The Global Online Sexuality Survey (GOSS) 2015: Erectile Dysfunction Among English-Speaking Internet Users in the United States

Original Article

Osama Shaeer[1], Kamal Shaeer[2], Mikkel[3], Fode, Ege Serefoglu[4]

[1,2]Department of Andrology, Faculty of Medicine, Cairo University, Egypt, [2]Department of Urology, University Hospital of Zealand, Roskilde and Herlev/Gentofte Hospital, Herlev, Denmark, [3]Department of Urology, Bagcilar Training & Research Hospital, Istanbul, Turkey

ABSTRACT

Introduction: The Global Online Sexuality Survey (GOSS) is an ongoing online epidemiologic study of male and female sexuality launched across the globe. The first launch was in the Middle East in 2010 followed by USA in 2011. This is the report on trends in male sexuality and prevalence and risk factors for erectile dysfunction (ED) in USA; 2015.

Patients and Methods: English-speaking web surfers in the USA were recruited for GOOS 2015 by an international online survey service provider, with age and ethnicity distribution matching that of the general US population. A total of 100 questions were offered to the participants, including the abbreviated international index of erectile function, risk factors for ED, ejaculatory function, therapeutic trends, sexual preferences and sexual orientation.

Results: A total of 610 men with a median age of 44 years (range 18-82). Of the participants, 90.2% described themselves as exclusively or predominantly heterosexual and 52.3% were married whereas 20.1% had multiple partners simultaneously, 54% had experienced one-night stands, with 33% never or rarely using condom on those occasions. ED was encountered in 55.4% of the participants. Some risk factors had a statistically significant influence on ED prevalence including diabetes, smoking, low desire, dissatisfaction with penile size and multiplicity of partners.

Conclusion: ED seems to affect 55.4 % of males in USA; in 2015, with an association to diabetes mellitus, obesity, hypothyroidism, subjective impression of having premature ejaculation, low desire, difficult urination, smoking, dissatisfaction with penile size and multiplicity of partners, with emphasis on online cohorts being heavily weighted towards younger and better educated individuals (only 2.1% in the age of 60 and up).

Key Words: Epidemiology, Survey, Erectile Dysfunction, United States of America, Prevalence.

Received: 5 October 2017, **Accepted:** 23 October 2017

Corresponding Author: Osama Shaeer , **Tel.:** 01006600606, **E-mail:** osamashaeer@gmail.com

ISSN: 2090-6048, September 2017, Vol. 7, No. 4

INTRODUCTION

The development of the first oral medication for the treatment of erectile dysfunction (ED) in 1999 unveiled the unknowns regarding this sexual problem and revolutionized our understanding of ED. Since then, numerous well-designed epidemiologic studies have been conducted to demonstrate the prevalence of ED[1-3] and identify potential factors which may cause or contribute to this problem[4-8]. Since the population projection for the USA revealed that the life expectancy of men is rapidly increasing over the next 2-decades[9], the age-related urological problems will also increase with time[10].

The Global Online Sexuality Survey (GOSS) is an ongoing online epidemiologic study of male and female sexuality launched across the globe in different languages, aiming to provide knowledge about sexual issues in the general population[11]. The first launch in the USA was performed in 2011 where the authors demonstrated that the prevalence of ED in the USA was 33.7%[11].

The aim of the current paper is to analyze the prevalence of ED in the 2015 GOSS update in US males and compare it with 2011 outcomes, as well as to evaluate classic and novel risk factors for ED.

PATIENTS AND METHODS

GOSS was randomly offered to English-speaking male web surfers in the United States of America in 2015. Participants were recruited by an international online survey service provider based in USA, with age and ethnicity distribution matching that of the adult USA male population for the same year. All participants were 18 years of age and older. Participants were informed of the nature of the survey, ensuring anonymity and non-collection of personal information including email and

 DOI: 10.21608/ha.2017.1788.1015

ip-address. Participants were informed that they would be able to see the survey results after completion and to follow the data prospectively as information from other participants pool up. It was stressed that the accuracy of the information they provided would reflect on the accuracy of the information they would eventually be able to access. To ensure reliability of responses, quality control measures were applied by the service provider including estimation of the optimal duration for completion of the survey and excluding fast-raters. Participants were randomly recruited, avoiding targeting according to special interests, marital status or health status.

GOSS is designed as multiple choice questions as well as numerical and text boxes, which are mostly validated to only accept the appropriate entries and notify participants of errors. The survey also includes open-ended questions for general thoughts and insights. Explanatory notes and diagrams are offered when deemed appropriate.

A total of 100 questions were offered to the participants, divided into separate sections: demographics, erectile function, risk factors for ED, ejaculatory function, therapeutic trends, sexual preferences (including trends in marriage, polygamy, coital frequency, sexual positions and masturbation), and sexual orientation, among others. Questions regarding erectile function included the abbreviated International Index of Erectile Function (IIEF-5)[12]. An IIEF-5 score of 21 was considered the cut off value between normal erectile function and ED, with a score between 22 and 25 indicating normal erectile function (no ED), 17- 21: mild ED, 12 -16: mild to moderate ED, 8- 11: moderate ED, and 5 -7: severe ED[12]. Participants were allowed to complete the survey at their own pace and to come back for further data feeding at their convenience.

Ethical approval was obtained from the ethical committee of the Department of Andrology, Cairo University, Egypt. Statistical analysis was done using SPSS for Microsoft Windows, version 19. Data were presented as means ± standard deviation (SD), frequencies and percentages. Comparison between groups was done using independent student T-test or Chi square test as appropriate. Significance was set at $p<0.05$. Multivariate regression analysis was used to evaluate the effect of various risk factors on ED. Many questions were rated on a 5-point grading scale, and were evaluated as is, then re-evaluated after rendering them into as a yes/no format. For instance, smoking was rated on a 5-point scale “no, rarely, sometimes, frequently and very frequently”. The first two choices were aggregated into “No” and the latter three into “Yes”.

RESULTS

Invitations were sent to 2033 individuals. 820 agreed to participate. 210 were excluded due to speeding through or incomplete responses, yielding 610 participants completing the 100 survey questions (30%). The mean and median age of the participants were 44.4 years ± 15.8 and 44, respectively (range 18 -82). Further demographic characteristics are summarized on (Table 1).

Systemic ailments subjectively reported by participants are listed in Table 2, with smoking, hypertension, overweight, diabetes and depression being the most prevalent. Median number of cigarettes smoked was 10 per day (range 0 – 55), for a median duration of 15 years (range 0 – 62).

The most commonly used medicaments were antihypertensives, antidepressants, and erection-enhancing medications (Table 3).

On a 5-point Likert scale, 6.1% of participants evaluated their emotional relationship with the partner as very bad or bad, 13.7% reported that partner willingness to have sex was (not very willing or not wiling at all), and 7.1% reported (too willing, more than I wish to). Moreover, 31.3% reported that they practiced masturbation whereas 26.4% reported dissatisfaction with penile size. Of the patients, 20.1% reported they currently had multiple partners (with a relationship lasting for more than one month).

Mean IIEF-5 score was 19.3 ± 5.6 (range 5-25). Accordingly, 55.4 % of the study population demonstrated various degrees of ED (mild ED: 28.9%, mild to moderate ED: 15.5%, moderate ED: 4.6%, and severe ED: 6.4%) (Figure 1). Participants with a sexual partner in the preceding 6 months had ED in 52.8%, compared to 63.8% in those without a partner, p=0.032. Erection enhancing medications were always used in 4% and frequently used in 4.5%. In this combined subset, ED prevalence was 86.7%.

Prevalence of ED was the highest in the >60 age group (66.4%), followed by the 50 -59 group (55.9%), 18 -39 (52.4%) and least in the 40 -49 age group (47.4%), with a statistically significant difference between the consecutive groups except the 18- 39 and the 40- 49 groups. Prevalence of moderate and severe ED were highest in the >60 age group ($p=0.001$ and $p<0.0001$, respectively) (Table 4). Of the patients, 14.9% reported that their IIEF-5 answers were always or mostly under erection-enhancing medications.

The risk factors which multivariate analysis revealed to have a statistically significant effect on ED are demonstrated in (Table 5): diabetes mellitus, obesity, hypothyroidism, subjective impression of having premature ejaculation, low desire, difficult urination, smoking, dissatisfaction with penile size and multiplicity of partners. Other factors that showed no statistically significant effect on ED included

age (p=0.246), educational level (p=0.055), income (p=0.264), ethnicity (p=0.191), religion (p=0.069), hyperlipidemia (p=0.126), hypertension (p=0.363), depression (p=0.456), Cushing's syndrome (p=0.247), Addison's disease (p=0.147), neurological problems (p=0.201), hepatic diseases (p=0.125), renal (p=0.05) and bone/joint (p=0.081) disorders, infertility (p=0.44), sexually transmitted diseases (p=0.055), benign prostatic hyperplasia (p=0.35), prostatic (p=0.372) and bladder cancers (p=0.147), circumcision (p=0.108), masturbation (p=0.067), and low sexual desire on the partner's side (p=0.489).

Table 1: Demographic characteristics of the participants

Factors	(%)
Age groups:	
18-39	43.1
40-49	17.6
50-59	16.9
60 and up	22.4
Ethnicity:	77
White	12.2
African-American	6.1
Hispanic/Latino	2.2
Asian	1.2
Other	
Educational Level:	18
Post-graduate	33.7
School	45.5
University	0.9
No formal education	2
Other	
Income:	3.6
Very High	14.9
High	55.1

Average	20.9
Low	5
Very Low	0.6
Other	
Religion:	66.4
Christian	2.2
Jewish	1.4
Muslim	4.6
Buddhist	22.4
No particular religion	4.6
Other	
Circumcision:	
Yes	66.9
No	28.8
Not Sure	4.3
Sexual Orientation:	86.6
Exclusively heterosexual with no homosexual	12.1
Other (please specify)	3.6
Predominantly heterosexual, only incidentally homosexual	1.1
Predominantly heterosexual, but more than incidentally homos	1.4
Equally heterosexual and homosexual	0.5
Predominantly homosexual, but more than incidentally heteros	0.7
Predominantly homosexual, only incidentally heterosexual Exclusively homosexual	4.8

Table 2: Systemic ailments subjectively reported by participants

Ailment	(%)
Smoking	26.2
Hypertension under treatment	16.6
Overweight	16.6
Diabetes	12.0
Depression (subjective)	8.5
Depression (diagnosed)	7.2
Low desire	4.9
Benign prostatic hyperplasia	3.9
Hypertension without treatment	3.4
Bone/Joint Disease	3.0
Hyperlipidemia	2.8
Coronary heart disease	2.5
Difficult urination	2.5
Hypothyroidism	2.1
Renal	1.5
Hypogonadism	1.1
Prostatic cancer	1.1
Neurological	0.8
Hepatic	0.7
Infertility	0.7
Sexually transmitted infection	0.7
Cushing	0.3
Hyperprolactinemia	0.3
Painful urination	0.3
Addisson’s disease	0.2
Bladder cancer	0.2

Table 3: The most commonly used medicaments

Medicaments	(%)
None	66.40
Antihypertensives	12.3
Antidepressants	7.70
Erection-enhancing medication	4.80
Antipsychotics	2.30
Testosterone	1.80
Medications for prostatic enlargement	1.10
Nitrates	0.80
Antiandrogens	0.20

Table 4: Prevalence of ED by grade, in different age groups

	ED Grade					
	Severe ED (5-7)	Moderate ED (8-11)	Mild to Moderate ED (12-16)	Mild ED (17-21)	No ED (22-25)	Total
Age Groups 18-39	2.1%a	2.6%a	13.7%a	33.9%a	47.6%	100.0%
40-49	2.1%a	3.2%a	15.8%a	26.3%a	52.6%	100.0%
50-59	5.4%a	3.2%a	18.3%a	29.0%a	44.1%	100.0%
>60	19.3%b	10.1%b	15.1%a	21.8%a	33.6%	100.0%
Total	6.5%	4.4%	15.2%	29.1%	44.8%	100.0%

Table 5: Statistically significant risk factors for erectile dysfunction according to the results of the multivariate analysis.

		ED	No ED	*p* value
Diabetes	Yes	72.60%	27.40%	0.001
	No	52.80%	47.20%	
Overweight	Yes	64.40%	35.60%	0.04
	No	53.40%	46.60%	
Hypothyroidism	Yes	84.60%	15.40%	0.031
	No	54.70%	45.30%	
Ejaculating too fast	Yes	93.80%	6.30%	0.002
	No	54.30%	45.70%	
Low desire	Yes	96.70%	3.30%	<0.0001
	No	53.00%	47.00%	
Difficult urination	Yes	93.30%	6.70%	0.003
	No	54.40%	45.60%	
Smoking	Yes	64.80%	35.20%	0.007
	No	52.10%	47.90%	
Are you satisfied with the size of your penis?	No	67.60%	32.40%	0.031
	Yes	51.30%	48.70%	
Multiple partners	Yes	79.30%	20.70%	<0.0001
	No	50.30%	49.70%	

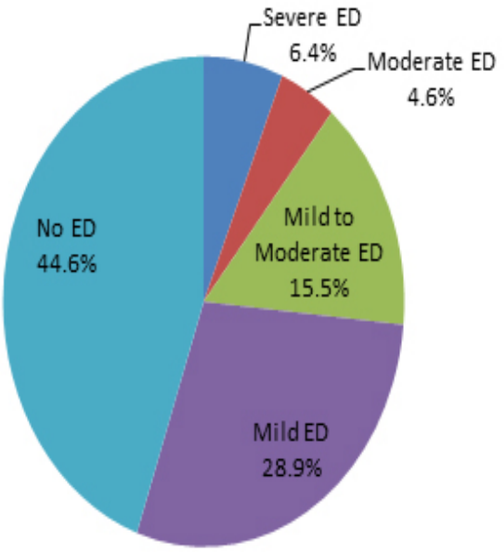

Fig. 1: The severity of the ED complaints of the participants according to the International Index of Erectile Function – 5 outcomes.

DISCUSSION

ED is defined as the inability to achieve and maintain penile erection necessary for satisfactory sexual intercourse[13]. Several well-designed epidemiologic studies conducted in 1990s highlighted the high prevalence of this sexual problem and defined its risk factors[1, 2]. The Massachusetts Male Aging Study[1] which was a community based, random sample observational survey of non-institutionalized men recorded the prevalence of ED as 52% among men aged 40 to 70 years. The authors noted that prevalence of complete ED tripled from 5 to 15% between subject ages 40 and 70 years[1] whereas subjects with heart disease, hypertension, diabetes, associated medications, smoking and depression had higher probability of having ED. Longitudinal results of the same study revealed that the risk of ED is 26 cases per 1,000 men annually, and confirmed that it increases with age, lower education, diabetes, heart disease and hypertension[14]. Analysis of data from the National Health and Social Life Survey which has been conducted on a national probability sample of 1410 men aged 18 to 59 years reported the prevalence of sexual dysfunction as 31%[2].

The first GOSS was designed as an internet-based survey for investigating various aspects of male and female sexual function. Online launch aimed to avoid responder bias which may arise from personal concerns about social stigmatization[11]. The results of the initial GOSS study conducted in 2011 demonstrated that the prevalence of ED in the USA was 37.7%[11] In the current study, 55.4% of the study population demonstrated various degrees of ED.

The results of the multivariate analysis in GOSS 2015 confirmed that diabetes, obesity, smoking, ejaculating too fast, concerns over genital size (not necessarily a smaller penis per se) and low libido are risk factors for ED, which are in accordance with the findings of GOSS 2011[11]. Moreover, GOSS 2015 revealed novel risk factors such as hypothyroidism, difficult urination and having multiple partners, which could not be identified in GOSS 2011. Previous studies demonstrated increased ED risk among patients with thyroid disorders[15] and lower urinary tract symptoms[4] which are in accordance with the findings of GOSS 2015. To our knowledge the higher ED prevalence among men who have multiple partners has not been reported before. Theoretically, ED patients may be interested in checking their potency with different partners, assuming that their ED may be partner-related, not to mention the possibly higher arousal with a new relationship. As a result, multiplicity may result in ED due to the possibly associated psychological stress out of guilt, fear of STD's or higher demand for sexual activity which may exceed one's potency. Further epidemiologic studies are warranted to confirm the validity of this finding.

We could not detect any impact of educational level, income, ethnicity and religion on ED. However, results of the Boston Area Community Health (BACH) Survey which used a multistage stratified random sample of 2,301 men aged 30 -79 years demonstrated an association between education/household income and ED[8]. The authors concluded that the increased risk of ED in Black and Hispanic men is associated with differences in socioeconomic status rather than differences in known risk factors of ED[8].

In our study we could not detect any association between ED and several other medical conditions such as hyperlipidemia, hypertension, depression, hyperthyroidism, Cushing's syndrome, Addison's disease, neurological problems, hepatic diseases, renal and bone/joint disorders, infertility, sexually transmitted diseases, benign prostatic hyperplasia, prostatic and bladder cancers, some of which are well known risk factors for ED[16]. Moreover, our results could not find any association between ED and circumcision, masturbation, or low sexual desire on the partner's side.

This study is not without limitations. First of all the diagnosis of ED was based on the IIEF-5 results. Of the men included, 14.9% reported that their IIEF-5 answers were always or mostly under erection-enhancing medications, indicating that the prevalence and/or

severity of ED may be higher than reported. Online surveys may decrease the confrontation-generated bias and may possible confer more reliable answers. However, samples recruited for online surveys may not necessarily reflect the general population since they usually involve younger and possibly healthier individuals with better education (only 2.1% in the age of 60 and up). The sample at hand was recruited according to the USA census data on age and ethnicity, among other factors, but had higher participation from the better educated which is demonstrated in Table 1. Finally, self-reported medications and comorbid conditions likely greatly underestimates the true results. The cross-sectional nature of this study does not allow to establish cause-consequence relationships, hence analysis of the effect of possible risk factors is only suggestive rather than conclusive. A lot of data on risk factors may require further details, not to mention confirmation by specialists.

CONCLUSION

ED seems to affect 55.4% of males in USA; in 2015, with an association to diabetes mellitus, obesity, hypothyroidism, subjective impression of having premature ejaculation, low desire, difficult urination, smoking, dissatisfaction with penile size and multiplicity of partners, and unrelated to ethnicity, income, education or religion, with emphasis on online cohorts being heavily weighted towards younger and better educated individuals.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Feldman, H.A., et al., Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. J Urol, 1994. 151(1): p. 54 -61.

2. Laumann, E.O., A. Paik, and R.C. Rosen, Sexual dysfunction in the United States: prevalence and predictors. JAMA, 1999. 281(6): p. 537- 44.

3. Laumann, E.O., et al., Sexual problems among women and men aged 4080- y: prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. Int J Impot Res, 2005. 17(1): p. 39 -57.

4. Brookes, S.T., et al., Relationship between lower urinary tract symptoms and erectile dysfunction: results from the Boston Area Community Health Survey. J Urol, 2008. 179(1): p. 2505-; discussion 255.

5. Fang, S.C., et al., Changes in erectile dysfunction over time in relation to Framingham cardiovascular risk in the Boston Area Community Health (BACH) Survey. J Sex Med, 2015. 12(1): p. 100- 8.

6. Kupelian, V., S.A. Hall, and J.B. McKinlay, Common prescription medication use and erectile dysfunction: results from the Boston Area Community Health (BACH) survey. BJU Int, 2013. 112(8): p. 1178 -87.

7. Kupelian, V., C.L. Link, and J.B. McKinlay, Association between smoking, passive smoking, and erectile dysfunction: results from the Boston Area Community Health (BACH) Survey. Eur Urol, 2007. 52(2): p. 416- 22.

8. Kupelian, V., et al., Socioeconomic status, not race/ethnicity, contributes to variation in the prevalence of erectile dysfunction: results from the Boston Area Community Health (BACH) Survey. J Sex Med, 2008. 5(6): p. 1325- 33.

9. World population prospects: the 2015 revision. Available from: http://esa.un.org/unpd/wpp.

10. Litman, H.J. and J.B. McKinlay, The future magnitude of urological symptoms in the USA: projections using the Boston Area Community Health survey. BJU Int, 2007. 100(4): p. 820- 5.

11. Shaeer, O. and K. Shaeer, The Global Online Sexuality Survey (GOSS): the United States of America in 2011. Chapter I: erectile dysfunction among English-speakers. J Sex Med, 2012. 9(12): p. 3018 -27.

12. Rosen, R.C., et al., Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. Int J Impot Res, 1999. 11(6): p. 319- 26.

13. NIH Consensus Conference. Impotence. NIH Consensus Development Panel on Impotence. JAMA, 1993. 270(1): p. 83 -90.

14. Johannes, C.B., et al., Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study. J Urol, 2000. 163(2): p. 460- 3.

15. Veronelli, A., et al., Prevalence of erectile dysfunction in thyroid disorders: comparison with control subjects and with obese and diabetic patients. Int J Impot Res, 2006. 18(1): p. 111 -4.

16. Hatzimouratidis, K., et al., Guidelines on male sexual dysfunction: erectile dysfunction and premature ejaculation. Eur Urol, 2010. 57(5): p. 804- 14.