

Prevalence and factors associated with erectile dysfunction among adult men in Moshi municipal, Tanzania: community-based study

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Keywords: Erectile dysfunction, Diabetes mellitus, Hypertension, Physical activities, Prevalence, Predictors, Tanzania

Posted Date: January 28th, 2020

DOI: <https://doi.org/10.21203/rs.2.22030/v1>

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Version of Record: A version of this preprint was published at Basic and Clinical Andrology on December 1st, 2020. See the published version at <https://doi.org/10.1186/s12610-020-00118-0>.

Abstract

Background: Erectile dysfunction (ED) has a negative impact on ones' relationships with poor quality of life as inevitable result. Men's sexual health has been forgotten in most developing countries and therefore the burden of ED and associated risk factors are not known in these settings. This study aimed to determine the prevalence and factors associated with erectile dysfunction among adult men in Moshi municipality, northern Tanzania. **Methodology:** A community based cross-sectional study was conducted in July 2019. Multi stage sampling technique was used to enroll men aged 18 years and above in four wards of Moshi municipality. The 5-item version of the International Index of Erectile Function (IIEF-5) scale was used to assess erectile dysfunction. Multivariate logistic regression was done to get factors associated with ED. **Results:** The mean age of the 381 men was 39.6 (SD \pm 16.8) years. The overall prevalence of ED on this study was 29.7%. The severity of ED among study participants was 13.4 % (51), 9.7 % (37), 3.7 % (14), 2.9% (11) participants had mild, mild to moderate, moderate and severe erectile dysfunction respectively. Age, tobacco use, overweight, hypertension and diabetes all showed significance association with ED. However, in multivariate logistic analysis only age \geq 40 years and hypertension remain statistically significant associated with ED [(OR 5.2, 95% CI 2.68-10.21, P<0.001), (OR 11.5, 95% CI 5.8-22.76, P<0.001) and (OR 2.5, 95% CI 1.06-5.86, P=0.035)] respectively. **Conclusion:** About one in three men in Moshi municipal had ED. High prevalence of ED among hypertensive individuals suggest a need to establish ED screening program during their routine clinic for early detection and treatment. Furthermore, education should be given on lifestyle modification to prevent hypertension and diabetes in the community. The outcome will be improvement of patient's quality of life. **Key words:** Erectile dysfunction, Diabetes mellitus, Hypertension, Physical activities, Prevalence, Predictors, Tanzania

Plain English Summary

Erectile dysfunction (ED) is defined as the persistence inability to achieve and maintain an erection adequate to permit satisfactory sexual act, has severe consequence on men's mental health and their quality of life. There is wide variation of ED prevalence globally and the burden is increasing attributed to rise of non-communicable diseases and aging population. Information on the burden of the problem and who is more affected is limited in Tanzania. The aim of this study therefore was to establish the level and factors associated with erectile dysfunction (ED) among men aged 18 years and above in Moshi municipality, northern Tanzania. A total of 381 men were recruited and interviewed. International index of erectile function five item version (IIEF-5) was used to assess erectile dysfunction. Body mass index, hypertension, diabetes and physical activities were defined according to world health organization (WHO) cutoff value. About one third (29.7%) of the men had some form of erectile dysfunction. Age greater than 40 years and hypertension were factors associated with having ED. ED is common problem among men. High prevalence of ED among hypertensive individuals suggest a need to establish ED screening program during their routine clinic for early detection and treatment. Furthermore, education should be given on lifestyle modification to prevent hypertension and diabetes in the community.

Background

Erectile dysfunction (ED) is defined as the persistence inability to achieve and maintain an erection adequate to permit satisfactory sexual act [1]. ED has a negative impact on ones' relationships with poor quality of life as inevitable result [2]. Though considered by many to be part of normal aging process, ED can be an outcome of several causes. These causes have been categorized into organic and psychogenic causes [3]. ED has been found to be more prevalent among aged population [4–6], smokers [7] and in population with comorbidities like diabetes mellitus [8–10], peripheral vascular disorders, coronary artery disease [11] and among individuals treated for hypertension [12]. Needless to say psychogenic illness like anxiety [13,14], depression [15,16] have also shown an impact on ED.

It is estimated about 150 million people are affected with erectile dysfunction and this number is expected to double by 2025 with majority of affected people coming from developing countries [17]. There is wide variation in prevalence of erectile dysfunction worldwide. In Europe the prevalence was found to range from 32–69% [18,19] while in Asia it was found to range from 2–81.8% [20] and in Africa prevalence was found to vary from 25–59% [4,5,21,22].

Erectile dysfunction has severe consequence on men's mental health like depression, anxiety and low self-esteem and these effects may even extend to their female companion [23]. It affects quality of life and sometimes it has been associated with common mental disorders [13–16]. The effects of ED maybe worse in developing countries setting like Tanzania because men's sexual health has been forgotten. Men's sexual and reproductive health needs are not in the national reproductive health strategic plans. Therefore, the burden of ED and associated risk factors or correlates is not known in our setting. This community-based study aimed to determine the prevalence and factors associated with ED in an urban setting in northern Tanzania in order to provide an insight to the situation.

Methods

Study design and site

The study was a community- based cross sectional study. Recruitment and data collection were conducted in July 2019, at Moshi Municipal, situated in Kilimanjaro region in the northern Tanzania.

Kilimanjaro is one of the 31 regions found in northern zone of Tanzania. It is the home of 1.64 million people according to 2012 census. Moshi municipal is one of the seven district of Kilimanjaro region. It has 21 wards and covers an area of 59 km². The municipal has a population of 184,292 where males are 89,174 and females are 95,118 according to 2012 census.

Study population, sampling and data collection procedures

Population

The study population was men aged at least 18 years in selected wards of Moshi Municipal and consented to participate in the study. The study excluded men who are not permanent residents in the study area.

Sample size

Sample size for this study was estimated by using the formula for precision

$$N = Z^2 p (1-p) / \epsilon^2$$

Where N is estimated minimum sample size; Z is confidence level at 95% (standard value is 1.96); P is expected proportion in population based on previous study (prevalence and correlates of erectile dysfunction) = 24% [6]

ϵ is precision at 95% CI = 0.05.

The minimum sample that was required for this study was 346 men. Addition of 10% for non-response gave a minimum sample of 381 men aged at least 18 years.

Sampling: Multistage sampling technique was used to obtain men who participated in the study. The multistage sampling techniques involved the following stages. Stage 1: 4 out of 21 wards that make up the municipal were randomly selected. Stage 2: Two streets from each of the selected ward were randomly selected: At Majengo ward, Shauri moyo and Sokoni streets, were randomly selected. At Mji Mpya ward, Sokoni and Langoni streets were randomly selected. At Kiboriloni ward, mnazi mmoja and KDC streets were randomly selected. At Rau ward, Saba saba and Karikacha streets were randomly selected. From these streets, men aged 18 years and above who consented to participate in this study were recruited.

Study procedures

Ethical clearance was obtained from the KCMU college Ethical committee before starting the research. The ethical clearance was delivered to District Medical Officer (DMO) of Moshi Municipal, where permission to conduct the study was sought from the DMO office. DMO gave us introductory letter that was presented to Ward and streets leaders. The ward and street leaders were all informed about their key role of introducing researchers to the community and help to inform adult males about the study prior to the beginning of the study.

After reaching to the center which was established, at respective wards those who were eligible and consented to participate interviewed. This was followed by general clinical examination and measurement of the blood pressure (BP), anthropometric measurements and taking blood for Random blood glucose level (RBG) measurement. After the test participants were informed the results of BP, overweight/obesity and RBG on the same day.

Those found with confirmed either diabetes or hypertension were informed about their results and then referred to the nearby health centre. Those with erectile dysfunction were referred at KCMC referral hospital urology clinic where there is expertise to manage the condition. The physician responsible was

then informed about their health status through a referral letter. They were also given advice on diet, physical activity, on salt and alcohol intake.

Data collection tool and methods

Data collection tools

Data was collected using a questionnaire which had both open and closed ended questions and was in Swahili language. The questionnaire had three sections, the first part collected information on socio-demographic characteristics, and the second part assessed the behavioral characteristics and of the participant. The third part was clinical examination. The validated Swahili-translated 5-item version of the international index of erectile function (IIEF-5) scale was used to assess erectile dysfunction.

Data collection methods: Face to face interview was used to collect information from the consented participant. Blood pressure was measured twice before and after the interview. Weight (kg), height (cm), blood sample (finger prick) was collected to check for random blood glucose (RBG). Data collection process took place privately in a selected room (i.e. ward executive office).

Anthropometric measurement

Weight in kg was measured using weighing machine (SECA) participants were requested to remove shoes, extra clothing like jackets and anything in pockets before measurements. Height was measured with a height stadiometer where by individual stood upright with no shoes and the ruler hook was placed such that it just touches the head then the height in cm was recorded. BMI was calculated by a ratio of weight (in kilograms) to height (in meters) squared. WHO BMI cut-off values were used.

Blood pressure measurements

Blood pressure was measured by manual BP machines. BP was recorded from the left arm using an appropriate size cuff that covers two – third of the upper arm after the participant rested for at least five minutes and no smoking or caffeine 30 minutes before measurements, with the arm supported at the level of the heart, palm facing upward. Two measurement were taken at the start of interview and at the end in a sitting position while the participant rested quietly, then the average of the two measurement was recorded.

Blood glucose measurements

Random Blood glucose was measured using a GlucoPlus. Blood sample was collected through finger pricking and dropped on glucometer strip to give the reading.

Data Analysis

The data was entered and analyzed using SPSS 20. Before analysis, data was cleaned by running frequency of each variable. Categorical variables were summarized into frequency and percent while continuous variables were summarized using measures of central tendency and their respective measure

of dispersion. Odds ratio with their 95% confidence interval were used to measure the strength of association between age, alcohol drinking, tobacco use, physical activities, overweight/obesity, hypertension, diabetes mellitus and erectile dysfunction. Multivariable logistic regression analysis was conducted to control for confounders and get independent predictors for erectile dysfunction. P-value of < 0.05 was considered statistically significant.

Categorization of variables:

ED was assessed using IIEF with 5 questions each with scale of 5. Maximum possible score is 25 and minimum score is 5. The IIEF-5 scale categorizes ED into five categories depending on the score i.e. 22–25: no ED, 17–21: mild ED, 12–16: mild to moderate ED, 8–11: moderate, 5–7: severe ED.

A systolic blood pressure (SBP) < 120 mmHg and a diastolic blood pressure (DBP) < 80 mmHg was defined as normotensive. Pre-hypertension was defined as SBP of 120–139 mmHg or DBP of 80–89 mmHg, while SBP \geq 140 mmHg or DBP \geq 90 mmHg indicated hypertension.

Diabetes was defined as RBG \geq 11.1 mmol/L. Prediabetes was defined as RBG of 7.8–11.0 mmol/L.

WHO BMI cut-off values were used. Underweight was defined as BMI of < 18.5 Kg/m², normal was defined as BMI of 18.5–24.9 Kg/m², overweight was defined as BMI of 25–29.9 Kg/m² and obese was defined as BMI of \geq 30 Kg/m².

Physical inactivity was defined as having less than 150 minutes of moderate to vigorous -intensity physical activity throughout the week.

Results

Socio-demographic, life style and clinical characteristics of participants

A total of 381 men aged 18 years and above were enrolled in the study. The age of the participants ranged from 18 to 87 years with mean age of 39.6 (\pm 16.8) years. Of the 381 participants; 61.2% were married/cohabiting, 52.0% had secondary education or higher, 49% reported to be taking alcohol, 22.0% were smoking cigarette and 36% had \leq 150 minutes of moderate to vigorous intensity physical activities per week, Table 1.

Table 1
Socio-demographic, life style and clinical
characteristics of study participants (N = 381)

Characteristic	Frequency	%
Age group		
18–39	227	59.6
40–54	67	17.6
≥55	87	22.8
Education level		
No formal education	8	2.1
primary education	175	45.9
Secondary education/high	198	52.0
Marital status		
Single	127	33.3
Married/cohabiting	233	61.2
Divorced/widower	21	5.5
Alcohol intake		
Yes	185	48.6
No	196	51.4
Tobacco use		
Yes	84	22.0
No	297	78.0
Physical activities		
None	71	18.6
< 150 min/week	65	17.1
≥150 min/week	245	64.3
Body mass index		
Normal	215	56.4
Underweight	28	7.3

Characteristic	Frequency	%
Overweight	101	26.5
Obesity	37	9.7
Blood pressure		
Normal	246	64.6
Prehypertensive	88	23.1
Hypertension	47	12.3
Blood sugar level		
Normal	354	92.9
Pre diabetes	19	5.0
Diabetes	8	2.1

The mean BMI was 24.4 (± 10.3) kg/m² and 36.2% were overweight and obese. The mean SBP and DBP were 122 (± 29) mmHg and 77 (± 10) mmHg respectively and 12.3% of the participants had high blood pressure. The mean random blood glucose level was 5.9 (± 1.5) mmol/L and 2.1% of the 381 men had diabetes mellitus (Table 1).

(Table 1 here)

Prevalence and factors associated with erectile dysfunction(ED)

The overall prevalence of erectile dysfunction among adult males in Moshi municipal was 29.7% (n = 113). Of the 113 men with ED, 45.3% (51) had mild form, 32.7% (37) had mild to moderate form, 12.3% (14) had moderate form and 9.7% (11) had severe form.

In bivariate analysis, age, alcohol use, overweight and obesity, high blood pressure and pre-diabetes/diabetes were associated with erectile dysfunction (Table 2). Participants aged 40–54 and ≥ 55 had 6.6 and 16.0 higher odds of having ED compared to participants aged 18–39. Men who were overweight had 90% higher odds of ED and obese had 2-fold odds of ED compared to men with normal BMI. Pre-hypertensive and hypertensive men had 80% higher odds of ED than to normotensive men and men with pre diabetes/ diabetes had 5-fold higher odds of ED than men with normal values.

Table 2
bivariate and multivariable logistic regression model for factors associated with erectile dysfunction (N = 381)

Variable	ED (n = 113)		
	n (%)	cOR (95% CI)	aOR (95% CI)
Age (years)			
18–39	25 (11.0)	1	
40–54	30 (44.8)	6.6 (3.5–12.4)	5.2 (2.68–10.21)
≥55	58 (66.7)	16 (8.8–29.7)	11.5 (5.8–22.76)
Alcohol intake			
No	55 (28.1)	1	
Yes	58 (31.8)	1.2 (0.8–1.82)	
Tobacco use			
No	80 (27.1)	1	
Yes	33 (38.4)	1.7 (1–2.77)	1.4 (0.75–2.75)
Physical activity			
≥150 min/week	69 (28.2)	1	
None/<150 min/week	44 (32.4)	1.2 (0.8–1.92)	
Body mass index			
Normal	53 (24.7)	1	
Underweight	6 (21.4)	0.8 (0.3–2.17)	0.5 (0.17–1.66)
Overweight	39 (38.6)	1.9 (1.2–3.19)	1.5 (0.79–2.83)
Obesity	15 (40.5)	2.1 (1–4.31)	1.3 (0.5–3.34)
Blood pressure			
Normal	52 (21.1)	1	
Pre-hypertensive	29 (33.0)	1.8 (1.1–3.15)	1.0 (0.53–1.88)
Hypertensive	32 (68.1)	8.0 (4–15.8)	2.5 (1.06–5.86)
Blood sugar level			

Adjusted for Age, Tobacco use, Body mass index, Blood pressure range and Blood sugar level

Variable	ED (n = 113)		
Normal	95 (26.8)	1	
Diabetes	18 (66.7)	5.5 (2.4–12.6)	2.5 (0.51–12.42)
Adjusted for Age, Tobacco use, Body mass index, Blood pressure range and Blood sugar level			

In multivariate logistic regression analysis, age and high blood pressure remained associated with ED. Men aged 40–54 years and those 55+ had 5.2 and 11.5 significantly higher odds of ED than men aged 18–39 years. Likewise, men who were hypertensive had 2.5 higher odds than those who had normal blood pressure, Table 2.

Discussion

In this study, 29.7% adult men had ED. Of those with ED, 12.3% and 9.7% respectively had moderate to severe form. Age and high blood pressure were independent predictors of ED in this setting.

The prevalence of ED of 29.7% in this study is close to that from an Australian study by Ponholzer et al [19] which reported a prevalence of 32.1% [19]. However, the prevalence from this study was slightly higher than a similar study in Dar-es-salaam, Tanzania, which reported a prevalence of 24% [6]. It should be noted that there is a wide variability of the prevalence of ED from 25–59% in low developing countries setting [5,18]. This is attributed to variability of population characteristics and tools used for ED assessment among studies. However, having one in 3 men with ED problem, is serious, and calls for countries like Tanzania to start investing in men’s sexual and reproductive health in order to achieve the MDG 3 of having healthy lives by 2030.

Age was strongly associated with ED. Our study showed that individuals aged 40–54 and ≥ 55 had higher odds of having ED compared to participants aged younger men (18–39). A study done by Fafilou and colleagues [24] showed that men aged 45 years, or more were 3 times more likely to have ED compared to men aged less than 45 years. The variability of our study from others is due to the difference in comparison group where men aged 55 years and above were compared to men aged 18–39 years while in massachusetts [25], the comparison was between men aged 40 and 70 years and in Fafilou’s study [24], the comparison was between those aged less than 45 to those of 45 or more years. In spite of comorbidities associated with age, there is decrease in sexual function among men as they age which explains the higher prevalence of ED [26].

Tobacco users had 70% increased chances of having ED compared to non-tobacco users in bivariate but not in multivariate analysis. Different authors have also shown an association between smoking and ED where smokers had 40% increased risk of having ED compared to non smokers, and in some studies there was a dose response relationship [27, 28]. Our results are similar to those of Ahmed et al [29] which showed no association between Tobacco usage and ED after adjusting for confounders [29]. Researchers have shown that the effect of smoking in erectile dysfunction is through its impact on vascular

morphology and physiology and that withdrawal can reverse the damage [30]. There is a need to raise awareness among men about effects of smoking not only in ED, but in other cardiovascular morbidity.

Individuals with diabetes mellitus had higher odds for ED compared to non-diabetic individuals in bivariate but not in multivariate analysis. Results from an Egyptian study done by Zedan et al [31] reported diabetic individuals had 5 times higher odds of having ED. Also, a study done by Oyelade in Nigeria showed diabetic individuals were 8 times more likely to develop ED [5]. Other studies have shown that diabetic individuals present with ED at a younger age than non-diabetic ones [31]. Diabetes affects vascular system, and this may explain the association with ED. However, lack of association between DM and ED after controlling for confounders in this study may be due to relatively young population (mean age of 39.6 years and very few participants with DM).

Participants who were hypertensive had more than 2.5 times higher odds of ED compares to normotensive ones. In both Canada and Nigeria, it has been demonstrated that hypertensive individuals were 1.84 times more likely to have ED than normotensive individuals [33, 34]. Other authors have failed to demonstrate any association between hypertension duration and its treatment with ED [34]. ED has been found twice more common among hypertensive individuals whereas management of hypertension can also result into ED [36]. Hypertension and ED go hand in hand in that, during high blood pressure, there is disturbance in vascular endothelia which lead to increase in contraction of vascular smooth muscles. Also, some of the anti-hypertensive drugs can result into ED [37].

Study Strength:

It was a population based study, it gives an estimated burden of ED in a population compared to a facility-based study. Assessing diabetes, hypertension, weight and height simultaneously with ED helped us to take them into account as predictors for ED instead of relying on participants' self-report. The study used an internationally recognized tool for assessment of ED that will allow us to make comparisons with other studies.

Study Limitations:

There are limitations also that has to be taken into account when interpreting the results of this study. As across-sectional study it was difficult to determine temporal relationship. Men are shy to report problems related to sexual performance, and the tool used to measure ED relied on report from men themselves. Under reporting may have led to underestimation of prevalence of ED.

Conclusion And Recommendations

The prevalence of ED is high among men in Moshi municipal as 1 out of 3 men have ED. Age and hypertension were independent predictors of ED. Since prevalence of ED was high among hypertensive individuals, there is a need to establish ED screening and treatment programs targeting this group of people with an aim of improving quality of life.

These results will provide insight on prevalence and factors associated with erectile dysfunction, particularly to policy makers who will spearhead allocation of adequate resources to improve diagnosis, treatment and awareness of ED.

There is a need to provide education and awareness to men through communication media about ED and directing them to where they should seek medical care.

Given that the problem is substantial, there is a need for future studies to evaluate the effects of ED on men's mental health and quality of life.

Abbreviations

BMI	Body Mass Index
BP	Blood pressure
CVD	Cardiovascular Diseases
DM	Diabetes Mellitus
ED	Erectile Dysfunction
HTN	Hypertension
NCDs	Non-Communicable diseases
NHI	National Health Institute
RBG	Random Blood Glucose
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

This study was approved by the Kilimanjaro Medical University College (KCMUCo) institution ethical review board (Certificate number UG 007). Permission to conduct the study was sought from the District Medical Officer of Moshi municipal. Purpose of the study, benefit, right to refuse participation or leaving the study was explained to each participant before the interviews. The study participants were informed

that the data will be kept confidential and only numbers were used in the questionnaires and not personal identifiers. A signed consent was obtained from each participant. In the case of illiterate men, the right thumbprint was used as a signature.

Consent to publish

Not applicable, the manuscript does not contain any individual personal data.

Availability of data and material

The datasets used and analyzed during the current study can be freely available from the corresponding author on reasonable request.

Competing interests

The authors declared that they have no competing interests.

Funding

Tanzania Higher Education Students Loans Board (HESLB) supported Kenan B Nyalile, Emmanuel HP Mushi, and Epiphania Moshi. Sia E. Msuya and Beatrice J. Leyaro were THRiVE-2 faculty and partially supported by the DELTAS Africa Initiative grant # DEL-15-011 to THRiVE-2.

The funders did not have any role or influence the design of the study, data collection, analysis or interpretation of the results and in development of the manuscript.

Authors' contributions

KN, EHM and HM designed the study, carried out statistical analysis and manuscript writing. SM, BJL and OM provided guidance in designing the study, guided in conducting the study, statistical analysis and reviewed the manuscript for intellectual content.

Acknowledgements

We are grateful to men who participated in this study. We also thank the district health management team for permission to conduct the study in the district. The authors are indebted to District Medical Officer of **Moshi** municipal, Dr Linda P. Samu as well as ward leaders who helped during interviews.

References

1. Consensus NIH. Development Panel on Impotence. NIH Consensus Conference. Impotence. *JAMA* 1993; 270: 83–90.
2. Althof SE. Cme Article Quality of Life and Erectile Dysfunction. *Eurology Journal* 2002; 4295(02): 803–810.
3. Conaglen J. Erectile Dysfunction. *BPJ* 2012; 12: 34–40.

4. Amidu N, Owiredu W, Woode E, Addai-Mensah O, Gyasi-Sarpong K, *et al.* Prevalence of male sexual dysfunction among Ghanaian populace: myth or reality?. *International Journal of Impotence Research* 2010; 22(6): 337–342.
5. Oyelade BO, Jemilohun CJ and Aderibigbe AA. Prevalence of erectile dysfunction and possible risk factors among men of South- Western Nigeria: a population based study. *Pan African Medical Journal* 2016; 24(124): 1–8.
6. Pallangyo P, Nicholaus P, Kisenge P, Mayala H, Swai N, *et al.* A community-based study on prevalence and correlates of erectile dysfunction among Kinondoni District Residents , Dar Es Salaam , Tanzania. *Reproductive Health* 2016; 13(140): 1–6.
7. Seyam RM and Dandash K. Prevalence of erectile dysfunction and its correlates in Egypt: A community- based study Prevalence of erectile dysfunction and its correlates in Egypt: a community-based study. *International Journal of Impotence Research* 2003; 15: 237–245.
8. Grover SA, Lowensteyn I, Kaouache M, Marchand S, Coupal L, *et al.* The Prevalence of Erectile Dysfunction in the Primary Care Setting. *Arch Intern Med* 2006; 166(2): 213-219.
9. Selvin E, Burnett AL and Platz EA. Prevalence and Risk Factors for Erectile Dysfunction in the US. *The American Journal of Medicine* 2007; 120(2): 151–157.
10. Mutagaywa RK, Lutale J, Aboud M, Kamala BA. 'Prevalence of erectile dysfunction and associated factors among diabetic men attending diabetic clinic at Muhimbili National Hospital in Dar-es-Salaam, Tanzania'. *Pan African Medical Journal* 2014; 17(227): 1–8.
11. Safarinejad MR. Prevalence and risk factors for erectile dysfunction in a population-based study in Iran. *International Journal of Impotence Research* 2003; 15: 246–252.
12. Idung AU, Abasiubong F, Ukott IA , Udoh SB and Unadike BC. Prevalence and risk factors of erectile dysfunction in Niger delta region , Nigeria. *African Health Sciences* 2012; 12(2): 160 - 165.
13. Latini DM, Penson DF, Colwell HH, Lubeck DP, Mehta SS, *et al.* Psychological Impact of Erectile Dysfunction: Validation of a new Health Related Quality of Life Measure for Patients with Erectile Dysfunction. *Journal of Urology* 2002; 168(5): 2086–2091.
14. Rajkumar PR, and Kumaran KA. 'ScienceDirect Depression and anxiety in men with sexual dysfunction: a retrospective study', *Comprehensive Psychiatry* 2015; 27–31.
15. Shabsigh R, Perelman MA, Lockhart DC, Lue TF, and Broderick GA. Outcomes / Epidemiology / Socioeconomics Health Issues Of Men: Prevalence And Correlates Of Erectile Dysfunction. *The Journal Of Urology* 2005; 174: 662–667.
16. Liu Q, Zhang Y, Wang J, Li S, Cheng Y, *et al.* 'Erectile Dysfunction and Depression: A Systematic Review and', *The Journal of Sexual Medicine* 2018; 15(8): 1073–1082.
17. Aytac IA and Ckinlay JB. The likely worldwide increase in erectile dysfunction between 1995 and 2025 and some possible policy consequences. *BJU International* 1999; 84: 50–56.
18. Akkus E, Kadioglu A, Esen A, Doran S, Ergen A, *et al.* Prevalence and Correlates of Erectile Dysfunction in Turkey: A Population-Based Study. *European Urology* 2002; 41: 298–304.

19. Ponholzer A, Temm C, Mocka K, Marszaleka M, Obermayrc R, *et al.* European Urology Prevalence and Risk Factors for Erectile Dysfunction in 2869 Men Using a Validated Questionnaire. *European Urology* 2005; 47: 80–86.
20. Park K, Hwang EC and Kim S. Prevalence and medical management of erectile dysfunction in Asia. *Asian Journal of Andrology* 2011; 13(4): 543–549.
21. Olugbengha-Bello AI, Adeoye OA, Adeomi AA and Olajide AO. Prevalence of erectile dysfunction (ED) and its risk factors among adult men in a Nigerian community. *The Nigerian Postgraduate Medical Journal* 2013; 20(2): 130-135.
22. Yovwin DG, Imarhiagbe FA, Obazee EM, and Oguike TC. Erectile dysfunction in a sub-saharan African population: Profile and correlates in a tertiary care hospital. *Sahel Medical Journal* 2015; 18(3): 116–120.
23. Leiblum SR, and Wiegel M. Psychotherapeutic interventions for treating female sexual dysfunction. *World J Urol* 2002; 20: 127–128.
24. Fafiolu AS, Adebayo AM, Akande TO, Akinboboye OO. Erectile Dysfunction Among Male Hypertensives in a Tertiary Health Facility in South-West Nigeria. *Global Journal of Health Science* 2015; 7(1): 154-160
25. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and It's Medical and Psychological Correlates: Results of The Massachusetts Male Aging Study. *The Journal Of Urology* 1994; 151: 54-61
26. McVary KT, Carrier S, Wessells H. Subcommittee on Smoking and Erectile Dysfunction Socioeconomic Committee, Sexual Medicine Society of North America. Smoking and erectile dysfunction: evidence based analysis. *J Urol* 2001; 166(16): 24–32.
27. Gades NM, Nehra A, Jacobson DJ, McGree ME, Girman CJ, *et al.* Association between Smoking and Erectile Dysfunction: A Population-based Study. *American Journal of Epidemiology* 2005; 161(4): 346-351
28. He J, Reynolds K, Chen J, Chen C, Wu X, *et al.* Cigarette Smoking And Erectile Dysfunction among Chinese without Clinical Vascular Disease. *American Journal Of Epidemiology* 2007; 166(7): 803-809
29. Ahmed A, Alnaama A, Shams K, and Salem M. Prevalence and risk factors of erectile dysfunction among patients attending primary health care centres in Qatar. *Eastern Mediterranean Health Journal* 2009; 17(7): 587–592.
30. Messner B, Bernhard D. Smoking and Cardiovascular Disease Mechanism of Endothelial Dysfunction and Early Atherogenesis. *Arterioscler Thromb Vasc Biol* 2014; 34: 509-515
31. Zedan H, Hareadei AA, Abd-Elsayed AA, Abdel-Maguid EM. Cigarette smoking, hypertension and diabetes mellitus as risk factors for erectile dysfunction in upper Egypt. *East Med Health J* 2010; 16(28) : 1-5.
32. Cho NH, Ahn CW, Park JY, Ahn TY, Lee HW, *et al.* Prevalence of Erectile Dysfunction in Korean men with Type 2 diabetes mellitus. *Diabetic Medicine* 2006; 23: 198-203

33. Adebusoye LA, Olapade-olaopa OE, Ladipo MM, Owoaje ET. Prevalence and Correlates of Erectile Dysfunction among Primary Care Attendees in Nigeria. *Global Journal of Health Science* 2012; 4(4): 107-117
34. Skeldon SC, Detsky AS, Goldenberg SL, Law MR. Erectile Dysfunction and Undiagnosed Diabetes, Hypertension, and Hypercholesterolemia. *Ann Fam Med* 2015; 13(4): 331-335
35. Roth A, Kalter-Leibovici O, Kerbis Y, Tenenbaum-Koren E, Chen J, *et al.* Prevalence and Risk Factors for Erectile Dysfunction in Men with Diabetes, Hypertension, and Both Diseases: A Community Survey among 1412 Israel Men. *Clin. Cardiol.* 2003; 26: 25-30.
36. Viigimaa M, Doumas M, Vlachopoulos C, Anyfantis P, Wolf J, *et al.* Hypertension and sexual dysfunction: time to act. *Journal of Hypertension* 2011; 29: 403-407.
37. Nunes KP, Labazi H, Webb RC. New Insight into Hypertension-Associated Erectile Dysfunction. *Curr Opin Nephrol Hypertens* 2012; 21(2): 163-170

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