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## Epidemiology of Erectile Dysfunction

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### SUMMARY

Erectile dysfunction (ED) is a highly prevalent condition among men all over the world. It has a significant negative impact on the quality of life of the patients and their partners. Its prevalence and incidence are associated with aging as well as important comorbidities, such as cardiovascular disease, diabetes, metabolic syndrome, hyperlipidemia, depression, pelvic surgery, side effects of medications, neurological disorders, trauma, symptoms of benign prostate hyperplasia, and psychological and interpersonal problems. Furthermore, lifestyle choices of major public health impact are also associated with ED. These include preventable causes of disease such as obesity, smoking, alcohol abuse, and sedentary lifestyle. Recent studies have revealed that ED is not only a correlate of cardiovascular disease, diabetes, and metabolic syndrome; it is rather an early warning symptom. Studies on treatment-seeking behavior revealed significant barriers to seeking treatment for this condition and its important correlates.

**Key Words:** Erectile dysfunction; metabolic syndrome; risk factors for endothelial dysfunction; Massachusetts Male Aging Study; global sexual dysfunction.

### INTRODUCTION

The treasure of knowledge about the epidemiology of erectile dysfunction (ED) has expanded significantly in the past three decades. Several national and international studies have been performed using population samples that have produced data on the prevalence and incidence of ED. Additionally, large studies have helped in the understanding of the correlates, risk factors, and impact of ED as well as the effect of aging. However, gaps in our knowledge remain in the areas of natural history of ED and risk modification.

### PREVALENCE AND INCIDENCE OF 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). World-wide estimates of ED prevalence range from 2% in men younger than 40 yr to 86% in men 80 yr or older (2). Prins et al. (2) systematically reviewed 23 studies (including 15 from Europe, 5 from the United States, 2 from Asia, and 1 from Australia) and reported

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the prevalence of ED in population-based studies. They reported the drawbacks of some studies—namely, prevalence rates without classifying patients with ED into different age groups or without referring to the severity of ED and its nomenclature: mild/partial/minimal, moderate/intermediate, complete/severe. Prevalence rates of ED among specific age groups were not reported in every study. This makes it difficult to draw solid conclusions regarding the prevalence of different degrees of severity of ED among different age groups. ED prevalence and severity increase with age. ED prevalence has been reported as 7% among men aged 18 to 29 yr, 2 to 9% among men aged 30 to 39 yr, 9 to 11% among men aged 40 to 49 yr, 16 to 18% among men aged 50 to 59 yr, 34% among men aged 60 to 69 yr, and 53% among men aged 70 to 80 yr (2).

The large variation in reported prevalence rates reflects differences in methodology, definitions of ED, regional and cultural perceptions of ED, age, and extent of concomitant medical conditions (2,3). Risk factors for ED include aging, comorbid disease, certain medications, obesity, and lifestyle behaviors (e.g., alcohol and tobacco use; ref. 4). The prevalence of ED is not the same among different countries or continents nor among different ethnic groups. The prevalence rates for mild and severe ED has been reported as 35% in the United States, 26% in Finland, 21% in Italy, 12% in France, and 11% in Spain (5–9). In Malaysia, Low et al. (8) reported a difference in the concept of ED and its prevention and treatment among males from three different ethnic groups living in the country (Malay, Chinese, and Indian) without reporting the percentages of each group. Among men consulting for ED in Israel, a multi-ethnic country, 13% were born in Israel, 33% were immigrants from North African (Morocco, Libya, Yemen) or other Middle East countries (Iraq, Iran), and 54% came from North and South America and Europe (9). The Cologne study shows an important difference between an overall ED prevalence of 19.2% among 71.3 to 96% men involved in regular sexual activity and 31.5 to 44% of responders who were dissatisfied with their current sex life (5). The prevalence of ED may be different, depending on the system used to perform the evaluation. ED prevalence has been reported as 12 to 25% on the basis of self-evaluation compared to 19 to 31.6% according to International Index of Erectile Function criteria (7–9).

Although much data exist regarding the prevalence of ED, there is little information regarding the incidence of dropout from treatment programs or discontinuation of follow-up visits. Among 4489 responders in the Cologne study, 46.2% were willing to contribute financially toward the cost of a regular treatment for ED (5). On the other hand, 9 to 25% of sildenafil responders discontinued successful treatment because of medication cost (10,11).

The Massachusetts Male Aging Study (MMAS), the first large-scale, population-based study of ED, found that the prevalence of ED correlated highly with age (12). This study also found that ED correlated with heart disease, hypertension, diabetes, and low levels of high-density lipoprotein cholesterol, independent of age. Using a large claims database of 28 million health plan members in the United States, Seftel et al. (13) found that hypertension, hyperlipidemia, diabetes, and depression were prevalent in men with ED, suggesting that ED shares common etiological risk factors with these comorbidities. Esposito et al. (14) showed that lifestyle changes, such as weight loss and increased physical activity, were associated with improvement in sexual function in about one-third of men with ED.

Many of the diseases associated with ED appear to affect the vascular system (e.g., atherosclerosis, hypertension, lipid disorders, myocardial infarction, cerebrovascular accidents, peripheral vascular disease, and diabetes mellitus; refs. 4 and 12). The erectile

response involves a complex interaction between neurological, vascular, and hormonal processes. Accordingly, disorders that impair processes common to those that underlie the erectile mechanism (e.g., neural transmission, blood flow, or smooth muscle response) may play a role in ED (4). Recently, considerable attention has been given to the correlation between lower urinary tract symptoms (LUTS) and ED (5,15,16). LUTS—frequently caused by benign prostatic hyperplasia—is an aggregate of related voiding symptoms, including urinary frequency, urgency, nocturia, and slow stream. Although the pathophysiological link between LUTS and ED is not understood, the findings from several studies suggest that LUTS is a risk factor for ED, independent of age and other comorbidities (5,10,17).

The Cross-National Survey on Male Health Issues was a population-based, international survey for men regarding their health issues. The study was unique because it primarily measured the prevalence of ED in men who used health care systems. The objectives of the survey were to investigate the prevalence of ED, to evaluate treatment-seeking behaviors among these men, to assess their attitudes toward the condition, and to identify the barriers and motivators of seeking treatment for ED. The treatment-seeking behaviors of men with ED have been reported (18). The results have confirmed other population-based reports that only a minority of men with ED seek treatment. Common barriers to seeking treatment included the belief that the condition would resolve on its own (primarily younger men) and the perception that ED was a normal part of aging (primarily older men). The study also confirmed the association of ED with age, overall health, and comorbidities such as hypertension, hyperlipidemia, diabetes, depression, and LUTS.

Men who currently or formerly suffered from ED comprised 19% of the population in the Cross-National Survey on Male Health study, which is consistent with reports from other population-based surveys(2,3), yielding an overall worldwide prevalence rate of 19%. Age was the primary variable that correlated with ED in this study. Respondents in the oldest age group (70–75 yr) had a 14-fold higher relative risk of experiencing ED than respondents in the youngest age group (20–29 yr). Across the six countries, ED prevalence rates increased from 4 to 6% in men younger than age 40 yr to 39 to 73% in respondents age 70 to 75 yr. These findings are consistent with those from another population-based study (2).

Information on the screening questionnaire allowed the assessment of the correlation between ED and overall health. The results of the analysis showed a significant positive correlation between ED and increasingly poor health, with respondents who reported poor health experiencing a fivefold higher risk for ED than respondents who reported excellent health. The results of the screening analysis showed a significant association between ED and LUTS, which is consistent with findings from other studies. The follow-up questionnaire completed by men who reported ED included several items related to demographics, comorbidities, and medication use. The most frequently reported comorbidities in this sample population of men in the health care system were hypertension and hyperlipidemia. Diabetes was also cited as a frequent comorbidity by a large number of men. These findings are consistent with reports from other population-based surveys (12, 17,19–21). In the MMAS, total serum cholesterol did not correlate with prevalence of ED, but high-density lipoprotein cholesterol was inversely correlated with ED (12). The prevalence of comorbidities for ED in our survey increased with increasing severity of ED when severity was based on either the International Index of Erectile Function or self-report. With the exception of anxiety, depression, and spinal cord injury, the rates of comorbidities increased with age. In our survey of men with ED in six countries, approx

10 to 20% were taking  $\beta$ -blockers. Only a small percentage (2–8%) of men with ED used nitrates for comorbid cardiac disorders, which is important because many men with ED receive phosphodiesterase-5 inhibitors as first-line therapy, and this class of agents is contraindicated with nitrate use. Similarly to all epidemiological studies, there were inherent biases in the survey methodology and data analyses. The analyses performed using the data were *post hoc* and exploratory. As expected, because of the sensitivity of the subject matter and the fact that respondents answered in private and could leave blanks, large amounts of data were missing from the survey.

Results from the Cologne Male Survey of 8000 men in Germany revealed that the prevalence of LUTS was approx 72% in men with ED vs 38% in men without ED (odds ratio: 2.11; ref. 17). Multivariate analyses showed that the association of LUTS with ED occurred independently of age and other comorbidities such as diabetes, hypertension, and history of pelvic operations. Similarly, the results of the Multinational Survey of the Aging Male, which was conducted on approx 14,000 men in the United States and six European countries (United Kingdom, France, Germany, the Netherlands, Italy, and Spain), found that ED was strongly associated with LUTS severity ( $p < 0.001$ ), independently of age- and vascular-related comorbidities (15).

A noteworthy observation in the Cross-National Survey on Male Health Issues was that the prevalence of comorbidities increased with the severity of ED. This finding, in addition to data showing that ED correlated with overall health, indicates that ED is a prognostic marker of overall health and important diseases. Presentation of diseases such as hypertension, hyperlipidemia, diabetes, depression, and urinary problems should alert the primary care physician, urologist, cardiologist, or endocrinologist to the possibility of ED. For example, practitioners who see men with urinary symptoms have an opportunity to inquire about the possibility of ED, thereby providing a means for overcoming barriers to discussion and treatment. Conversely, the presence of ED should alert practitioners to the likelihood of other common comorbidities. Men with comorbid conditions, such as vascular diseases and LUTS, should be screened for ED, and men with ED should be screened for comorbid conditions. The results from this and similar surveys will improve identification and disease management as well as treatment paradigms for ED.

## AGING AND ERECTILE DYSFUNCTION

*“A man is as old as his arteries”—Sir William Osler*

Because the penis is a vascular organ, it is true that a man is as old as his penis. The classical work by Kinsey (22) revealed that aging is a key risk factor for the development of male ED. In his pioneering work, Kinsey showed that the prevalence of ED increased with age from 0.1% at 20 yr to 75% at 80 yr. A half century later, the MMAS (12) showed the same trend—namely, the prevalence of ED increased from 39% in men in their 40s to 67% for men in their 70s. Using the same questionnaire as the MMAS study, the Cross-National Epidemiological Study was conducted in four different countries with varying cultures: Brazil, Italy, Japan, and Malaysia (23). The results confirmed the findings of the MMAS with an age-dependent increase in the prevalence of ED in these different countries.

The world is getting older and older, especially in developed countries. Japan is the most aged and still aging country in the world. We see the future of the rest of the world by studying what happens in Japan. The ministry of the Health and Welfare of Japan has

projected that the percentage of the population over 65 yr will represent as much as 20% by the year of 2010. The French, German, and Swedish populations will have a similar distribution based on age by the year 2020. The British and American populations are lagging and, therefore, will not reach 20% of the population over age 65 until the year 2030. Because age has been shown to be a significant risk factor for all types of sexual dysfunction, we anticipate that with the growing population over age 65, there will be an enormous number of patients with either ED or sexual dysfunction (24).

Another key factor is treatment-seeking behavior. The marketing of sildenafil in Japan is a striking example of how aging affects treatment-seeking behavior. Despite the fact that Japan has a significant elderly population, the sales of sildenafil have been disappointing on a per capita basis. Only 800,000 (8%) of the estimated 10,000,000 patients received prescriptions for sildenafil (23). This is especially surprising because neither Caverject nor MUSE<sup>®</sup> are available in Japan. My colleagues and I (18) reported the treatment-seeking behavior in six different countries (the United States, France, Germany, Italy, Spain, and the United Kingdom). They showed that treatment-seeking rate has a peak during middle age, with the exception of in the United States. The most common reason for the older age group to not seek treatment is their impression that “ED is a natural part of aging.” Therefore, aging did not directly increase the cost of ED diagnosis and treatment. We have to estimate the cost by combining the age demographics and the treatment-seeking rate in each country or each culture. However, if we manage to eliminate this kind of stigma by educating the medical professionals and the public—especially among the older people—the cost will be much higher.

## RISK FACTORS FOR ERECTILE DYSFUNCTION

According to the United Nations, by 2025, there will be more than 356 million men older than age 65 worldwide, an increase of 197 million from the current number. In 1995, the global proportion of men older than age 65 was 4.2%; this is expected to rise to 9.5% by 2025. Because of the correlation between ED and age, global aging will bring an increase in the number of men with ED in the future. ED is commonly associated with aging and age-related health problems, such as vascular, hormonal, neural, psychogenic factors, and side effects of therapeutic drugs. Current data on ED among the healthy population—particularly for physiological and psychosocial variables—is extremely lacking, despite the prevalence and implications of ED on quality of life (24).

ED is common in men with cardiovascular disease and is probably brought about by shared factors that impair the hemodynamic mechanisms (25,26). The majority of patients with ED have at least one significant cardiovascular risk factor (e.g., hypertension, diabetes mellitus, smoking, or hyperlipidemia). Therefore, vasculogenic ED may be the harbinger of a systemic vasculopathic state.

MMAS results showed the age-adjusted probability of the onset of moderate ED increased from 6.7 to 25% as high-density lipoprotein cholesterol decreased from 90 to 30 mg/dL in younger men (40–55 yr) and from 0 to 16% in older men (56–70 yr; refs. 18 and 24). In the study, heart disease and associated risk factors, hypertension, and low-serum high-density lipoprotein significantly correlated with ED (25,26). Oaks and Moyer reported that 8 to 10% of all untreated hypertensive patients were impotent the time that hypertension was diagnosed (26a). Furthermore, Wabrek and Burchell reported that in a group of 131 men with acute myocardial infarction between ages 31 and 86 yr, 64% were



impotent; additionally, in a study of patients who underwent coronary artery surgery, 57% were mostly impotent (26b). In a study of men in a hypertension center, ED was found to be highly prevalent and severe in men with hypertension (27). Furthermore, ED was found to be a prognostic marker of the complications of hypertension—namely, myocardial infarctions and cerebrovascular accidents (28).

Diabetes is another major illness associated with ED. In the MMAS sample, the age-related probability of complete ED was three times greater in patients with diabetes than in those without diabetes. Other studies using diabetic populations have consistently found a high prevalence of diabetes-related ED, with estimates ranging from 35 to 50% and up to 75%. The prevalence of ED in patients with diabetes has been reported to increase from 15% in men aged 30 to 35 yr to 55% in men aged 60 yr. ED occurs at an earlier age in people with diabetes than in the general population and often follows, or leads to, the diagnosis of either insulin-dependent or non-insulin-dependent diabetes (24,25).

The exact link between ED and depression is not well defined, because its significance is twofold; depression can be both a cause and an effect of ED (29). Depression has numerous ED-correlated symptoms: changes in sleep patterns, decreased interest in and response to pleasurable activities, and anticipation of a negative outcome. However, depression brought on by episodes of ED may perpetuate erectile failure, cause deeper depression, and result in the avoidance of sexual opportunity, even with an effective treatment. In the MMAS study, patients with depression had a 1.82 higher chance of developing ED than patients who did not suffer from depression.

The link between cigarette smoking and ED is not clearly understood (30–32). The MMAS sample did not show a significant difference in cases of ED between current smokers and nonsmokers. However, the association of ED with certain risk factors was greatly amplified in current smokers. According to MMAS data analysis, the age-adjusted probability of complete ED in subjects treated for heart disease was 56% for current smokers compared to 21% for nonsmokers. Furthermore, the Vietnam Experience Study found that the prevalence of ED was 1.5-fold greater in current smokers compared to nonsmokers. A cross-sectional study conducted in Italy comparing nonsmokers and current smokers and exsmokers in 2010 men older than age 18 yr presented an odds ratio of ED of 1.7 and 1.6, respectively. The study also showed that the risk of developing ED is influenced by smoking and that the duration of the habit increases this risk.

Other important factors include heavy alcohol consumption, obesity, and physical activity. Chronic, heavy alcohol consumption may have an irreversible effect on erectile function because of neurological damage; specifically, changes in drinking habits may not influence erectile function. Chronic drug abuse, especially combined with alcohol consumption, can lead to erectile disorders, specifically because of behavioral changes (32). The link between ED and the use of certain medications is underestimated.

A close link exists between ED and pelvic surgery, with rates ranging up to 80%. In this case, radical prostatectomy, cystectomy, and radical pelvic surgery are considered. Transurethral resection of the prostate plays an unclear role (33).

The rise in the prevalence of worldwide ED, coupled with the new high-profile medical treatments, is raising policy issues (24). National health systems that are already underfunded are facing unexpected requests for resources and challenges to current government funding priorities. The wide range of treatment options available since the arrival of new oral drugs effective for the treatment of ED has, above all, re-opened the debate over rationing and funding priorities.

## IMPACT OF ERECTILE DYSFUNCTION

ED is highly prevalent, the incidence is strongly age-related, and it is progressive and undertreated (34). The world population is rapidly aging. In 2000, 13% of the world's population was older than 65 yr, and it is estimated that by 2020, this population will increase to 20%. The projections made in 1998—namely, that a fourfold increase in the ED industry would occur by 2002, from about \$0.9 to \$5 billion—have been proven (35, 36). The impact of a condition with such escalating proportions seems obvious. The economical impact of a medical condition or disease is not limited by the cost of diagnosis and treatment, but it includes the impact on the patient and society in various ways, such as loss of time at work, decreased productivity for the patient, and the effect on the partner, the family, and co-workers. The impact is further confounded by the correlates of ED, which have a high economical impact, such as atherosclerosis, myocardial infarction, hypertension, diabetes mellitus, depression, and conditions of the prostate, such as benign prostatic hyperplasia and cancer of the prostate.

### *Economical*

An attempt was made to estimate the economical impact of ED in the United Kingdom (24,36). In this study (conducted from 1997 to 1998) on the cost of ED in the National Health Service (NHS), it was estimated that £53 million was spent to manage 113,600 patients with ED (36). The main cost driver was outpatient visits, which accounted for 65% of the cost. Drugs accounted for 25% and genito-urinary consultations, and prostheses accounted for only 4% of the cost. It was estimated that the NHS managed 35% of the population with ED. Assuming that this was representative, the total population of individuals in the United Kingdom was estimated to be approximately 325,600. It has been further estimated that these men incur £7.0 million in cost directly attributable to ED (19.63 d/yr to lost work), thus costing the society another £2.2 million in lost gross domestic product. It was concluded that ED imposes a relatively small economical burden on the UK Society (£53 million), of which 83% is borne by the NHS, 13% is borne by patients, and 4% is borne as indirect costs to society resulting from lost productivity. The authors stated that the future burden would depend largely on patient's eligibility to receive treatment under the NHS.

In an attempt to curb expenditure, the NHS imposed prescribing restrictions for ED under Schedule 11. Wilson et al. (37) assessed the effect of these restrictions. During the period of the study (1997–2000), a 30% increase in the number of patients (79,800 to 257,984) and a 40% increase in cost (£29.4 million to £73.8 million) were observed. The actual expenditure per patient decreased by 22% from £368 to £286 and the main expenditures were ascribed to specialist consultations (30%) and drug prescriptions (25%). The increased cost mainly resulted from a threefold increase in the number of patients presenting to general practitioners, who then referred patients to specialists because of Schedule 11 restrictions. This led to an increased use of all resources, including sildenafil. The investigators concluded that the cost-effectiveness of transferring prescribing responsibility in cases of severe distress from specialists to general practitioners remained to be determined. In a study on the containment of costs by the implementation of the Department of Health guidelines, following the introduction of sildenafil in Portsmouth and South East Hampshire, researchers observed that specialist care and associated costs fell by 70% in the first year following the introduction of the Department of Health guidelines,

whereas prescribing costs of primary care doubled. Overall costs for providing services in 1999 to 2000 were £232,169 compared to overall costs of £225,108 (uplifted to 1999–2000 values) incurred in 1998 to 1999 (38). These studies indicate that costs can be contained despite the escalation in the number of patients. Potential benefits of the impact of introducing oral treatment for ED have been reported (39,40). Health care systems have generally rejected treatment of ED, despite ignorance regarding the effect of non-treatment (41,42).

### *Quality of Life*

General and disease-specific quality of life in men with diseases such as cancer of the prostate and end-stage renal disease have been evaluated and reported (43–49). In a multicenter European study of men with organic ED, self-administration of intra-urethral prostaglandin E<sub>1</sub> (MUSE) resulted in a 70% improvement in the quality of erections, a 34% improvement in relationships with partners, and statistically significant improvements in personal wellness, contentment, and self-esteem, which translates indirectly to an improvement in quality of life (50). Intracavernosal injection of prostaglandin E<sub>1</sub> also resulted in significant improvement, as measured by the Life Satisfaction Checklist (51). According to the Life Satisfaction Checklist, it was possible to differentiate between patients with organic, psychogenic, and no ED. The study indicated that sexual satisfaction was a major indicator for general life satisfaction. In two further studies of intracavernous injection for ED, a large percentage of patients indicated that treatment improved quality of life (52,53). Most reports from studies on various aspects of quality of life in patients with ED, such as the International Index of Erectile Function (question 13, overall satisfaction with sex life, and question 14, sexual relationship with partner), the Erection Distress Scale, and the Psychological General Well-Being Index, showed improvements in quality of life. However, it was unclear why some instruments as measures of self-control and anxiety, such as the Rosenberg Self-Esteem Scale and the Medical Outcome Study, did not detect improvement in quality of life (54–57). Most studies have limited and diverse quality-of-life measurements, but they all support the notion that therapy for ED improves quality of life.

### *Relationship*

Improvement in the quality of life in patients affects their partners. In studies where partners were assessed about their responses, they responded equally as well to treatment and reported significant increases in intercourse frequency, sexual arousal, orgasm, and overall sexual satisfaction (58). The mental and social domains, as measured by the Duke Health Profile, improved significantly after intracavernosal injection of prostaglandin E<sub>1</sub> as treatment for ED (59). A 34% improvement in “relationship with partner” domain was reported in a multicenter European study of 249 men with organic ED who were treated with self-administered transurethral alprostadil (58).

### *Comorbid Conditions*

Comorbid conditions affect erectile function and quality of life negatively, and treatments of these conditions usually improve erectile function and quality of life. Interestingly, symptomatic treatment of ED with sildenafil resulted in an improvement of depression, as measured by depressive scales (60).

In conclusion, ED is a highly prevalent condition, the incidence is strongly associated with age, and it is progressive and undertreated. Although the general impact on a society



is immense, costs may be containable, and the effects on quality of life of patients, their partners, and society are highly favorable.

## TREATMENT-SEEKING BEHAVIOR

Behavioral factors significantly influence the behavior of patients with ED as well as their partners. This influence ranges from attitudes toward diagnosis, treatment-seeking behavior, and, ultimately, treatment compliance and dropout. In one study, Althof stated that the high rate of discontinuation for men receiving treatment for ED (50–60%) could not be explained by inefficacy. Althof explored psychological reasons for dropout and proposed seven factors that may explain why men, women, and couples resist continued treatment (61,62). In another study, 30 of 47 patients successfully treated with intracavernous vasoactive agents responded to a self-questionnaire regarding their reasons for dropping out of the program. The authors concluded that discontinuation did not result from treatment-related problems (63).

Another two studies showed a factor that might affect dropout or noncompliance as the tendency to attribute one's problems to external factors (i.e., the partner); therefore, the alleviation of the problem might not be properly attributed to medical intervention (64,65). A Japanese study specifically addressed patient attitudes toward ED treatment through a national mail survey sent to married couples ages 30 to 79 yr. Of the 2034 males and 1820 females who responded to questions about the male's sexuality, 29.9% of males felt they had ED and 30.1% of females felt their husbands had ED. A low percentage of those who responded sought treatment; only 4.8% of male sufferers had consulted a physician. Reasons cited might include culture ("shyness," "should be covered by insurance," or "not bothered by ED;" ref. 66).

In a study using questionnaires sent to 108 patients, 100 (93%) responded. Researchers looked at hospital records and data from the survey. Only 32% continued self-injection treatment, about half of those (56%) discontinued within the first year, and patients who stopped therapy were significantly older and had poor initial impressions of therapy. Similarly to other studies, the authors concluded that dropout had little to do with side effects or etiology (67). In a study of 195 men comparing treatment compliance and treatment choice with marital satisfaction using the Maudsley Marital Questionnaire, no differences were found between the four groups tested: patients on intracavernosal injection treatment, patients who dropped out during the trial-dose phase, patients on other treatment, and patients who renounced treatment after first counseling. However, in the patients treated with intracavernosal injections, efficacy was increased by offering information and enabling couple communication (64). Finally, a survey of depressive symptoms in patients presenting with ED suggested that patients suffering from ED who had high depressive scores were more likely to discontinue treatments for ED (58).

In the Cross-National Survey on Male Health Issues (18,25,65), the aim was to describe the motivators and barriers influencing treatment-seeking behavior in men with ED. Screening included 32,644 men. Follow-up questionnaires were completed by 2831 men who suffered from ED. Men were recruited in waiting rooms in general practice offices. Treatment-seeking among men who suffered from ED was highest among Spanish men (48%) and lowest for German and Italian men (27 and 28%, respectively). Rate of current ED medication use among men suffering from ED was quite low across all countries, ranging from only 8% in France and Italy to 14% in the United States.

The top three barriers to seeking ED treatment were the belief that ED was a normal part of aging, the belief that the condition would resolve on its own, and embarrassment. Older men were more likely to view ED as a normal condition, and younger men were more likely to hope that their ED would resolve on its own. Once they perceived an erection problem, men waited many months before seeking treatment, ranging from just over 1 yr in Italy to almost 3 yr in the United Kingdom. Several barriers continue to influence treatment-seeking behavior in men with ED, resulting in low rates of utilization and high rates of dropout for therapies for ED. Further research in this field is urgently necessary.

## CONCLUSION

ED is highly prevalent among men, regardless of geography or ethnicity. Its prevalence and incidence are associated with aging, cardiovascular disease, diabetes, hyperlipidemia, lifestyle issues (such as smoking, alcohol abuse, obesity, and sedentary lifestyle), depression, pelvic surgery, neurological disorders, trauma, symptoms of benign prostatic hyperplasia, side effects from medication, and psychological and interpersonal factors. The severity of ED is also a prognostic marker of important medical diseases. ED has a significant negative impact on the quality of life of patients and their partners. Treatment-seeking behavior is influenced negatively by certain barriers, including the belief that ED is a normal part of aging, denial, and embarrassment.

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