors for non-responders. A general linear model was used to test for the dependence of erectile dysfunction on a list of explanatory variables, such as age and treatable cardiovascular risk factors. *P* values of ≤ 0.05 were considered statistically significant throughout. All analyses were performed using SAS version 8 (SAS institute Inc., Cary, NC, USA).

Results

A total of 19,131 men, with a mean age of 34.0 ± 7.1 years, participated in the Staff Periodic Examination Center medical screening exams between January 2001 and December 2005, of whom 9956 (52%) completed the SHIM questionnaire (henceforth referred to as "responders"). Compliance with the SHIM questionnaire gradually grew with time, ranging from 45.4% to 56.2% [Figure 1]. No significant differences were found between responders and non-responders to the SHIM questionnaire in terms of mean age, mean body mass index, and prevalence of treatable cardiovascular risk factors [Table 1].

The mean SHIM score for responders was 22.5 ± 3.4 . The prevalence of low SHIM scores (< 22) suggesting erectile dysfunction was 25.2% (2506 men), which was mild in 18.9%, mild to moderate in 4.4%, moderate in 1.1%, and severe in 0.7%.

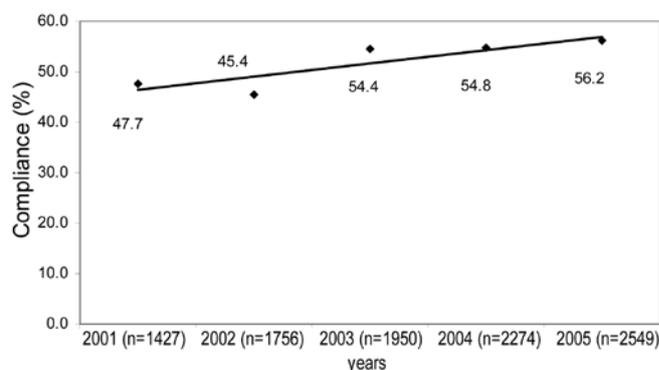


Figure 1. Compliance with the Sexual Health Inventory for Men questionnaire over 5 years

Table 1. Characteristics and prevalence of cardiovascular risk factors among responders and non-responders to the SHIM questionnaire

		Responders (n=9956)	Non-responders (n=9175)	<i>P</i>
Age (yrs)	Mean \pm SD	34.0 ± 7.3	34.3 ± 7.1	NS
Body mass index (kg/m ²)	Mean \pm SD	26.3 ± 4.2	26.1 ± 4.3	NS
Smoking	n (%)	2549 (25.6%)	2385 (25.9%)	NS
Diabetes	n (%)	162 (1.6%)	122 (1.3%)	NS
Dyslipidemia	n (%)	4498 (45.2%)	4314 (47.0%)	NS
Hypertension	n (%)	419 (4.2%)	385 (4.2%)	NS

The prevalence of erectile dysfunction was higher in men aged 25–29 years compared with men aged 35–39 years due to the relatively high prevalence of both mild and severe dysfunction in men aged 25–29 years, increasing for all subgroups after age 40 [Figure 2]. Prevalence of dysfunction was 21.8% in men aged 25–39 years, compared with 33.7% in men aged 40–55 years ($P < 0.0001$).

The prevalence of treatable cardiovascular risk factors among responders was 45.2% for dyslipidemia, 25.6% for smoking, 4.2% for essential hypertension, and 1.6% for diabetes mellitus [Figure 3]. The probability of suffering from erectile dysfunction was twice as high for diabetic men than for non-diabetic men aged 25–55 years (50% vs. 25%, $P < 0.0001$). SHIM scores were inversely correlated with age ($r = -0.12$, $P < 0.0001$). In a general linear model, the probability of having erectile dysfunction was influenced by age and diabetes mellitus alone ($P < 0.0001$). Dyslipidemia, hypertension and smoking did not significantly influence the probability of having erectile dysfunction in men aged 25–55 years.

Discussion

Erectile dysfunction is a common condition affecting the quality of life of men worldwide. According to our previous findings, it is common not only in middle-aged men but also in young adults [13]. This report reinforces these findings: 25.2% of Israeli men aged 25–55 years and 21.8% of Israeli men aged 25–39 years suf-

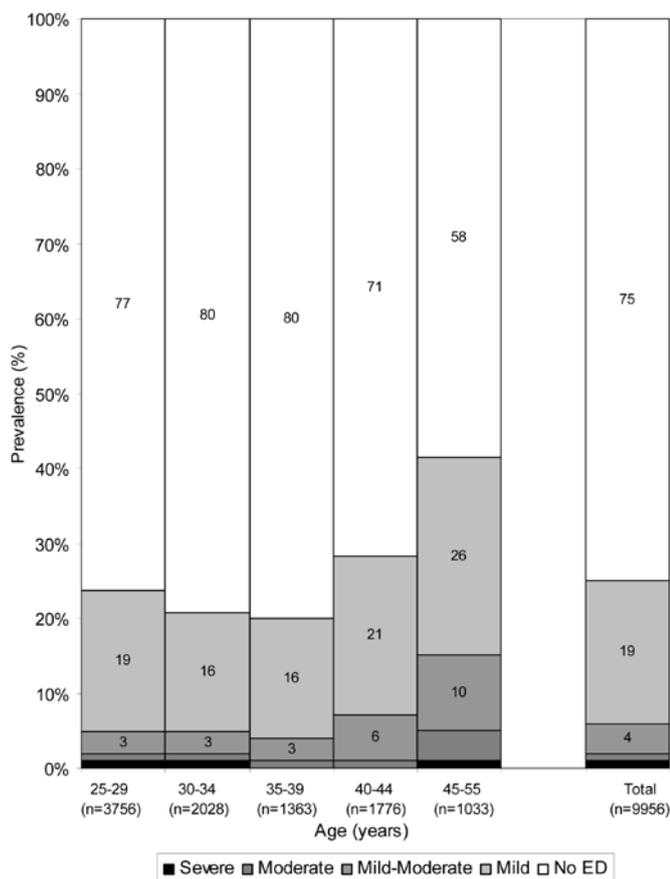


Figure 2. Prevalence of erectile dysfunction by severity and by age group. ED = erectile dysfunction

fer from erectile dysfunction. These findings enhance the MMAS findings by showing that it is not only men aged 40+ who suffer from erectile dysfunction [2], suggesting that primary care physicians should address sexual issues in all age groups. Treatable cardiovascular risk factors were quite prevalent in the responding group: 45.2% had dyslipidemia, 25.6% smoked, 4.2% had essential hypertension, and 1.6% had diabetes mellitus. These findings were consistent with those of a previous cohort in which the prevalence of treatable cardiovascular risk factors was studied among 23,339 Israeli men aged 25–55 [14]. Since erectile dysfunction may serve as an indicator for future cardiovascular events, neglecting cases of dysfunction could prove detrimental. Since training in communication skills is the strongest predictor for sexual history-taking by primary care physicians [15], we suggest that our findings be presented to Israeli primary care physicians during their training in order to increase their awareness regarding the high prevalence of this condition in young men.

Although the etiology of erectile dysfunction was not investigated in this cohort, we believe the relatively high prevalence of mild and severe dysfunction in men aged 25–34 years to be the result of psychogenic effects, and the general increasing

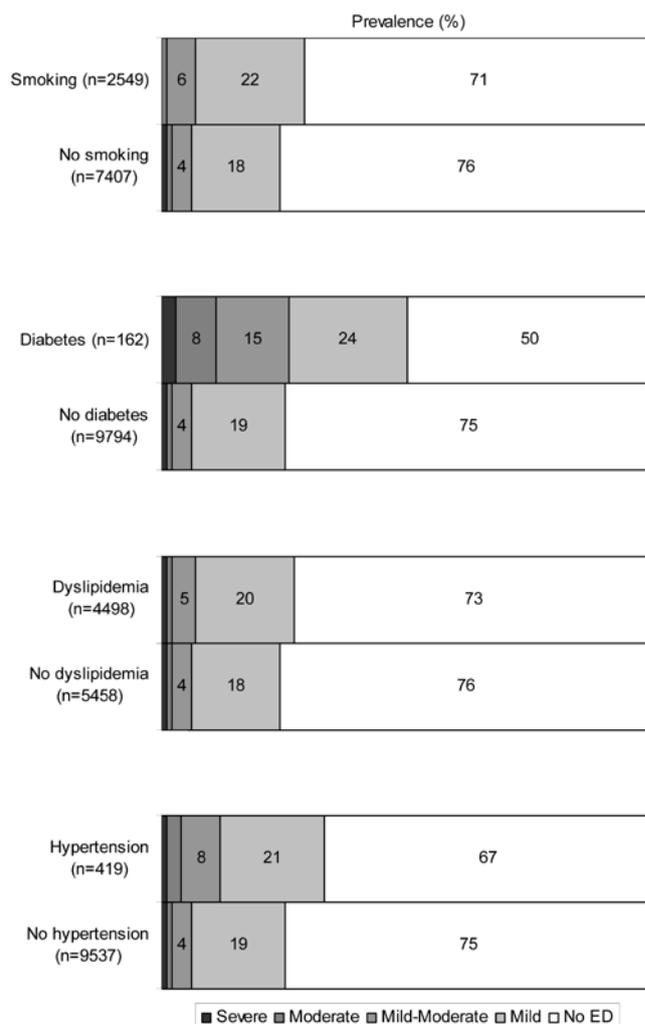


Figure 3. Prevalence of erectile dysfunction by severity and by cardiovascular risk factors. ED = erectile dysfunction

prevalence of the condition in men aged 40+ to be the result of vascular effects. This assumption is also consistent with diabetes mellitus being the only cardiovascular risk factor influencing the probability of the condition in men; after all, diabetes mellitus might cause dysfunction in young men earlier than other cardiovascular risk factors such as hypertension [16] and by several mechanisms other than atherosclerosis [17]. Our findings complement the MMAS findings [2]; although the prevalence of erectile dysfunction is quite high among men aged 25–39 years, it decreases between the ages of 25 and 39, and increases in men aged 40+.

Discussing erectile dysfunction might be difficult for both primary care physicians and patients. Primary care physicians, particularly female, are often reluctant to ask patients about their sexual activity [15]. Self-assessment sexual questionnaires endeavor to overcome this difficulty and raise the level of awareness regarding the condition. Since first introduced in 1999, the SHIM questionnaire has proven highly effective in screening for

MMAS = Massachusetts Male Aging Study

erectile dysfunction and assessing its severity. High correlation values were found between the SHIM score and patient self-assessment [12]. When we added the SHIM to routine examinations of IDF personnel, we expected low compliance due to the combination of the intimacy of its questions and the reserved nature of military personnel. Still, we found it valuable for detecting erectile dysfunction within the first months [18] and even more so over a 3 year period [13]. Compliance with the questionnaire was surprisingly high and even increased over the years. Though only a minority of those with the condition eventually turned to the IDF sex clinic for consultation, an increasing number of men with low SHIM scores turned to that clinic every year, and an increasing number of men were referred to the same sex clinic by their primary care physician [19]. To the best of our knowledge, our experience in screening for erectile dysfunction is unique, and quite successful. We therefore believe that other health screening programs, which ignore these intimate aspects of well being, should view the IDF as a model for successful screening of erectile dysfunction.

Study limitations

One might claim that compliance with the SHIM questionnaire, ranging from 45.4% to 56.2%, is too low to draw population-based conclusions. However, this compliance is surprisingly high given the intimate nature of the questionnaire and the reserved nature of military personnel. Moreover, we demonstrated similarity between the responders and non-responders to the SHIM questionnaire in terms of mean age, mean body mass index, and prevalence of treatable cardiovascular risk factors.

Conclusions

The prevalence of erectile dysfunction is high not only in men aged 40 years and above, but also in men 25–39 years old, especially those with diabetes. The decreasing prevalence of erectile dysfunction between the ages of 25 and 39 years is probably due to psychogenic effects, while the increasing prevalence of dysfunction after the age of 40 is probably due to vascular factors. We want to raise the awareness of Israeli physicians to the high prevalence of erectile dysfunction and associated treatable cardiovascular risk factors in young Israeli men.

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Appendix: The Sexual Health Inventory for Men questionnaire (SHIM) during the past 6 months

How would you rate your confidence in achieving erection?

- 1 Very Low
- 2 Low
- 3 Moderate
- 4 High
- 5 Very High

During experienced erections from sexual stimulation, how often were your erections hard enough for penetration?

- 0 No sexual activity
- 1 Almost never or never
- 2 A few times
- 3 Sometimes
- 4 Most times
- 5 Almost always or always

During sexual intercourse, how often were you able to maintain your erection after penetrating your partner?

- 0 Did not attempt
- 1 Almost never or never
- 2 A few times
- 3 Sometimes
- 4 Most times
- 5 Almost always or always

During sexual intercourse, how difficult was it for you to maintain erection to completion of intercourse?

- 0 Did not attempt
- 1 Extremely difficult
- 2 Very difficult
- 3 Difficult
- 4 Slightly difficult
- 5 Not difficult

When attempting sexual intercourse, how often was it satisfactory for you?

- 0 Did not attempt
- 1 Almost never or never
- 2 A few times
- 3 Sometimes
- 4 Most times
- 5 Almost always or always