


# Epidemiology of Male Sexual Dysfunction in Asian and European Regions: A Systematic Review

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## Abstract

Male sexual dysfunctions (MSDs) often remain undiagnosed and untreated in Asia compared to Europe due to conservative cultural and religious beliefs, socioeconomic conditions, and lack of awareness. There is a tendency for the use of traditional medicines and noncompliance with and reduced access to modern healthcare. The present systematic review compared the incidence and factors of MSD in European and Asian populations. English language population/community-based original articles on MSDs published in MEDLINE from 2008 to 2018 were retrieved. A total of 5392 studies were retrieved, of which 50 (25 Asian and 25 European) were finally included in this review. The prevalence of erectile dysfunction (ED) (0%–95.0% vs. 0.9%–88.8%), low satisfaction (3.2%–37.6% vs. 4.1%–28.3%), and hypoactive sexual desire disorder (HSDD) (0.7%–81.4 vs. 0%–65.5%) was higher in Asian than in European men, whereas the prevalence of anorgasmia (0.4% vs. 3%–65%) was lower in Asian than in European men. Age was an independent positive factor of MSD. In European men over 60 years old, the prevalence of premature ejaculation (PE) decreased. The prevalence of MSD was higher in questionnaires than in interviews. The significant factors were age, single status, low socioeconomic status, poor general health, less physical activity, cardiovascular diseases, diabetes, obesity, lower urinary tract symptoms, prostatitis, anxiety, depression and alcohol, tobacco, and drug use. The prevalence of MSD differed slightly in Asian and European men. There is a need to conduct large studies on the various Asian populations for the effective management of MSD.

## Keywords

sexual dysfunction, erectile dysfunction, premature ejaculation, Asian region, European region

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Male sexual dysfunction (MSD) generally entails an alteration in at least one of the basic sexual functions (desire, erection, orgasm, and ejaculation). The most common MSD-related complaints are hypoactive sexual desire disorder (HSDD), erectile dysfunction (ED), anorgasmia or difficulties in reaching orgasm, and premature or delayed ejaculation (Wylie & Kenney, 2010). MSD may also involve pain during sexual activities and dissatisfaction with sexual life (Ni Lochlainn & Kenny, 2013).

Erectile dysfunction is a consistent or recurrent inability to attain and/or maintain penile erection sufficient for sexual activity (Mola, 2015). Ejaculation dysfunction involves anejaculation, retrograde ejaculation, premature ejaculation (PE), or delayed ejaculation (DE). Anejaculation and retrograde ejaculation (ejaculation back to the urinary bladder) are symptomatically similar due to the absence of fluid ejaculation during

orgasm. In the former condition, semen is not produced at all, whereas in the latter condition, semen is produced but cannot be released during orgasm.

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Post-orgasm urine analysis reveals sperm in urine in the case of retrograde ejaculation (McMahon, 2014). PE is a spontaneous ejaculation that occurs sooner than desired, either before or after penetration. DE is an undue delay in ejaculation (Ralph & Wylie, 2005). Orgasmic dysfunction is defined by anorgasmia, reduced orgasmic sensation, or delayed orgasm during sexual activity (DeLamater & Karraker, 2009). Sexual desire disorder is characterized by a reduced desire (hypoactive desire) compared to normal levels, increased desire (hyperactive desire) than normal, or sexual aversion (fear, revulsion, or disgust for sexual activity) (Kafka, 2010; Montgomery, 2008).

The causes of MSD are physical, psychological, or a combination of both. MSD can occur due to several pathological conditions (diabetic neuropathy, hypertension, endocrine alterations, prostate cancer, urinary infections, urinary incontinence, degenerative and vascular diseases, and surgical damage to nerves and organs), psychological problems (relationship with partner, depression, and anxiety), and the use of psychoactive (antipsychotic) and antihypertensive drugs (Al-Turki, 2012; DeLamater & Karraker, 2009; Hassan et al., 2014; Hoekstra et al., 2012; Huhtaniemi, 2014; Justo et al., 2010; Mutagaywa et al., 2014; Wong et al., 2009a; Zhang et al., 2017). Lifestyle (smoking, substance abuse, overweight, and obesity) and sociodemographic factors (age, income, education, and employment status) may also be associated with MSD (Donnelly et al., 2018; Isha et al., 2016; Palacios-Ceña et al., 2012; Rao et al., 2015; Zhang et al., 2017).

Residents of European countries have access to sophisticated diagnostic and treatment options for their sexual problems. Discussing sex is a taboo in most Asian societies, and sexual dysfunctions are considered a part of the normal process of aging. Due to Asian men's cultural and religious beliefs, socioeconomic conditions, lack of awareness, tendency for traditional medicines, and noncompliance with and reduced access to modern healthcare, they do not take sexual dysfunction as a serious disorder, and it commonly remains undiagnosed and untreated (Ho et al., 2011). The differences in genetic and environmental factors may also influence the risks of MSD in Asian and European populations differently. The differences in prevalence and associated factors of MSD between these regions are not being reported. This review is being performed to investigate the comparative incidence of and factors contributing to MSD in European and Asian populations. The prevalence of MSD among young men, defined as men under 60 years of age (<60 years), and elderly men, defined as men over 60 years of age (>60 years), of the two regions will also be compared.

## Methods

### Systematic Literature Search

The literature was searched on MEDLINE using the following keywords: "male sexual dysfunctions," "erectile dysfunctions," "ejaculation dysfunctions" and "orgasmic dysfunctions". The search was not narrowed down to Asian and European regions to avoid missing potential studies, because many of the studies mention countries but do not mention the region.

### Inclusion and Exclusion Criteria

The criteria for eligibility of studies included that they be original quantitative population/community-based studies published from 2008 to 2018 in the English language. The 10 years duration is to represent a recent review of the epidemiology of MSD. In this regard, qualitative studies, reviews, conference abstracts and proceedings, case reports, reviews, and editorials were excluded. Furthermore, studies conducted in a population with specific morbidities and from other than Asian and European regions were also excluded (Figure 1).

### Data Extraction

The studies were carefully reviewed, and information was extracted about the first authors, study types, population characteristics, sampling durations, types of MSD, definitions of MSD, instruments and methods used to assess the prevalence of MSD, and associated factors. Men <60 years of age were categorized as young men and >60 years as elderly, in accordance with the criteria of the World Health Organization (WHO).

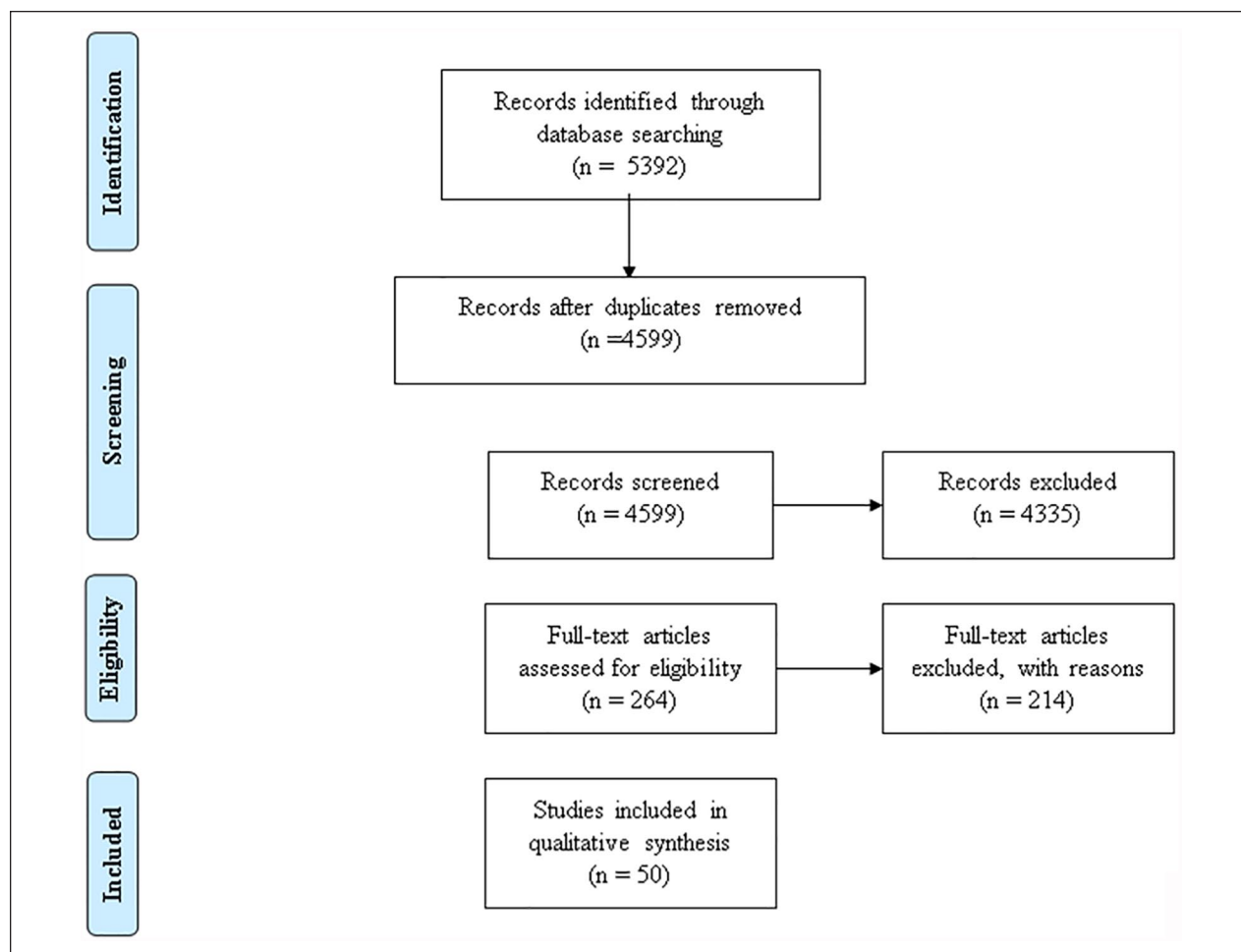
## Results

### Included Studies

The database search resulted in the identification of 5,392 studies. In total, 793 of these articles were duplicates, and 2,533 did not discuss the desired research topic. The remaining 2,066 articles were screened based on abstracts, and 1,802 studies were excluded based on their design as a specific cohort, review, or qualitative studies. The full texts of the 264 remaining studies were assessed, and, finally, 50 of those studies were included in this systematic review (Figure 1).

### Characteristics of Included Studies

Table 1 presents the population/community-based studies reporting on MSD in Asian ( $n = 25$ ) and European



**Figure 1.** Flow diagram of study selection.

( $n = 25$ ) populations. The Asian studies covered the prevalence of MSD in eight countries: China (Chung et al., 2015; Hao et al., 2011; Huang et al., 2014; Kim et al., 2009; Liang et al., 2010; Tang et al., 2015; Wong et al., 2009a; Wong et al., 2009b; Zhang et al., 2013; 2016; 2017), India (Rao et al., 2015), Jordan (Ghalayini et al., 2010), Korea (Jeong et al., 2011; Kim & Jeon, 2013; Lee et al., 2013; Park et al., 2010), Malaysia (Khoo et al., 2008; Quek et al., 2008), Taiwan (Hwang et al., 2010; Liu et al., 2010), Thailand (Permpongkosol et al., 2008), and Turkey (Çayan et al., 2017; Kendirci et al., 2014; Serefoglu et al., 2011). The European studies were from 15 countries, namely Belgium (Hendrickx et al., 2016), Croatia (Carvalho et al., 2014; Landrijet & Stulhofer, 2015), Denmark (Andersen et al., 2008; Christensen et al., 2011), Finland (Jern et al., 2012; Kontula & Haavio-Mannila, 2009), France (Moreau et al., 2016), Germany (Beutel et al., 2018), Ireland (Donnelly et al., 2018), the Netherlands (Korfage et al., 2008), Norway (Traeen & Stigum, 2010), Poland

(Jankowska et al., 2008), Portugal (Quinta Gomes & Nobre, 2014), the Republic of Moldova (Dumbraveanu et al., 2018), Spain (Castellanos-Torres et al., 2013; Ruiz-Muñoz et al., 2013), Sweden (Beckman et al., 2008; Holm et al., 2012), and the United Kingdom (Lee et al., 2016; Mitchell et al., 2016; Mitchell et al., 2013), while a further three studies were conducted on men from 10 particular countries: Belgium, Estonia, France, Germany, Hungary, Italy, Poland, Spain, Sweden, and the United Kingdom (Corona et al., 2010; Lee et al., 2013; Sand et al., 2008).

The most investigated MSDs included ED, various types of ED, ejaculation dysfunctions (PE and DE), and HSDD in both the Asian and European studies. A total of 19 Asian studies presented the prevalence of ED (Çayan et al., 2017; Chung et al., 2015; Ghalayini et al., 2010; Hao et al., 2011; Huang et al., 2014; Hwang et al., 2010; Jeong et al., 2011; Khoo et al., 2008; Kim et al., 2009; Liu et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al.,

**Table 1.** Sexual Dysfunctions in Asian and European Men.

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Asia</b>							
<b>China</b>							
Kim et al. (2009)		SAQ	Erectile difficulties for 3 months	Year	ED	12.2	NA
			No interest in sex	Year	HSDD	12.2	25–59 years: 12.2
			Anxiety about sex	Year	Anxiety	16.0	25–59 years: 16.0
Liang et al. (2009)	NS	SAQ	Ejaculation within 1 min of penetration always or nearly always	6 months	PE	15.3	15–30 years: 9.2 31–40 years: 25.6 41–50 years: 11.2 51–60 years: 3.3
Wong, Leung, and Woo (2009a)	2001–2003	IAQ#	Impotent	NS	ED	56.6	(+) Prostatitis (+) Mod to severe LUTS (+) BMI (+) CVD (+) Hypertension (+) Diabetes (+) Stroke (+) $\beta$ -blockers use (+) Thiazides (+) Clinical depression
Wong, Leung, and Woo (2009b)	NS	IAQ	Mildly impotent		Mild ED	24.9	$\geq 65$ years: 24.9
			Moderately impotent		Mod ED	19.8	$\geq 65$ years: 19.8
			Completely impotent		Severe ED	11.9	$\geq 65$ years: 11.9
			6 months	NS	ED	88.3	$\geq 65$ years: 88.3 (+) Age (+) Mod to severe LUTS (+) Depression (-) Physical activity
Hao et al. (2011)	2007	SAQ#	Inability to sustain or achieve an erection sufficient for satisfactory intercourse		Mild ED Mod ED Severe ED ED	77.0 7.4 4.0 12.1	$\geq 65$ years: 77.0 $\geq 65$ years: 7.4 $\geq 65$ years: 4.0 $\leq 30$ years: 11.1 31–40 years: 10.5 41–50 years: 12.1 51–60 years: 17.2
					Mild ED	62.3	15–60 years: 62.3
					Mod ED	23.3	15–60 years: 23.3
					Sever ED	14.4	15–60 years: 14.4
					ED	40.5	$\leq 30$ years: 33.2 <sup>P</sup> 31–40 years: 36.5 <sup>P</sup> 41–50 years: 56 <sup>P</sup> 51–60 years: 75.9 <sup>P</sup>
					ED	39.3	$\leq 30$ years: 34.9 <sup>a</sup> 31–40 years: 32.5 <sup>a</sup> 41–50 years: 41.8 <sup>a</sup> 51–60 years: 61.1 <sup>a</sup>

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Zhang et al. (2013)	2007	SAQ; IIEF-5	<22	Year	ED	≤30 years: 16.0	(+) Age (+) Partner sought medical help (+) Nonliberal attitudes toward female sexual initiation (+) Nonliberal attitudes toward female sexual refusal (+) Dissatisfaction with marriage Age (for PE/DE)
						31–40 years: 14.5	
						41–50 years: 15.4	
						51–60 years: 29.1	
						15–60 years: 64.8	
						15–60 years: 20.5	
						15–60 years: 14.7	
						≤30 years: 28.3 <sup>P</sup>	
						31–40 years: 33.6 <sup>P</sup>	
						41–50 years: 44.0 <sup>P</sup>	
51–60 years: 70.0 <sup>P</sup>							
Huang et al. (2014)	2008–2011	SAQ; IIEF-5	<22	6 months	ED	≤30 years: 20.1 <sup>a</sup>	(+) Age (+) Diabetes (+) Hypertension (+) BPH (+) PLS (+) FBG (+) TP5A (+) FSH BMI, WC, exercise, alcohol, tea, smoking, dyslipidemia, BP, HR, creatinine, TT, LH, PRL, E2, ALT, and TG
						31–40 years: 25.6 <sup>a</sup>	
						41–50 years: 30.0 <sup>a</sup>	
						51–60 years: 53.7 <sup>a</sup>	
						30–39 years: 1.0	
						40–49 years: 3.4	
						50–60 years: 9.8	
						30–39 years: 4.2	
						40–49 years: 4.4	
						50–60 years: 6.1	
30–39 years: 7.0							
40–49 years: 10.3							
50–60 years: 17.2							
30–39 years: 10.3							
40–49 years: 14.0							
50–60 years: 21.7							
40–51: 58.6							
52–59 years: 60.1							
60–64 years: 51.2							
65–80 years: 39.6							
Chung et al. (2015)	2001–2005	Interview#	Impotent	NS	ED	≥65 years: 57.2	(+) All causes mortality (CVD, respiratory and Cancer)
						24.7	
						20.0	
						12.5	

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Tang et al. (2015)	2007–2008	SAQ; Chinese version IIEF-5	<22	NS	ED	77.9 40–49 years: 55.3 50–59 years: 88.2 60–69 years: 91.8	(+) Age (+) Occupation (physical, semi-physical, or mental labor) (+) Educational level (+) Poor health status (+) Drug use (+) Smoking duration (+) Drinking frequency, (+) Genitourinary diseases
			12–21		Mild ED	28.1 40–49 years: 35.0 50–59 years: 25.1 60–69 years: 23.6	
			8–11		Mod ED	10.3 40–49 years: 8.2 50–59 years: 13.0 60–69 years: 9.7	
			5–7		Severe ED	39.5 40–49 years: 12.2 50–59 years: 50.1 60–69 years: 58.4	
		SAQ; Chinese version of ADAM	NS	NS	LOH	80.8 40–49 years: 55.7 50–59 years: 91.5 60–69 years: 97.1	(+) Severe ED
		SAQ; Chinese version of AMS	≥ 27	NS	LOH	32.3 40–49 years: 9.5 50–59 years: 25.9 60–69 years: 63.7	
		Total testosterone	≤ 9.13 nM	NS	AD	14.0 40–49 years: 12.9 50–59 years: 15.0 60–69 years: 13.9	
		cFT	≤ 0.169 nM			43.7 40–49 years: 30.3 50–59 years: 43.1 60–69 years: 57.4	
		ADAM + cFT	NS			37.9 40–49 years: 18.9 50–59 years: 38.1 60–69 years: 55.9	
		AMS + cFT	NS			15.4 40–49 years: 4.6 50–59 years: 6.9 60–69 years: 36.0	
Zhang et al. (2017)	2010–2013	IAQ; IIEF-5	<22	NS	ED	40.6 40–49 years: 18.1 50–59 years: 23.6 60–69 years: 48.4 ≥ 70 years: 81.6	(+) Age (+) 30 cigarettes daily (+) Bad spouse relationship (+) Diabetes (+) BPH related LUTS (+) BMI: 30kg/m <sup>2</sup> (+) Personal income (-) Zhuang & Muslim
							Marital status, waist-to-hip ratios, education levels, area of residence, CYD, cerebrovascular diseases, and alcohol

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors	
Zhang et al. (2015)	2012	SAQ#	No erection or could not maintain erection for 3 months	Year	ED	5.0 18–29 years: 0.0 30–39 years: 0.8 40–49 years: 5.7 50–59 years: 8.7 >60 years: 16.7	(+) Age (+) Dissatisfied with marriage (+) HSDD (+)	Employment, housing ownership, having children, length of marriage, and divorce
<b>India</b>								
Sathyarayanan Rao et al. (2015)	NS	IAQ; IIEF-5	NS	NS	ED	43.5 >60 years: 43.5	(+) Married (+) Unemployed (+) Hypertension (+) Diabetes	Age, occupation, education, sociodemographic status, domicile, family structure, alcohol, and smoking
					Mild ED	10.5 >60 years: 10.5		
					Mild to Mod ED	31.6 >60 years: 31.6		
					Mod ED	36.8 >60 years: 36.8		
					Severe ED	21.0 >60 years: 21.0		
		IAQ; PEDT	NS		PE	10.9 >60 years: 10.9		
		IAQ	NS	NS	Anorgasmia	0.38 >60 years: 0.38		
		IAQ			HSDD	0.77 >60 years: 0.77		
<b>Jordan</b>								
Ghalayini et al. (2010)	NS	IAQ; IIEF-5	≤20	NS	ED	49.9 <29 years: 24.7 30–39 years: 41.4 40–49 years: 52.7 50–59 years: 59.5 60–69 years: 72.3 >70 years: 89.2	(+) Age (+) BMI, (-) Educational level (+) Smoking (-) Household income (-) Physical activity (+) Medication (+) Diabetes mellitus (+) HTN (+) IHD ≥18 years: 25.0 ≥18 years: 13.5 ≥18 years: 11.4	
<b>Korea</b>								
Park et al. (2010)	2008	SAQ	Self-diagnosed premature ejaculation	3 months	PE	27.5 20–29 years: 23.4 30–39 years: 24.6 40–49 years: 30.7 ≥50 years: 36.8	(+) Prostatitis (+) Hypertension (+) Psychological disturbances	
					Mild ED	25.0		
					Mod ED	13.5		
					Severe ED	11.4		
Jeong et al. (2011)	2003	SAQ; Korean Version IIEF-5	<18	NS	ED	48.8 45–54 years: 18.2 55–64: 26.2 65–74 years: 60.4	(+) Age (+) Past smoking (+) Depression (-) Frequency of sexual activity (-) Satisfaction in relationship with spouse (-) Cognitive function	Educational level, exercise, marital status, alcohol, BMI, and hypertension
Kim and Jeon (2013)	2008–2009	Interview#	Never satisfied Not satisfied Less satisfied		Low satisfaction	3.2 13 37.6		Age, education, income, diseases, health status of self and spouse, ADL, IADL, cognitive function, length of cohabitation, depression, and importance of sex-life

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Lee et al. (2013)	2010	SAQ	NS		PE	19.5 20–29 years: 10.7 30–39 years: 14.9 40–49 years: 19.3 50–59 years: 27.8 60–64 years: 41.8	(+) Age (+) Diabetes (+) Hypertension (+) Arthritis (+) Back pain (+) Thyroid disease (+) Spinal disease (+) Prostatic disease (+) ED (-) Satisfaction  For IELT: Hypertension, back pain, thyroid disease, spinal disease, prostatic disease, and satisfaction
		SAQ; PEDT Stopwatch IELT	≤8 ≤2 min		PE PE	11.3 16.6 20–64 years: 11.3 20–29 years: 15.0 30–39 years: 13.2 40–49 years: 16.5 50–59 years: 16.6 60–64 years: 35.4	
<b>Malaysia</b>							
Khoo et al. (2008)	NS	IAQ; IIEF-5	<22	NS	ED	74.5 50–59 years: 67.5 60–69 years: 90.8 >70 years: 95.0	(+) Age (-) Health status (+) Occupation (+) LUTS (+) Depression  Ethnicity, educational level,
			17–21		Mild ED	32.8 50–59 years: 36.8 60–69 years: 30.3 >70 years: 30.0	
			12–16		Mild to Mod ED	17.7 50–59 years: 16.7 60–69 years: 5.0 >70 years: 28.9	
			8–11		Mod ED	5.1 50–59 years: 5.1 60–69 years: 5.0 >70 years: 6.6	
			1–7		Severe ED	14.5 50–59 years: 9.0 60–69 years: 55.0 >70 years: 25.0	
		IAQ; ADAM	Yes to three questions		AD	25.4 50–59 years: 18.3 60–69 years: 33.3 >70 years: 63.0	(+) BMI (+) Glucose
Quek et al. (2008)	NS	SAQ; IIEF-5	<21		ED	41.6 20–29 years: 6.3 30–39 years: 6.5 40–49 years: 22.9 50–59 years: 54.6 ≥60 years: 62.7	(+) Age (+) Diabetes (+) Hypertension (+) Nocturia  Marital difficulties, anxiety, and depression,
			≤2 min		Overall SP	50.0 20–29 years: 25.0 30–39 years: 29.7 40–49 years: 45.8 50–59 years: 75.3 ≥60 years: 88.2	
		IELT			PE	22.3 20–29 years: 16.7 30–39 years: 13.0 40–49 years: 9.4 50–59 years: 1.0 ≥60 years: 0	(+) Frequency of sex (+) Anxiety (-) Diabetes  Age, marriage difficulties, hypertension, and depression

(continued)





Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Turkey</b> Serifoglu et al. (2011)	2009	IAQ; Turkish version of PEDT, AIPE, and PEP	>9, <31	6 months	PE	25.0 20–29 years: 14.0 30–39 years: 15.5 40–49 years: 20.5 50–59 years: 22.0 60–69 years: 38.7 ≥70 years: 49.1	(-) Sexual function  (-) Income (+) BMI (+) Dyslipidemia (+) Hypertension, (+) Diabetes mellitus (+) CVD (-) Educational level (+) Retired (+) Urban residence (+) Income (+) Vascular disorder (mod-severe ED) (+) CP or BPE (mod-severe ED) (+) Diabetes (mod-severe ED) (+) Hypertension (mod-severe ED) (+) Atherosclerosis (mod-severe ED) (+) CAD (mod-severe ED) (+) Dyslipidemia (mod-severe ED) (+) CP (+) BPH
Kendirici et al. (2014)	2010	IAQ; IIEF-5, IPSS, and MSHQ-4	≤25, ≥1, ≤12	NS	MPD	24.4 40–49 years: 9.1 50–59 years: 27.1 60–69 years: 56.7 ≥70 years: 76.6	Residence area and testosterone deficiency
Cayan et al. (2017)	NS	IAQ; IIEF-5	<26	NS	ED	33 40–49 years: 17.0 50–59 years: 35.5 60–69 years: 68.8 ≥70 years: 82.9	Unemployment and BMI
					Mild ED	25.6 40–49 years: 2.5 50–59 years: 10.5 60–69 years: 38.5 ≥70 years: 28.1	
					Mod ED	5.5 40–49 years: 0.29 50–59 years: 1.6 60–69 years: 8.1 ≥70 years: 26.0	
					Severe ED	1.9 40–49 years: 0.1 50–59 years: 0.5 60–69 years: 0.8 ≥70 years: 14.9	
<b>EUROPE</b> <b>Belgium</b> Hendrickx et al. (2016)	2011–2012	SAQ; SFS	≥3	6 months	ED	8.3 14–34 years: 0.9 35–49 years: 3.0 50–64 years: 11.0 65–80 years: 41.3	(+) Age (ED, HSDD) (-) Satisfaction  Age (PE/DE)
					PE	9.2 14–34 years: 9.3 35–49 years: 10.7 50–64 years: 9.8 65–80 years: 2.7	
					DE	1.4 14–34 years: 1.3 35–49 years: 2.1 50–64 years: 1.8 65–80 years: 10.7	

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Croatia</b> Carvalho et al. (2014)	NS	SAQ; NATSAL 2000	Orgasm without ejaculation	6 months	RE	0.6	14–34 years: 0 35–49 years: 0 50–64 years: 1.8 65–80 years: 1.4
						13	14–34 years: 1.8 35–49 years: 2.1 50–64 years: 7.3 65–80 years: 5.3
						0.6	14–34 years: 0.9 35–49 years: 0.9 50–64 years: 0 65–80 years: 0
						1.44	18–29 years: 3.3 30–39 years: 5.7 40–49 years: 3.4 50–59 years: 1.8 >60 years: 0.2
							18–29 years: 22 30–39 years: 26.2 40–49 years: 27.5 50–59 years: 29.9 >60 years: 22.9
							(+) Croatian and Norwegian (+) Asexuality (+) Higher depression (-) Self-confidence of erection (+) Duration of relationship (+) Negative perception of attractiveness of partner (+) Partner hurts feelings (+) Masturbation frequency (+) Pornography use (+) Perception of increased age (+) Bad health perception
							(+) Tiredness, professional stress, perception of sexual life boring and partner sexually passive, poor communication and relationship with partner; sexual abuse, medication, physical violent partner, partner does not want sex, not sexually attracted to partner, not sexually attractive, did not have sex for long, and pornography use
							(+) Pornography use and education
							(-) Education (Croatian 2)
							(+) Age (Croatian & Portuguese) (-) Education (Croatian)
<b>Denmark</b> Andersen et al. (2008)	2011	SAQ; GSSAB	Difficulties with achieving and maintaining erection for 2 months	Year	ED	14.2–28.3	18–40 years: 14.2–28.3
						30.8	18–40 years: 30.8 <sup>b</sup>
						16.3–37.4	18–40 years: 16.3–37.4
						12.8	18–40 years: 12.8 <sup>b</sup>
						6.2–19.9	18–40 years: 6.2–19.9
						9.3	18–40 years: 9.3 <sup>b</sup>
						10.1	20–45 years: 5.5
						8.2 <sup>c</sup>	20–45 years: 4.6 <sup>c</sup>
						10.8 <sup>d</sup>	20–45 years: 5.2 <sup>d</sup>
						17.4 <sup>e</sup>	20–45 years: 12.7 <sup>e</sup>
	50–75 years: 18.4 50–75 years: 17.1 <sup>c</sup> 50–75 years: 18.3 <sup>d</sup> 50–75 years: 23.1 <sup>e</sup>						
	(+) Age (+) BMI ≥30 (20–45 years) (+) Smoking (20–45 years)						
	50–75 years: Age and BMI						

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Christensen et al. (2011a)	2005	SAQ	Ejaculation come too fast "all the time," "almost all the time," or "quite often"	6 months	PE	22.3	BMI
						22.0 <sup>c</sup>	
						21.7 <sup>d</sup>	
						27.0 <sup>e</sup>	
						20–45 years: 23.7	
						20–45 years: 23.4 <sup>f</sup>	
						20–45 years: 23.1 <sup>d</sup>	
						20–45 years: 28.6 <sup>e</sup>	
						50–75 years: 19.6	
						50–75 years: 17.6	
50–75 years: 19.8							
50–75 years: 25							
20–45 years: 2.5							
20–45 years: 3.0 <sup>c</sup>							
20–45 years: 1.1 <sup>d</sup>							
20–45 years: 4.8 <sup>e</sup>							
50–75 years: 8.4							
50–75 years: 7.6							
50–75 years: 9.1							
50–75 years: 7.7							
20–45 years: 3.3							
20–45 years: 3.2 <sup>c</sup>							
20–45 years: 3.7 <sup>d</sup>							
20–45 years: 1.6 <sup>e</sup>							
50–75 years: 6.2							
50–75 years: 4.7							
50–75 years: 7.6							
50–75 years: 5.8							
50–75 years: 1							
50–59 years: 5							
≥60 years: 16							
<20 years: 2							
20–59 years: 10							
≥60 years: 20							
20–30 years: 23							
≥70 years: 65							
<20 years: 18							
≥70 years: 3							
5	ED	Erectile difficulties	NS	ED	5	(-) Employment (ED) (+) Difficulties paying bills last year (sexual dysfunction & Dyspareunia)	
Europe* Sand et al. (2008)	2001	Interview	No or short-term erection	NS	ED	16	Constructs of masculinity
						11	
						2	
						0.1	
						20–59 years: 11	
						40–49 years: 15	
						50–59 years: 22	
						60–69 years: 30	
						70–75 years: 37	
						Sexual dysfunction	
Sexual dysfunction							
Anorgasmia							
Sex painful							
11	Sexual dysfunction	Any sexual dysfunction	NS	Sexual dysfunction	11	(-) Employment (ED) (+) Difficulties paying bills last year (sexual dysfunction & Dyspareunia)	
2	Anorgasmia	Any sexual dysfunction	NS	Anorgasmia	2	(-) Income (Dyspareunia) (+) Unmarried (PE)	
0.1	Sex painful	Any sexual dysfunction	NS	Sex painful	0.1	(-) Employment (ED) (+) Difficulties paying bills last year (sexual dysfunction & Dyspareunia)	
16	ED	No or short-term erection	NS	ED	16	(-) Sexual satisfaction (-) Health satisfaction	
11	ED	No or short-term erection	NS	ED	11	(-) Sexual satisfaction (-) Health satisfaction	
15	ED	No or short-term erection	NS	ED	15	(-) Sexual satisfaction (-) Health satisfaction	
22	ED	No or short-term erection	NS	ED	22	(-) Sexual satisfaction (-) Health satisfaction	
30	ED	No or short-term erection	NS	ED	30	(-) Sexual satisfaction (-) Health satisfaction	
37	ED	No or short-term erection	NS	ED	37	(-) Sexual satisfaction (-) Health satisfaction	

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Corona et al. (2010)	NS	SAQ; EMAS-SFQ-14	NS	NS	ED	30.5 40–49 years: 5.2 50–59 years: 18.8 60–69 years: 35.9 ≥70 years: 55.5	(+) Age 0 (+) Country of residence (+) Smoking (+) Unemployment (+) Partner's poor health (-) Sexual satisfaction (+) Depression (+) LLUTS (+) CVD (+) Diabetes (+) Obesity
					Mod ED	17.3 40–49 years: 4.5 50–59 years: 14.1 60–69 years: 23.0 ≥70 years: 29	
					Severe ED	13.2 40–49 years: 0.6 50–59 years: 4.8 60–69 years: 15.0 ≥70 years: 35.0	
					Orgasmic disorder	12.1 40–49 years: 6.6 50–59 years: 8.9 60–69 years: 15 ≥70 years: 18.7	(+) Depression (+) LLUTS
					Anorgasmia	6.6 40–49 years: 3.0 50–59 years: 5.0 60–69 years: 8.0 ≥70 years: 11.0	
					Reach orgasm < Half time	5.6 40–49 years: 4.0 50–59 years: 4.0 60–69 years: 7.3 ≥70 years: 10.1	
					Low satisfaction	27.4 40–49 years: 23.2 50–59 years: 25.0 60–69 years: 27.2 ≥70 years: 28.3	(+) Age (+) Depression
Lee et al. (2013)	NS	SAQ; EMAS-SFQ	Sometimes—never able to get and keep erection	Year	ED	50.3 ≥60 years: 50.3 ≥60 years: 41.9 <sup>f</sup> ≥60 years: 61.1 <sup>g</sup> ≥60 years: 77.4 <sup>h</sup>	(+) Pre-frailty (+) Frailty
<b>Finland</b> Konttula et al. (2009)	1992&1999	SAQ	Erectile difficulties quite often Not satisfied with sexual life	Year	ED	14 45–54 years: 8 55–64 years: 16 65–74 years: 30 45–54 years: 18 55–64 years: 21 65–74 years: 23	

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Jern et al. (2012)	2005–2006	SAQ; IIEF-5	Lack of own sexual desire caused problems very or quite often in last year		HSDD	15 45–54 years: 13 55–64 years: 12 65–74 years: 30	(-) Good health (+) Low sexual self-esteem (-) Good sexual functioning (-) Sexually skillful partner (-) Considering sexual life important (+) Unsatisfied with sex (-) Finding pornography arousing  (+) Age (+) ED at first intercourse (+) Anxiety (+) Depression 18–48 years: 13.2 18–48 years: 1.6 18–48 years: 0.4 18–48 years: 0.0
<b>France</b>							
Moreau et al. (2016)	2010	Interview	Problem in maintaining erection often to rarely Premature ejaculation often to rarely Difficulty in reaching orgasm often to rarely Pain during sex often to rarely Low sexual desire often to rarely No pleasure in sex often to rarely Sexual dysfunction at least one Sexual dysfunction > 1	Year	ED PE DE Sex painful HSDD Sex not pleasurable Sexual dysfunction	16 52 17 13 28 26 17 6	(+) Sexual satisfaction when ED or PE hindering intercourse or > 1 dysfunctions (+) Unintended pregnancy when hindering sexual intercourse  Forced sex, STIs, and ever unintended pregnancy
<b>Germany</b>							
Beutel et al. (2018)	2005	IAQ	No feeling of sexual desire	Month	HSDD	8.4 18–30 years: 0.0 31–40 years: 0.6 41–50 years: 0.5 51–60 years: 4.4 61–70 years: 14.9 ≥70 years: 47.4	(+) Age (+) Sampling year  Cohabiting (2005)

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
						5.8	18–30 years: 0.0' 31–40 years: 0.0' 41–50 years: 0.0i 51–60 years: 1.8' 61–70 years: 9.8' ≥70 years: 37.9'
						14.0	18–30 years: 0.0' 31–40 years: 2.1' 41–50 years: 1.9i 51–60 years: 14.0' 61–70 years: 36.8' ≥70 years: 61.5i
	2016					13.2	18–30 years: 2.8 31–40 years: 4.8 41–50 years: 4.2 51–60 years: 7.7 61–70 years: 19.8 ≥70 years: 50.0
						8.9	18–30 years: 0.0' 31–40 years: 1.7' 41–50 years: 1.7' 51–60 years: 4.1' 61–70 years: 13.9i ≥70 years: 38.5i
						19.1	18–30 years: 4.2i 31–40 years: 11.5i 41–50 years: 8.5i 51–60 years: 14.5i 61–70 years: 31.1i ≥70 years: 65.5i
<b>Ireland</b>							
Donnelly et al. (2018)	NS	SAQ; EPIC-26	Very poor to no erection	NS	ED	24.6	(+) Age (+) BMI (+) Deprived (+) Poor general health (-) Physical activity Area of residence
			No or poor ability to reach orgasm	NS	Orgasmic disorder	22.9	40–59 years: 8.9 60–69 years: 15.5 70–79 years: 30.7 ≥80 years: 64.2
			Big sexual problems	NS	SP	19.5	40–59 years: 10.1 60–69 years: 15.7 70–79 years: 25.1 ≥80 years: 65.3

(continued)

**Table I. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Netherlands</b>							
Korffrage et al. (2008)	2003–2004	SAQ; Dutch module SAC	Problems with getting or maintaining erections	NS	ED	19.1	(+) Age 58–61 years: 12.0 62–64 years: 14.6 65–67 years: 18.4 68–70 years: 21.9 71–78 years: 26.3 58–61 years: 40.8 62–64 years: 41.4 65–67 years: 46.1 68–70 years: 51.6 71–78 years: 57.7
			Almost no sexual desire		HSDD	48.0	
			Very dissatisfied		Low satisfaction	20.2	
<b>Norway</b>							
Traaen and Stigum (2010)	2008	Interview	Problem of erection manifested	Year	ED	10.0	18–29 years: 5.0 30–39 years: 5.0 40–49 years: 7.0 50–59 years: 11.0 60–67 years: 33.3
			Problem of erection manifested	Year	ED	9.0	18–29 years: 5.0 30–39 years: 3.0 40–49 years: 4.0 50–59 years: 9.0
			NS		PE	31	18–29 years: 24.0 30–39 years: 23.0 40–49 years: 19.0 50–59 years: 24.0 60–67 years: 28.0
			NS		PE	38	18–29 years: 28.0 30–39 years: 22.0 40–49 years: 30.0 50–59 years: 33.0
			NS		DE	8	18–29 years: 10.0 30–39 years: 8.0 40–49 years: 8.0 50–59 years: 7.0 60–67 years: 11
			NS		DE	6	18–29 years: 9.0 30–39 years: 7.0 40–49 years: 11.0 50–59 years: 16.0
			Orgasmic problem		Orgasmic disorder	6	18–29 years: 5.0 30–39 years: 5.0 40–49 years: 6.0 50–59 years: 5.0 60–67 years: 14

(continued)



**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Poland</b> Janikowaska et al. (2008)	NS	Polish version of AMS scale	Orgasmic problem		Orgasmic disorder	18–29 years: 6.0 30–39 years: 4.0 40–49 years: 8.0 50–59 years: 13.0	(+ ) Age (- ) Educational level
			Reduced sexual desire	≥ 6	HSDD	18–29 years: 15.0 30–39 years: 19.0 40–49 years: 13.0 50–59 years: 13.0 60–67 years: 2.6	
			Reduced sexual desire	6–7	HSDD	18–29 years: 12.0 30–39 years: 13.0 40–49 years: 14.0 50–59 years: 19.0	
				≥ 11	Sexual problems	32–45 years: 69.9 46–55 years: 96.6 56–65 years: 100 66–79 years: 100	
				8–10	Mild	32–45 years: 22.8 46–55 years: 14.9 56–65 years: 2.5 66–79 years: 0	
				≥ 11	Mod	32–45 years: 28.7 46–55 years: 32.4 56–65 years: 12.3 66–79 years: 5.0	
					Severe	32–45 years: 18.4 46–55 years: 49.3 56–65 years: 85.2 66–79 years: 95.0	
					ED	18–70 years: 21.1	
					Mild ED	18–24 years: 11 25–34 years: 7 35–44 years: 12 45–54 years: 23 ≥55 years: 39	
					Mod to severe ED	18–24 years: 2 25–34 years: 1 35–44 years: 6 45–54 years: 12 ≥55 years: 21	
<b>Portugal</b> Gomes et al. (2013)	2008–2010	SAQ; Portuguese version of IIEF	Sometimes to always erection difficulties	NS	ED	18–70 years: 21.1	Age (PE), length of current relationship, educational level (ED, HSD, PE), and marital status
		Sometimes and about half of the time erection difficulties		NS	Mild ED	10.9	
		Most times and almost always erection difficulties			Mod to severe ED	10.2	
		Sometimes to always rapid ejaculation			PE	45.2	

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
			Sometimes and about half of the time rapid ejaculation		Mild PE	18–24 years: 40 25–34 years: 45 35–44 years: 43 45–54 years: 48 ≥55 years: 49	
			Most times and almost always rapid ejaculation		Mod to severe PE	18–24 years: 23 25–34 years: 28 35–44 years: 23 45–54 years: 20 ≥55 years: 22	
			Sometimes to always orgasmic difficulties		DE	18–70 years: 17.5	
			Sometimes and about half of the time orgasmic difficulties		Mild DE	18–24 years: 12 25–34 years: 9 35–44 years: 11 45–54 years: 17 ≥55 years: 30	
			Most times and almost always orgasmic difficulties		Mod to severe DE	18–24 years: 8 25–34 years: 4 35–44 years: 8 45–54 years: 3 ≥55 years: 14	
			Sometimes to always low sexual desire		HSDD	18–70 years: 17.2	
			Sometimes and about half of the time low sexual desire		Mild low HSDD	18–24 years: 11 25–34 years: 4 35–44 years: 8 45–54 years: 17 ≥55 years: 34	
			Most times and almost always low sexual desire		Mod to severe HSDD	18–24 years: 2 25–34 years: 1 35–44 years: 1 45–54 years: 1 ≥55 years: 7	
<b>Republic of Moldova</b> Dumbraveanu et al. (2018)	2015–2016	IAQ; IIEF-5	NS	NS	ED	18–29 years: 17.2 30–39 years: 26.9 40–49 years: 52.0 50–64 years: 72.5 ≥65 years: 88.8	(+) Age (+) Nocturia (+) LUTS
					Mild ED	18–29 years: 11.9 30–39 years: 17.3 40–49 years: 30.2 50–64 years: 28.9 ≥65 years: 18.7	

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
<b>Spain</b> Castellanos-Torres et al. (2013)	2009	Interview	Feelings after sexual relations	Year	Mild to Mod ED	12.4	18–29 years: 3.0 30–39 years: 5.8 40–49 years: 14.0 50–64 years: 22.0 ≥65 years: 21.5
						7.6	18–29 years: 1.4 30–39 years: 2.7 40–49 years: 5.5 50–64 years: 15.7 ≥65 years: 17.8
						5.1	18–29 years: 0.7 30–39 years: 1.2 40–49 years: 2.2 50–64 years: 5.9 ≥65 years: 30.8
						8.7	16–29 years: 5.3 30–44 years: 5.0 45–64 years: 4.7 ≥65 years: 6.9
						10.1	16–24 years: 12.3 25–34 years: 9.8 35–44 years: 9.2
						5.1	16–24 years: 6.6 25–34 years: 5.3 35–44 years: 4.1
						12.0	70 years: 12.0
						18.1	70 years: 18.1
						8.3	70 years: 8.3
						3.7	70 years: 3.7
<b>Sweden</b> Beckman et al. (2008)	1976–77; 2000–01 1976–1977 2000–2001 1976–77 & 2000–2001 1976–1977 2000–2001 1976–77; 2000–01 2010	Interview	NS	NS	ED	12.0	70 years: 12.0
						18.1	70 years: 18.1
						8.3	70 years: 8.3
						3.7	70 years: 3.7
						3.6	70 years: 3.6
						3.8	70 years: 3.8
						6.0	70 years: 6.0
						16.6	35 years: 12.5 45 years: 19.5
						21.2	35 years: 18.3 45 years: 23.0

(continued)

Table 1. (continued)

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors	
<b>United Kingdom</b>								
Mitchell et al. (2013)	2010–2012	SAQ	Trouble getting and keeping an erection		ED	12.9	(+) Age	
						16–24 years: 7.6 24–34 years: 7.9 35–44 years: 7.9 45–54 years: 13.4 55–64 years: 23.5 65–74 years: 30.0		
			Low sexual function		Low sexual function	16–24 years: 14.1 24–34 years: 16.6 35–44 years: 21.2 45–54 years: 18.4 55–64 years: 27.8 65–74 years: 27.0	Deprived area of residence (+) Age (+) Unemployment (+) Depression (+) Poor health (-) Living with partner (+) Isolated (+) Unhappy to partner (+) Cannot talk about sex with a partner (+) Regret and distress at first time sex and past month (+) Same sex partner in last 5 years (+) Paying for sex in past year (+) Nonvolitional sex (+) STIs (+) Age	
			Anyone or more of sexual problems		SP	41.6	16–24 years: 36.2 24–34 years: 39.7 35–44 years: 40.3 45–54 years: 40.1 55–64 years: 48.1 65–74 years: 53.5	
			Any two or more of sexual problems		SP	13.8	16–24 years: 13.6 24–34 years: 14.9 35–44 years: 13.9 45–54 years: 11.7 55–64 years: 15.7 65–74 years: 13.0	Age
			Reached climax too quickly		PE	14.9	(-) Age 16–24 years: 16.5 24–34 years: 19.1 35–44 years: 15.8 45–54 years: 13.6 55–64 years: 10.0 65–74 years: 10.8	
			Difficulty in reaching climax		DE	9.2	16–24 years: 9.2 24–34 years: 9.8 35–44 years: 8.3 45–54 years: 7.9 55–64 years: 10.6 65–74 years: 10.4	Age

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Lee et al. (2016)	2012–2013	SAQ; ELSA SRA-Q	Lacked interest in sex	HSSD	14.9	16–24 years: 11.5	Age
						24–34 years: 14.5	
						35–44 years: 17.2	
						45–54 years: 15.3	
						55–64 years: 16.0	
						65–74 years: 13.6	
						16–24 years: 1.8	
						24–34 years: 1.7	
						35–44 years: 1.8	
						45–54 years: 2.0	
						55–64 years: 1.9	
						65–74 years: 1.0	
						16–24 years: 5.7	
						24–34 years: 6.3	
35–44 years: 5.8							
45–54 years: 4.4							
55–64 years: 5.5							
65–74 years: 3.8							
16–24 years: 5.4							
24–34 years: 6.7							
35–44 years: 5.0							
45–54 years: 3.3							
55–64 years: 4.6							
65–74 years: 1.8							
50–59 years: 15.5							
60–69 years: 35.5							
70–79 years: 66.1							
80–89 years: 88.3							
50–59 years: 24.2							
60–69 years: 30.1							
70–79 years: 42.6							
80–89 years: 49.1							
50–59 years: 8.3							
60–69 years: 14.9							
70–79 years: 33.2							
80–89 years: 52.2							
50–59 years: 18.7							
60–69 years: 22.5							
70–79 years: 20.2							
80–89 years: 19.2							
			Physical pain in sex		Sex painful	1.8	Age
			Felt anxious during sex		Anxiety	5.4	Age
			Lack enjoyment in sex		Sex not pleasurable	4.8	Age
			Erectile difficulties		ED	39.2	(+) Age (ED & DE) (+) High BP (ED) (+) Arthritis (ED & HSDD) (+) CVD (ED) (+) Diabetes (ED) (+) Asthma (ED) (+) Poor health (ED, DE & HSDD)
			Compared with previous year decreased level of sexual drive/desire		HSDD	32.3	(+) dissatisfaction with overall sex life (+) Depression (ED)
			Difficulty achieving orgasm		DE	15.6	
			Dissatisfied with overall sexual life		Low satisfaction	19.9	

(continued)

**Table 1. (continued)**

Author (Year)	Sampling Duration	Assessment Method	Cut-Off Score/Definition	Time Period	Condition/ Dysfunction	Prevalence (%)	Associated Factors
Mitchell et al. (2016)	2010–2012	SAQ	Difficulty getting and keeping an erection Anyone of sexual problems Reached climax too quickly Difficulty in reaching climax Lacked interest in sex Physical pain in sex Felt anxious during sex Lack enjoyment in sex		ED SP PE DE HSDD Sex painful Anxiety Sex not pleasurable	7.8 33.8 13.2 8.3 10.5 1.9 4.8 5.4	16–21 years: 7.8 NA 16–21 years: 33.8 16–21 years: 13.2 16–21 years: 8.3 16–21 years: 10.5 16–21 years: 1.9 16–21 years: 4.8 16–21 years: 5.4

Note. AD = androgen deficiency; ADAM = Androgen Deficiency Assessment Module; APE = Arabic Index of Premature Ejaculation; AMS = The Aging Male's Symptoms Scale; BMSFI = Brief Manual of Sexual Function Inventory; cFT = circulating free testosterone; ED = erectile dysfunction; EMAS SFQ = European Male Aging Study Sexual Function Questionnaire; ELISA SRA-Q = European Longitudinal Study of Aging Sexual Function Assessment Questionnaire; EPIC = The Expanded Prostate Cancer Index Composite; DE = delayed ejaculation; DSM-IV = Manual of Mental Disorder-IV; GDS-15 = 15-Item Geriatric Depression Scale; HSDD = hypoactive sexual desire disorder; IIEF-5 = 5-Items International Index of Erectile Dysfunction; IIEF-EF = International Index of Erectile Dysfunction – erectile function section; IELT = intravaginal ejaculation latency time; IPSS = International Prostate Symptom Score; ISSM = International Society for Sexual Medicine; LOH = late onset hypogonadism; Mod = moderate; MPD = male pelvic dysfunction; MSHQ-4 = Male Sexual Health Questionnaire; NATSAL 2000 = The National Survey of Sexual Attitudes and Lifestyles 2000; NS = not stated; PE = premature ejaculation; PEDT = Premature Ejaculation Diagnosis Tool; PEP = Premature Ejaculation Profile; SAC = sexual activity; SDI-2 = Sexual Desire Inventory 2; SFS = sexual function screener; SI = sexual inactivity; and SP = sexual problem.

<sup>a</sup>Single question.

<sup>b</sup>With prostate like symptoms.

<sup>c</sup>Study two.

<sup>d</sup>BMI: <25.

<sup>e</sup>BMI: 25–29.9.

<sup>f</sup>BMI: ≥30.

<sup>g</sup>Robust.

<sup>h</sup>Prefrail.

<sup>i</sup>Frail.

<sup>j</sup>Partnered.

<sup>k</sup>Single.

<sup>l</sup>Chronic prostatitis.

2009a; 2009b; 2016; Zhang et al., 2013, 2017), including eight studies that also presented different types of ED (Çayan et al., 2017; Chung et al., 2015; Khoo et al., 2008; Permpongkosol et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; 2009b). A total of seven Asian studies covered ejaculation dysfunction (Lee et al., 2013; Liang et al., 2010; Park et al., 2010; Quek et al., 2008; Rao et al., 2015; Serefoglu et al., 2011; Zhang et al., 2013), while four studies discussed HSDD (Kim et al., 2009; Liu et al., 2010; Rao et al., 2015; Zhang et al., 2013). Twenty studies investigated the prevalence of ED in European populations (Andersen et al., 2008; Beckman et al., 2008; Christensen et al., 2011; Corona et al., 2010; Donnelly et al., 2018; Dumbraveanu et al., 2018; Hendrickx et al., 2016; Jern et al., 2012; Holm et al., 2012; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Landripet & Stulhofer, 2015; 2013, 2016; Mitchell et al., 2013; 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Sand et al., 2008; Traeen & Stigum, 2010), and four of them also discussed the various types of ED (Corona et al., 2010; Dumbraveanu et al., 2018; Jern et al., 2012; Quinta Gomes & Nobre, 2014). A total of eight studies investigated ejaculation dysfunction (Andersen et al., 2008; Beckman et al., 2008; Hendrickx et al., 2016; Holm et al., 2012; Lee et al., 2016; Mitchell et al., 2013, 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Traeen & Stigum, 2010), and 13 studies discussed HSDD (Andersen et al., 2008; Beutel et al., 2018; Carvalheira et al., 2014; Hendrickx et al., 2016; Korfage et al., 2008; Landripet & Stulhofer, 2015; Lee et al., 2016; Mitchell et al., 2013, 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Traeen & Stigum, 2010). In the Asian and European populations, there were 23 and 24 studies, respectively, that discussed at least one associated factor of MSD (Table 1).

### Prevalence of Sexual Dysfunctions

**Erectile Dysfunction.** Table 1 presents that the prevalence of ED was 0% to 95.0% of Asian men. The prevalence of ED was 0% to 88.2% and 7% to 95.0% for men <60 years (Çayan et al., 2017; Ghalayini et al., 2010; Hao et al., 2011; Huang et al., 2014; Hwang et al., 2010; Jeong et al., 2011; Khoo et al., 2008; Kim et al., 2009; Liu et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Tang et al., 2015; Zhang et al., 2013, 2016, 2017) and >60 years (Çayan et al., 2017; Chung et al., 2015; Ghalayini et al., 2010; Huang et al., 2014; Hwang et al., 2010; Jeong et al., 2011; Khoo et al., 2008; Liu et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; Zhang et al., 2016; 2017), respectively. The prevalence of ED in Asian men <60 years was lowest for 18–29 years (0%–6.3%) (Hwang et al., 2010; Quek et al., 2008; Zhang et al., 2016), followed by 30–39 years (0.8%–41.4%) (Ghalayini et al.,

2010; Hwang et al., 2010; Quek et al., 2008; Zhang et al., 2013, 2016), 40–49 years (1%–55.3%) (Çayan et al., 2017; Ghalayini et al., 2010; Hwang et al., 2010; Liu et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Tang et al., 2015; Zhang et al., 2016; Zhang et al., 2013, 2017) and 50–59 years (3%–88.2%) (Çayan et al., 2017; Ghalayini et al., 2010; Huang et al., 2014; Hwang et al., 2010; Khoo et al., 2008; Liu et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Tang et al., 2015; Zhang et al., 2016, 2017). The prevalence of ED was 7% to 91.8%, and 15% to 95% for men 60–69 years (Çayan et al., 2017; Ghalayini et al., 2010; Huang et al., 2014; Hwang et al., 2010; Khoo et al., 2008; Liu et al., 2010; Tang et al., 2015; Zhang et al., 2017) and ≥70 years (Çayan et al., 2017; Ghalayini et al., 2010; Hwang et al., 2010; Khoo et al., 2008; Liu et al., 2010; Zhang et al., 2017), respectively.

The overall prevalence of ED in European men was 0.9% to 88.8%. European men <60 years had a prevalence of 0.9% to 52% (Andersen et al., 2008; Christensen et al., 2011; Corona et al., 2010; Dumbraveanu et al., 2018; Hendrickx et al., 2016; Holm et al., 2012; Jern et al., 2012; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Landripet & Stulhofer, 2015; Lee et al., 2016; Mitchell et al., 2013, 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Sand et al., 2008; Traeen & Stigum, 2010), while men >60 years had a prevalence of 8.3% to 88.8% (Andersen et al., 2008; Beckman et al., 2008; Christensen et al., 2011; Corona et al., 2010; Donnelly et al., 2018; Dumbraveanu et al., 2018; Hendrickx et al., 2016; Jern et al., 2012; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Landripet & Stulhofer, 2015; Lee et al., 2013; Mitchell et al., 2013; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Sand et al., 2008; Holm et al., 2012; Traeen & Stigum, 2010). The age groups showed that the European men <60 years in the age group 18–29 years had a prevalence of ED ranging from 5% to 17.2% (Dumbraveanu et al., 2018; Sand et al., 2008; Traeen & Stigum, 2010), which became 3% to 26.9% for 30–39 years (Dumbraveanu et al., 2018; Sand et al., 2008; Traeen & Stigum, 2010) and 4% to 52% in men 40–49 years (Corona et al., 2010; Dumbraveanu et al., 2018; Holm et al., 2012; Sand et al., 2008; Traeen & Stigum, 2010). European men 50–59 years had a prevalence that varied from 5% to 22% (Christensen et al., 2011; Corona et al., 2010; Lee et al., 2016; Sand et al., 2008; Traeen & Stigum, 2010), followed by 60–69 years (14.6%–35.9%) (Corona et al., 2010; Donnelly et al., 2018; Korfage et al., 2008; Lee et al., 2016; Sand et al., 2008; Traeen & Stigum, 2010), ≥70 years (8.3%–66.1%) (Beckman et al., 2008; Corona et al., 2010; Donnelly et al., 2018; Korfage et al., 2008; Lee et al., 2016; Sand et al., 2008), and ≥80 years (60.8%–88.3%) (Donnelly et al., 2018; Lee et al., 2016) (Table 1).

**Mild Erectile Dysfunction.** According to Table 1, the overall prevalence of mild ED was 2.5% to 77% in Asian men. The prevalence of mild ED ranged from 2.5% to 36.8% and 10.5% to 77% in men <60 years (Çayan et al., 2017; Ghalayini et al., 2010; Hao et al., 2011; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and >60 years (Çayan et al., 2017; Chung et al., 2015; Khoo et al., 2008; Permpongkosol et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; 2009b), respectively. The prevalence of mild ED for Asian men <60 years was lowest in the age group 40–49 years (2.5%–35%) (Çayan et al., 2017; Permpongkosol et al., 2008; Tang et al., 2015), followed by 50–59 years (10.5%–36.8%) (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015). The prevalence of mild ED was 23.6% to 38.5% and 28.1% to 30.0% for men 60–69 years (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and  $\geq 70$  years (Çayan et al., 2017; Khoo et al., 2008), respectively.

The overall prevalence of mild ED for European men was 7% to 39%. European men <60 years had a prevalence of 7% to 39% (Dumbraveanu et al., 2018; Jern et al., 2012; Quinta Gomes & Nobre, 2014), while men >60 years had a prevalence of 18.7% (Dumbraveanu et al., 2018). The age groups showed that European men <60 years in the age group 18–29 years had a prevalence of mild ED ranged from 11% to 11.9% (Dumbraveanu et al., 2018; Quinta Gomes & Nobre, 2014), which became 17.3% for 30–39 years (Dumbraveanu et al., 2018) and 30.2% in men 40–49 years (Dumbraveanu et al., 2018) (Table 1).

**Mild to Moderate Erectile Dysfunction.** For Asian men, the overall prevalence of mild to moderate ED was 5% to 31.6%. The prevalence of mild to moderate ED was 16.7% and 5% to 31.6% in men <60 years (Hwang et al., 2010; Khoo et al., 2008) and >60 years (Hwang et al., 2010; Khoo et al., 2008; Rao et al., 2015), respectively. The prevalence of mild to moderate ED for Asian men <60 years was lowest (16.7%) in 50–59 years (Khoo et al., 2008). The prevalence of mild to moderate ED was 5% and 28.9% for men 60–69 years (Khoo et al., 2008) and  $\geq 70$  years (Khoo et al., 2008), respectively (Table 1).

The overall prevalence of mild to moderate ED for European men was 1.6% to 22%. European men <60 years had a prevalence of 1.6% to 22% (Dumbraveanu et al., 2018; Jern et al., 2012), while men >60 years had a prevalence of 21.5% (Dumbraveanu et al., 2018). The age groups showed that European men <60 years in the age group 18–29 years had a prevalence of mild to moderate ED of 3%, which increased to 5.8% for 30–39 years and 14% in men 40–49 years (Dumbraveanu et al., 2018) (Table 1).

**Moderate Erectile Dysfunction.** For Asian men, the overall prevalence of moderate ED was 0.3% to 36.8%. The prevalence of moderate ED was 0.3% to 16.9% and 5% to 36.8% in men <60 years (Çayan et al., 2017; Ghalayini et al., 2010; Hao et al., 2011; Hwang et al., 2010; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and >60 years (Çayan et al., 2017; Chung et al., 2015; Khoo et al., 2008; Permpongkosol et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; 2009b), respectively. The prevalence of moderate ED for Asian men <60 years was lowest (0.29%–8.2%) for men 40–49 years (Çayan et al., 2017; Permpongkosol et al., 2008; Tang et al., 2015), followed by 1.6% to 16.9% in 50–59 years (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015). The prevalence of moderate ED was 5% to 9.7%, and 6.6% to 26% for men 60–69 years (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and  $\geq 70$  years (Çayan et al., 2017; Khoo et al., 2008), respectively (Table 1).

The overall prevalence of moderate ED for European men was 0.4% to 29%. European men <60 years had a prevalence of 0.4% to 14.1% (Corona et al., 2010; Dumbraveanu et al., 2018; Jern et al., 2012), while men >60 years had a prevalence of 17.8% to 29% (Corona et al., 2010; Dumbraveanu et al., 2018). The age groups showed that European men <60 years in the age group 18–29 years had a prevalence of moderate ED of 1.4% (Dumbraveanu et al., 2018), which increased to 2.7% in 30–39 years (Dumbraveanu et al., 2018), 4.5% to 5.5% in 40–49 years (Corona et al., 2010; Dumbraveanu et al., 2018), and 14.1% for men 50–59 years (Corona et al., 2010) (Table 1). The prevalence of moderate ED was 23% and 29% for men 60–69 years and  $\geq 70$  years, respectively (Corona et al., 2010).

**Severe Erectile Dysfunction.** For Asian men, the overall prevalence of severe ED was 0.1% to 58.4%. The prevalence of severe ED was 0.1% to 50.1% and 0.8% to 58.4% in men <60 years (Çayan et al., 2017; Ghalayini et al., 2010; Hao et al., 2011; Hwang et al., 2010; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and >60 years (Çayan et al., 2017; Chung et al., 2015; Khoo et al., 2008; Permpongkosol et al., 2008; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; 2009b), respectively. The prevalence of severe ED for Asian men <60 years was lowest (0.1% to 12.2%) in 40–49 years (Çayan et al., 2017; Permpongkosol et al., 2008; Tang et al., 2015) and increased to 0.5% to 50.1% in 50–59 years (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015). The prevalence of severe ED was 0.8% to 58.4% and 14.9% to 25% for men 60–69 years (Çayan et al., 2017; Khoo et al., 2008; Permpongkosol et al., 2008; Tang et al., 2015) and  $\geq 70$



years (Çayan et al., 2017; Khoo et al., 2008), respectively (Table 1).

The overall prevalence of severe ED for European men was 0% to 35%. European men <60 years had a prevalence of 0% to 4.8% (Corona et al., 2010; Dumbraveanu et al., 2018; Jern et al., 2012), while men >60 years had a prevalence of 15% to 35% (Corona et al., 2010; Dumbraveanu et al., 2018). The age groups showed that European men <60 years in the age group 18–29 years had a prevalence of severe ED of 0.7% (Dumbraveanu et al., 2018), which increased to 1.2% in 30–39 years (Dumbraveanu et al., 2018), 0.6% to 2.2% in 40–49 years (Corona et al., 2010; Dumbraveanu et al., 2018), and 4.8% in 50–59 years (Corona et al., 2010) (Table 1). The prevalence of severe ED was 15% and 35% for men 60–69 years and  $\geq 70$  years, respectively (Corona et al., 2010) (Table 1).

**Orgasmic Dysfunction.** The prevalence of anorgasmia was 0.4% and 3% to 65% in Asian (Rao et al., 2015) and European (Christensen et al., 2011; Corona et al., 2010) men, respectively. Other orgasmic dysfunctions were not reported in any of the Asian studies. The overall prevalence of orgasmic dysfunctions ranged from 4% to 64.2% in European men. The prevalence of orgasmic dysfunction was 4% to 13% and 7.3% to 64.2% for European men <60 years (Corona et al., 2010; Donnelly et al., 2018; Traeen & Stigum, 2010) and >60 years (Corona et al., 2010; Donnelly et al., 2018; Traeen & Stigum, 2010), respectively. The prevalence of orgasmic dysfunctions for European men <60 years was 5% to 6% in 18–29 years (Traeen & Stigum, 2010), 4% to 5% in 30–39 years (Traeen & Stigum, 2010), 3% to 8% in 40–49 years (Corona et al., 2010; Traeen & Stigum, 2010), and 4% to 13% in 50–59 years (Corona et al., 2010; Traeen & Stigum, 2010). The prevalence of orgasmic dysfunction was 7.3% to 15.5%, 10.1% to 13.7%, and 64.2% for European men 60–69 years (Corona et al., 2010; Donnelly et al., 2018; Traeen & Stigum, 2010),  $\geq 70$  years (Corona et al., 2010), and  $\geq 80$ , respectively (Table 1).

**Ejaculation Dysfunction.** Table 1 presents that the prevalence of PE was 0% to 49.1% of Asian men. The prevalence of PE was 1% to 27% and 0% to 49.1% for men <60 years (Lee et al., 2013; Liang et al., 2010; Park et al., 2010; Quek et al., 2008; Serefoglu et al., 2011) and >60 years (Lee et al., 2013; Quek et al., 2008; Rao et al., 2015; Serefoglu et al., 2011), respectively. The prevalence of PE for Asian men <60 years was lowest in 18–29 years (10.7%–23.4%) (Lee et al., 2013; Park et al., 2010; Quek et al., 2008; Serefoglu et al., 2011), followed by 30–39 years (13%–24.6%) (Lee et al., 2013; Park et al., 2010; Quek et al., 2008; Serefoglu et al., 2011), 40–49 years (9.4%–30.7%) (Lee et al., 2013; Park et al., 2010; Quek

et al., 2008; Serefoglu et al., 2011), and 50–59 years (1%–27.8%) (Lee et al., 2013; Quek et al., 2008; Serefoglu et al., 2011). The prevalence of PE was 35.4% to 41.8% and 49.1% for Asian men 60–69 years (Lee et al., 2013; Serefoglu et al., 2011) and  $\geq 70$  years (Serefoglu et al., 2011), respectively.

The overall prevalence of PE for European men was 2.7% to 52%. European men <60 years had a prevalence of 9.3% to 52% (Andersen et al., 2008; Hendrickx et al., 2016; Mitchell et al., 2016; Mitchell et al., 2013; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Traeen & Stigum, 2010), while men >60 years had a prevalence of 3.6% to 28%. The age groups showed that European men <60 years in the age group 18–29 years had a prevalence of PE that ranged from 24% to 28%, which became 22% to 23% in 30–39 years, 19% to 30% in 40–49 years, and 24% to 33% in 50–59 years (Traeen & Stigum, 2010). European men 60–69 years had a prevalence of 28% (Traeen & Stigum, 2010), which decreased to 3.6% to 3.8% in men  $\geq 70$  years (Beckman et al., 2008) (Table 1).

The studies on Asian men did not report DE. The overall prevalence of DE was 1.1% to 52.2% for European men. The prevalence of DE was 1.1% to 16% and 11% to 52.2% for men <60 years (Andersen et al., 2008; Hendrickx et al., 2016; Landripet & Stulhofer, 2015; Lee et al., 2016; Mitchell et al., 2013, 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Traeen & Stigum, 2010) and >60 years (Hendrickx et al., 2016; Lee et al., 2016; Mitchell et al., 2013; Traeen & Stigum, 2010), respectively. The prevalence of DE for European men <60 years was 9% to 10% in 18–29 years, 7% to 8% in 30–39 years, 8% to 11% in 40–49 years (Traeen & Stigum, 2010), and 7% to 16% in 50–59 years (1%–27.8%) (Lee et al., 2016; Traeen & Stigum, 2010). The prevalence of DE was 11% to 14.9%, 33.2%, and 52.2% in European men 60–69 years (Lee et al., 2016; Traeen & Stigum, 2010),  $\geq 70$  years (Lee et al., 2016) and  $\geq 80$  years (Lee et al., 2016), respectively (Table 1). Anejaculation and retrograde ejaculation were not reported in any of the Asian studies. A European study reported that the prevalence of retrograde ejaculation ranged from 1.4% to 1.8% (Hendrickx et al., 2016).

**Sexual Desire Disorder.** The overall prevalence of HSDD was 0.7% to 81.4% of Asian men. The prevalence of HSDD was 7% to 50.4% and 0.7% to 81.4% for men <60 years (Kim et al., 2009; Liu et al., 2010; Zhang et al., 2013) and >60 years (Liu et al., 2010; Rao et al., 2015), respectively. The prevalence of HSDD for Asian men <60 years was lowest in 30–39 years (7%) (Zhang et al., 2013), followed by 40–49 years (10.3%–50.4%) (Liu et al., 2010; Zhang et al., 2013), and 50–59 years (48.1%) (Liu et al., 2010). The prevalence of HSDD was 57% and

81.4% of Asian men 60–69 years and  $\geq 70$  years, respectively (Liu et al., 2010).

The overall prevalence of HSDD for European men was 0% to 65.5%. European men <60 years had a prevalence of 0% to 37.4% (Andersen et al., 2008; Beutel et al., 2018; Carvalheira et al., 2014; Hendrickx et al., 2016; Holm et al., 2012; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Landripet & Stulhofer, 2015; Lee et al., 2016; Mitchell et al., 2013, 2016; Moreau et al., 2016; Quinta Gomes & Nobre, 2014; Traeen & Stigum, 2010), while men >60 years had a prevalence of 0.2% to 65.5% (Beutel et al., 2018; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Lee et al., 2016; Mitchell et al., 2013; Traeen & Stigum, 2010). The age groups showed that the European men <60 years in the age group 18–29 years had a prevalence of HSDD ranging from 3.3% to 22% (Carvalheira et al., 2014; Traeen & Stigum, 2010), which became 5.7% to 26.2% in 30–39 years (Carvalheira et al., 2014; Traeen & Stigum, 2010), 3.4% to 27.5% in 40–49 years (Carvalheira et al., 2014; Traeen & Stigum, 2010), and 1.8% to 29.9% in 50–59 years (Carvalheira et al., 2014; Lee et al., 2016; Traeen & Stigum, 2010). European men 60–69 years had a prevalence varying from 41.4% to 46.1% (Korfage et al., 2008; Lee et al., 2016; Traeen & Stigum, 2010) and 37.9% to 65.5% in men  $\geq 70$  years (Beutel et al., 2018; Korfage et al., 2008; Lee et al., 2016). The prevalence of HSDD was 49.1% for men  $\geq 80$  years (Lee et al., 2016) (Table 1).

None of the Asian studies reported data on hyperactive sexual desire disorder, while only one European study reported that the prevalence varied from 1.7% to 2.7% (Hendrickx et al., 2016). Sexual aversion was also not reported in any of the Asian studies. The prevalence of sexual aversion was 0.9% in European men (Hendrickx et al., 2016).

**Androgen Deficiency.** Table 1 presents that the overall prevalence of androgen deficiency (AD) was 4.6% to 63% of Asian men (Khoo et al., 2008; Tang et al., 2015). The prevalence of AD was 4.6% to 43.1% and 13.9% to 63% for men <60 years (Khoo et al., 2008; Tang et al., 2015) and >60 years (Khoo et al., 2008; Tang et al., 2015), respectively. The prevalence of AD for Asian men <60 years was lowest in 40–49 years (4.6%–30.3%) (Tang et al., 2015), followed by 50–59 years (6.9%–43.1%) (Khoo et al., 2008; Tang et al., 2015). The prevalence of AD was 13.9% to 57.4% and 63% of Asian men 60–69 years (Khoo et al., 2008; Tang et al., 2015) and  $\geq 70$  years (Khoo et al., 2008), respectively. AD was not reported in any of the European studies.

**Low Satisfaction.** Low satisfaction with sexual activity was reported in 3.2% to 37.6% of Asian men >60 years (Kim & Jeon, 2013). For European men, the proportion

of low satisfaction was 4.1% to 28.3%. The prevalence of low satisfaction was 4.1% to 25% and 6% to 28.3% for men <60 years (Castellanos-Torres et al., 2013; Corona et al., 2010; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Lee et al., 2016; Ruiz-Muñoz et al., 2013) and >60 years (Beckman et al., 2008; Castellanos-Torres et al., 2013; Corona et al., 2010; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Lee et al., 2016), respectively. The prevalence of low satisfaction for European men 40–49 years was 23.2% (Corona et al., 2010) and 18.7% to 25% for 50–59 years (Corona et al., 2010; Lee et al., 2016). The prevalence of low satisfaction was 18.8% to 27.2% and 6% to 28.3% for European men 60–69 years (Corona et al., 2010; Korfage et al., 2008; Lee et al., 2016) and  $\geq 70$  years (Beckman et al., 2008; Corona et al., 2010; Korfage et al., 2008; Lee et al., 2016), respectively. The prevalence of low satisfaction was 19.2% in European men  $\geq 80$  years (Lee et al., 2016).

**Reduced/No Sexual Pleasure and Painful Intercourse.** None of the Asian studies reported the prevalence of reduced/no sexual pleasure. The prevalence was 3.3% to 26% and 1.8% to 52.2% for European men <60 years (Mitchell et al., 2013, 2016; Moreau et al., 2016) and >60 years, respectively. The proportion of European men reporting reduced/no sexual pleasure increased with age to 8.3% in 50–59 years, 14.9% in 60–69 years, 33.2% in 70–79 years, and 52.2% in 80–89 years (Table 1). The prevalence of painful intercourse was 1.7% to 18% and 1% to 3% for European men <60 years and >60 years, respectively (Christensen et al., 2011; Mitchell et al., 2013, 2016; Moreau et al., 2016).

### Method of Assessment

Table 2 presents that eight studies (Asian = 4; European = 4) used interviews and that these studies reported a prevalence of ED of 1%–77% and 3%–37% of Asian (Chung et al., 2015; Hwang et al., 2010; Permpongkosol et al., 2008; Zhang et al., 2013) and European (Beckman et al., 2008; Moreau et al., 2016; Sand et al., 2008; Traeen & Stigum, 2010) men, respectively. A total of 12 Asian (Çayan et al., 2017; Ghalayini et al., 2010; Hao et al., 2011; Huang et al., 2014; Hwang et al., 2010; Jeong et al., 2011; Khoo et al., 2008; Liu et al., 2010; Quek et al., 2008; Rao et al., 2015; Tang et al., 2015; Zhang et al., 2017) and three European (Dumbraveanu et al., 2018; Jern et al., 2012; Landripet & Stulhofer, 2015) studies used the five-item International Index of Erectile Function Questionnaire (IIEF-5) for the assessment of ED, and these studies reported a prevalence varying from 6% to 95% and 15.2% to 88.8% for Asian men and European men, respectively. Most of the Asian ( $n = 6$ ) (Hao et al., 2011; Huang et al., 2014; Hwang et al., 2010; Khoo et al.,

**Table 2.** Summary of Sexual Dysfunctions, and the Tools Used for the Assessment.

Dysfunction	Instrument	Asian		European	
		<i>n</i>	Prevalence (%)	<i>n</i>	Prevalence (%)
ED	<b>Interview</b>	<b>4</b>	<b>1–77</b>	<b>4</b>	<b>3–37</b>
	<b>Questionnaire</b>	<b>17</b>	<b>0–95</b>	<b>9</b>	<b>1–88.8</b>
	<b>IIEF-5</b>	<b>11</b>	<b>6.3–95</b>	<b>3</b>	<b>15.2–88.8</b>
	IAQ; IIEF-5	6	17–95	1	17.2–88.8
	SAQ; IIEF-5	5	6.3–91.8	2	15.2–30.8
	<b>Others</b>				
	IAQ; Self-developed	2	56.6–88.3	—	—
	SAQ; Self-developed	3	0–75.9	5	1–30
	IAQ; EHS	1	11–67	—	—
	SAQ; ADAM	—	—	1	12.5–19.5
	SAQ; ELSA SRA	—	—	1	15.5–88.3
	SAQ; EMAS SFQ-14	—	—	2	5.2–77.4
	SAQ; EPIC-26	—	—	1	9.4–60.8
	SAQ; GSSAB	—	—	1	14.2–28.3
	SAQ; SFS	—	—	1	0.9–41.3
SAQ; IIEF full version	—	—	1	21.1	
PE	<b>Interview</b>	—	—	<b>3</b>	<b>3.6–52</b>
	<b>Questionnaire</b>	<b>6</b>	<b>3.3–49.1</b>	<b>5</b>	<b>2.7–45.2</b>
	IAQ; PEDT	2	10.0–49.1	—	—
	SAQ; PEDT	1	11.3	—	—
	SAQ; Self-developed	3	3.3–41.8	3	10–28.6
	SAQ; SFS	—	—	1	2.7–10.7
	SAQ; IIEF	—	—	1	45.2
DE	<b>IELT</b>	<b>2</b>	<b>0–35.4</b>	—	—
	<b>Interview</b>	—	—	<b>2</b>	<b>7–17</b>
	<b>Questionnaire</b>	—	—	<b>7</b>	<b>1.3–52.2</b>
	SAQ; Self-developed	—	—	3	1.1–10.6
	SAQ; SFS	—	—	1	1.3–10.7
	SAQ; IIEF	—	—	1	17.5
	SAQ; ELSA SRA	—	—	1	8.3–52.2
HSDD	SAQ; GSSAB	—	—	1	6.2–19.9
	<b>Interview</b>	<b>1</b>	<b>7.0–17.2</b>	<b>2</b>	<b>12–28</b>
	<b>Questionnaire</b>	<b>3</b>	<b>0.8–81.4</b>	<b>12</b>	<b>0–65.5</b>
	IAQ; Self-developed	1	0.8	1	0–65.5
	IAQ; IIEF	1	48.1–81.4	1	17.2
	SAQ; Self-developed	1	12.2	4	1.6–30
	SAQ; SFS	—	—	1	1.8–7.3
	SAQ; NASTAL	—	—	1	0.2–29.9
	SAQ; GSSAB	—	—	1	12.8–37.4
	SAQ; Dutch module SAc	—	—	1	40.8–57.7
Anorgasmia	SAQ; ADAM	—	—	1	18.3–23.0
	SAQ; ELSA SRA	—	—	1	24.2–49.1
	<b>Questionnaire</b>	<b>1</b>	<b>0.4</b>	<b>2</b>	<b>3–65</b>
	IAQ; Self-developed	1	0.4	—	—
	SAQ; Self-developed	—	—	1	23–65
Orgasmic dysfunction	SAQ; EMAS-SFQ-14	—	—	1	3–11
	<b>Interview</b>	<b>1</b>	<b>5–14</b>	<b>1</b>	<b>4–14</b>
	<b>Questionnaire</b>	—	—	<b>2</b>	<b>4.0–64.2</b>
	SAQ; EPIC	—	—	1	8.9–64.2
SAQ; EMAS-SFQ-14	—	—	1	4.0–18.7	

(continued)

Table 2. (continued)

Dysfunction	Instrument	Asian		European	
		<i>n</i>	Prevalence (%)	<i>n</i>	Prevalence (%)
Low satisfaction	<b>Interview</b>	<b>1</b>	<b>3.2–37.6</b>	<b>3</b>	<b>4.1–12.3</b>
	<b>Questionnaire</b>	—	—	<b>5</b>	<b>13.3–28.3</b>
	SAQ; Self-developed	—	—	2	14.1–27.8
	SAQ; Dutch module SAc	—	—	1	13.3–23.2
	SAQ; EMAS-SFQ-14	—	—	1	23.2–28.3
Sex painful	SAQ; ELSA SRA	—	—	1	18.7–22.5
	<b>Interview</b>	—	—	<b>1</b>	<b>13</b>
	<b>Questionnaire</b>	—	—	<b>2</b>	<b>1–18</b>
Sex not pleasurable	SAQ; Self-developed	—	—	2	1–18
	<b>Interview</b>	—	—	<b>1</b>	<b>26</b>
	<b>Questionnaire</b>	—	—	<b>2</b>	<b>1.8–6.7</b>
	SAQ; Self-developed	—	—	2	1.8–6.7

Note. CESDS-11 = 11-Item Iowa form of the Center for Epidemiological Studies Depression Scale; BSFI = Brief Sexual Function Inventory; DSM-IV = Manual of Mental Disorder-IV; EMAS SFQ = European Male Aging Study Sexual Function Questionnaire; ELSA SRA-Q = European Longitudinal Study of Aging Sexual Function Assessment Questionnaire; EPIC = The Expanded Prostate Cancer Index Composite; GDS-15 = 15-Item Geriatric Depression Scale; HADS = Anxiety Subscale of the Hospital Anxiety and Depression Scale; IIEF-5 = International Index of Erectile Dysfunction; IELT = intravaginal ejaculation latency time; ISSM = International Society for Sexual Medicine; PEDT = Premature Ejaculation Diagnosis Tool; and SAc = sexual activity.

2008; Tang et al., 2015; Zhang et al., 2017) and European ( $n = 2$ ) (Jern et al., 2012; Landripet & Stulhofer, 2015) studies that used IIEF-5 adopted a variable cut-off score of <22 and reported a prevalence varying from 14.5% to 95% and 15.2% to 30.8% for Asian men and European men, respectively. The Asian studies also used variable cut-off scores of <26 ( $n = 1$ ; 17%–82.9%) (Çayan et al., 2017), <21 ( $n = 1$ ; 6.3%–89.2) (Quek et al., 2008) and <18 ( $n = 1$ ; 18.2%–60.4%) (Jeong et al., 2011). One Asian (Rao et al., 2015) and one European (Dumbraveanu et al., 2018) study did not report a cut-off score for the diagnosis of ED. Only Asian studies used a single question interview or questionnaire to assess ED ( $n = 5$ , 0%–57.2%) (Table 1).

An equal number of Asian ( $n = 5$ ; 0%–88.3%) (Hao et al., 2011; Kim et al., 2009; Wong et al., 2009a; 2009b; Zhang et al., 2016) and European ( $n = 5$ ; 1%–30%) (Andersen et al., 2008; Christensen et al., 2011; Kontula & Haavio-Mannila, 2009; Mitchell et al., 2013; 2016) studies used a self-developed questionnaire for the assessment of ED. An Asian study ( $n = 1$ ; 11%–67%) used an interviewer-assisted questionnaire (IAQ) of the erection hardness score (Hwang et al., 2010). The European studies, meanwhile, used self-administered questionnaires (SAQ) of androgen deficiency assessment module (ADAM) ( $n = 1$ ; 12.5%–19.5%) (Holm et al., 2012), the English Longitudinal Study of Aging sexual relationships and activities questionnaires (ELSA SRA-Q) ( $n = 1$ ; 15.5%–88.3%) (Lee et al., 2016); European Male Aging Study sexual function questionnaires (EMAS SFQ-14) ( $n = 2$ ; 5.2%–77.2%) (Corona et al., 2010; Lee et al.,

2013); the expanded prostate cancer index composite (EPIC-26) ( $n = 1$ ; 9.4%–60.8%) (Donnelly et al., 2018); the Global Study of Sexual Attitudes and Behaviors (GSSAB) ( $n = 1$ ; 14.2%–28.3%) (Landripet & Stulhofer, 2015), the Dutch module sexual activity (SAc) ( $n = 1$ ; 12.0%–26.3%) (Korfage et al., 2008), the sexual functioning scale (SFS) ( $n = 1$ ; 0.9%–41.3%) (Hendrickx et al., 2016), and the full version of the International Index of Erectile Function (IIEF) ( $n = 1$ ; 21.1%) (Quinta Gomes & Nobre, 2014) for the assessment of ED.

A total of three European studies used interviews to diagnose PE and reported a prevalence varying from 3.6% to 52% (Beckman et al., 2008; Moreau et al., 2016; Traeen & Stigum, 2010), while six Asian and five European studies used questionnaires for the assessment of PE. A total of three Asian studies used the premature ejaculation diagnosis tool with the IAQ ( $n = 2$ ; 10.0%–49.1%) or SAQ ( $n = 1$ ; 11.3%) method (Lee et al., 2013; Rao et al., 2015; Serefoglu et al., 2011). An equal number of Asian ( $n = 3$ ) (Lee et al., 2013; Liang et al., 2010; Park et al., 2010) and European ( $n = 3$ ) (Andersen et al., 2008; Mitchell et al., 2016; Mitchell et al., 2013) studies used a self-developed questionnaire and reported a prevalence of PE ranging from 3.3% to 41.8% and 10% to 28.6% for Asian men and European men, respectively. The remaining European studies used the SFS ( $n = 1$ ; 2.7%–9.3%) (Hendrickx et al., 2016) and the full version of the IIEF ( $n = 1$ ; 45.2%) (Quinta Gomes & Nobre, 2014) to diagnose PE.

DE was reported in only five European studies that used interviews ( $n = 2$ ; 7%–17%) (Moreau et al., 2016;

Traeen & Stigum, 2010), questionnaires with SFS ( $n = 1$ ; 1.3%–10.7%) (Hendrickx et al., 2016), the full version of the IIEF ( $n = 1$ ; 17.5%) (Quinta Gomes & Nobre, 2014), ELSA SRA-Qs ( $n = 1$ ; 8.3%–52.2%) (Lee et al., 2016), and the GSSAB ( $n = 1$ ; 6.2%–19.9%) (Landripet & Stulhofer, 2015).

HSDD was reported at 7.0% to 17.2% and 12% to 28% in Asian (Zhang et al., 2013) and European (Moreau et al., 2016; Traeen & Stigum, 2010) studies, respectively, that interviewed men for assessment of MSD. A total of three Asian and 11 European studies used questionnaires for the diagnosis of HSDD. Two Asian (Kim et al., 2009; Rao et al., 2015) and five European (Andersen et al., 2008; Beutel et al., 2018; Kontula & Haavio-Mannila, 2009; Mitchell et al., 2013; 2016) studies used a self-developed questionnaire. One Asian (48.1%–81.4%) (Liu et al., 2010) and one European (17.2%) (Quinta Gomes & Nobre, 2014) study used the full version of the IIEF, while the six remaining European studies used SFS ( $n = 1$ ; 1.8%–7.3%) (Hendrickx et al., 2016), the National Survey of Sexual Attitudes and Lifestyles (NASTAL) ( $n = 1$ ; 0.2%–29.9%) (Carvalho et al., 2014), GSSAB ( $n = 1$ ; 12.8%–37.4%) (Landripet & Stulhofer, 2015), the Dutch module SAc ( $n = 1$ ; 40.8%–57.7%) (Korfage et al., 2008), ADAM ( $n = 1$ ; 18.3%–23.0%) (Holm et al., 2012), and ELSA SRA-Q ( $n = 1$ ; 24.2%–49.1%) (Lee et al., 2016) for the assessment of HSDD.

For orgasmic dysfunctions, the Asian ( $n = 1$ ; 0.4%) (Rao et al., 2015) and European ( $n = 2$ ; 3%–65%) (Corona et al., 2010; Donnelly et al., 2018) studies reported anorgasmia using questionnaires. Other orgasmic dysfunctions were assessed through interviews by Asian studies ( $n = 1$ ; 5%–14%) and by means of EPIC-26 questionnaires ( $n = 1$ ; 8.9%–64.2%) (Donnelly et al., 2018), and EMAS SFQ-14s ( $n = 1$ ; 4.0%–18.7%) (Corona et al., 2010) in European studies.

The prevalence of low sexual satisfaction varied from 3.2% to 37.6% and 4.1% to 12.3% of Asian (Kim & Jeon, 2013) and European men (Beckman et al., 2008; Castellanos-Torres et al., 2013; Ruiz-Muñoz et al., 2013), respectively, in studies that interviewed men to assess MSD. The remaining four European studies used self-developed questionnaires ( $n = 2$ ; 18%–23%) (Kontula & Haavio-Mannila, 2009; Mitchell et al., 2013), the Dutch module SAc ( $n = 1$ , 13.3%–23.2%) (Korfage et al., 2008), EMAS SFQ-14s ( $n = 1$ ; 23.2%–28.3%) (Corona et al., 2010), or ELSA SRA-Qs ( $n = 1$ ; 18.7%–22.5%) (Lee et al., 2016).

One European study that used interviews reported painful intercourse in 13% of men (Moreau et al., 2016), while interviews using questionnaires ( $n = 3$ ) reported prevalence ranging from 1% to 18% (Christensen et al., 2011; Mitchell et al., 2016; Mitchell et al., 2013). A European study that interviewed men reported 26%

experienced no sexual pleasure (Moreau et al., 2016), while those using questionnaires ( $n = 2$ ) (Mitchell et al., 2013; Mitchell et al., 2013) reported 1.8% to 6.7% prevalence of the same MSD.

### Definition of MSD

The studies used variable definitions and time durations for MSD. The Asian and European studies defined ED alternatively as “erectile difficulties,” “erectile problem,” “impotence,” “inadequate erection,” “less strong erection,” “no or short-term erection,” “poor erection,” and “inability to sustain or achieve an erection sufficient for intercourse,” and 11 Asian studies used an IIEF-5 cut-off score ranging from  $<18$  to  $<26$  for the diagnosis of ED. Three Asian and three European studies did not define the ED at all. The time duration for which ED was diagnosed varied from 6 to 12 months. Although orgasm and ejaculation are two separate phenomena in men, the definitions of these overlapped in the previous studies (Table 1).

### Factors of MSD

**Age.** The prevalence of MSD increased significantly with age for both Asian (Hendrickx et al., 2016; Zhang et al., 2013) and European (Donnelly et al., 2018; Jankowska et al., 2008; Mitchell et al., 2013; Quinta Gomes & Nobre, 2014) men. Age distribution over 60 years of age was not significantly associated with MSD in Asian men (Rao et al., 2015).

Increased age showed a significant positive association with ED or erectile difficulties reported in Asian (Çayan et al., 2017; Hao et al., 2011; Jeong et al., 2011; Kendirci et al., 2014; Khoo et al., 2008; Park et al., 2010; Permpongkosol et al., 2008; Wong et al., 2009b; Zhang et al., 2016; Zhang et al., 2013, 2016, 2017) and European (Andersen et al., 2008; Corona et al., 2010; Jern et al., 2012; Korfage et al., 2008; Lee et al., 2016; Mitchell et al., 2013; Quinta Gomes & Nobre, 2014) men, and with the severity of erectile dysfunction in Asian men (Çayan et al., 2017; Kendirci et al., 2014; Khoo et al., 2008; Tang et al., 2015). Two studies reported that age was not significantly associated with ED in European men (Andersen et al., 2008; Landripet & Stulhofer, 2015).

Ejaculation dysfunctions were also significantly associated with age in Asian (Lee et al., 2013; Liang et al., 2010) and European (Andersen et al., 2008; Ghalayini et al., 2010; Mitchell et al., 2013) men. The prevalence of PE decreased with age in European men (Andersen et al., 2008; Ghalayini et al., 2010; Mitchell et al., 2013), whereas in Asian men the association of PE with age was inconsistent (Lee et al., 2013; Liang et al., 2010). A few Asian and European studies also reported

a nonsignificant association of PE with age (Quek et al., 2008; Quinta Gomes & Nobre, 2014; Zhang et al., 2013).

The association of DE with age in European men was inconsistent. While a few studies reported that the prevalence of DE was significantly increased with age (Andersen et al., 2008; Lee et al., 2016), others reported no association with age (Hendrickx et al., 2016; Landripet & Stulhofer, 2015; Mitchell et al., 2013). In some studies, age was a significant predictor of orgasmic difficulties in European men (Lee et al., 2016; Quinta Gomes & Nobre, 2014), however, one European study reported that difficulty in attaining orgasm, delayed orgasm, and early orgasm were not significantly associated with age (Hendrickx et al., 2016).

Age had no significant association with sexual satisfaction in Asian men (Kim & Jeon, 2013). In contrast, the proportion of European men satisfied with their sexual relationship was significantly lower in the oldest age decade compared with the youngest (Corona et al., 2010). Dissatisfaction varied with age in sexually inactive European men but not among sexually active men (Mitchell et al., 2013). For sexually active individuals, the proportion of men reporting distress increased with age (Mitchell et al., 2013). Among European men with ED, concern about ED was highest and lowest in the 50–59 years and  $\geq 70$  years bands, respectively (Corona et al., 2010). A few European studies also reported no significant association of sexual satisfaction with age (Castellanos-Torres et al., 2013; Lee et al., 2016; Ruiz-Muñoz et al., 2013).

The prevalence of low sexual desire decreased across the age range that became more obvious in later ages in both Asian and European men (Beutel et al., 2018; Hendrickx et al., 2016; Korfage et al., 2008; Landripet & Stulhofer, 2015; Lee et al., 2016; Quinta Gomes & Nobre, 2014; Zhang et al., 2013). In contrast, hyperactive sexual desire was associated with decreasing age and sexual aversion in European men (Hendrickx et al., 2016). Some studies reported no significant association between age and sexual desire after controlling for the effects of other variables in European men (Kontula & Haavio-Mannila, 2009; Mitchell et al., 2013; Holm et al., 2012). To express this result simply, the negative effects of biological aging on sexual desire disappear when people are satisfied with their sexual experiences, are sexually functioning, and are healthy (Kontula & Haavio-Mannila, 2009).

**Socioeconomic Status.** Men with lower levels of educational attainment were at higher risk of sexual dysfunction in both Asia and Europe (Çayan et al., 2017; Ghalayini et al., 2010; Hwang et al., 2010; Jankowska et al., 2008; Permpongkosol et al., 2008; Quinta Gomes & Nobre, 2014; Tang et al., 2015), including ED in Asian

men (Çayan et al., 2017; Ghalayini et al., 2010; Tang et al., 2015) and orgasmic dysfunctions in European men (Quinta Gomes & Nobre, 2014). The severity of ED also varied by education in Asian men (Permpongkosol et al., 2008). Another Asian study reported that further education up to the university level increased the prevalence of ED (Hwang et al., 2010). Other studies reported that education was not associated with the prevalence of sexual dysfunctions in Asian men (Kim & Jeon, 2013; Rao et al., 2015), including ED (Jeong et al., 2011; Khoo et al., 2008; Zhang et al., 2017) and sexual satisfaction (Kim & Jeon, 2013). In European men, PE, anorgasmia, sexual satisfaction, HSDD, DE, and painful sexual intercourse were not associated with education (Christensen et al., 2011; Kontula & Haavio-Mannila, 2009; Quinta Gomes & Nobre, 2014; Ruiz-Muñoz et al., 2013). One European study reported increased educational level was significantly associated with decreased HSDD (Landripet & Stulhofer, 2015).

MSD was significantly associated with employment in Asian (Permpongkosol et al., 2008; Rao et al., 2015) and European men (Christensen et al., 2011; Corona et al., 2010; Mitchell et al., 2013). Sexual dysfunctions were significantly more prevalent among unemployed Asian and European men (Corona et al., 2010; Donnelly et al., 2018; Mitchell et al., 2013; Rao et al., 2015). The risk factors for ED included occupation in Asian men (Khoo et al., 2008; Tang et al., 2015). Among Asian men, the unemployed occupational status had the highest prevalence of ED, followed by agricultural workers/fishermen, managerial workers, clerical workers, sales workers/merchants, service workers, policemen/soldiers, transportation/communication workers, manufacturing/construction workers, and professional/technical workers (Permpongkosol et al., 2008). Technicians and associate professionals, production and related workers, laborers, and retirees had a higher prevalence of moderate and severe ED compared with other occupational categories in Asian men (Khoo et al., 2008). In another study, being employed or unemployed did not show meaningful differences regarding rates of ED, but being retired was found to be an independent risk factor for having ED compared to working Asian men (Çayan et al., 2017).

Income had a negative association with MSD in Asian men (Kendirici et al., 2014), including ED (Çayan et al., 2017; Ghalayini et al., 2010; Hwang et al., 2010; Permpongkosol et al., 2008; Zhang et al., 2017). European men with a high income had significantly lower odds of painful sexual intercourse (Christensen et al., 2011). Tiredness and work-related stress were the most frequently reported reasons for decreased sexual interest in European men (Carvalho et al., 2014).

A few studies reported that sociodemographic factors (employment, occupation, house ownership, and income)

had no association with MSD, including ED and sexual satisfaction in Asian men (Kim & Jeon, 2013; Zhang et al., 2016) and sexual desire in European men (Kontula & Haavio-Mannila, 2009).

**Area of Residence.** European men from developing countries reported being less sexually satisfied than those from developed countries (Ruiz-Muñoz et al., 2013). The reasons for decreased sexual interest differed significantly across European countries (Carvalho et al., 2014). Croatian and Norwegian participants were more likely to have experienced a distressing lack of sexual interest in the past year than their Portuguese counterparts (Carvalho et al., 2014). One study reported that the likelihood of having ED was higher for Asian men living in urban areas than those living in rural areas (Çayan et al., 2017). Combinations of three problems (urinary, bowel, or sexual dysfunction) were significantly more prevalent amongst European men residing in deprived areas (Donnelly et al., 2018).

A large European study reported that there was a significantly higher prevalence of ED in Tartu (Estonia), followed by Florence (Italy), Malmö (Sweden), and Leuven (Belgium); however, the concern about ED was highest in Florence than Tartu (Corona et al., 2010). Tartu reported the lowest frequency of orgasms (as assessed by achieving orgasm more than half the time) and the lowest satisfaction regarding the timing of orgasm (proportion who were extremely/highly satisfied) (Corona et al., 2010). A few studies reported that the area of residence (living in rural, urban, or deprived areas) did not affect the presence of MSD in either Asian or European men (Mitchell et al., 2013; Rao et al., 2015), including male pelvic dysfunction (combined presence of ED, lower urinary tract symptoms (LUTSs), and ejaculation dysfunction) (Kendirici et al., 2014) in European men and ED in Asian men (Zhang et al., 2017).

**Marital Status.** The association between marital status and MSD was inconsistent for both Asian and European men. One Asian study reported that unmarried men had a higher prevalence of ED than married men, especially in severe ED cases (Permpongkosol et al., 2008). Single Asian and European men were reported as having significantly higher odds of PE compared to men who had partners or cohabited (Mitchell et al., 2013; Quek et al., 2008). HSDD was significantly more prevalent in European single men (Beutel et al., 2018). A few studies reported that marital status was not related to ED for Asian and European (Jeong et al., 2011; Tang et al., 2015; Zhang et al., 2016, 2017) men, nor to PE, DE, and HSDD for European men (Quinta Gomes & Nobre, 2014). One Asian study also reported that sexual problems were highly prevalent among married men (Rao et al., 2015).

European men who only had intercourse with a regular partner were more satisfied than men had intercourse with various casual partners or both regular and casual partners (Ruiz-Muñoz et al., 2013). An association between low sexual function and having a same-sex partner in the past 5 years was noted in European men. For European men, a strong association between low sexual function and paying for sex in the past year was also reported (Mitchell et al., 2013).

The length of marriage or cohabitation was not associated with ED in Asian and European men (Kim & Jeon, 2013; Zhang et al., 2016). In contrast, sexual boredom as a result of a long-term relationship was significantly and negatively correlated with the level of intimacy and sexual satisfaction in European men (Carvalho et al., 2014). European men in long-term relationships ( $\geq 5$  years) were more likely to report a lack of sexual interest with associated personal distress than men in short-term relationships ( $< 5$  years) (Carvalho et al., 2014). Another study reported that the duration of the present relationship had no association with sexual desire in European men (Kontula & Haavio-Mannila, 2009). The family structure and having children had no significant association with sexual disorders among Asian men (Kim & Jeon, 2013; Rao et al., 2015; Zhang et al., 2016).

A high prevalence of sexual dysfunctions, including ED, ejaculation dysfunctions (PE and DE), and HSDD, was observed in Asian and European men who were in estranged relationships or were dissatisfied with their marriage (Kim & Jeon, 2013; Mitchell et al., 2013; Zhang et al., 2013, 2016, 2017). In this regard, relationship-related reasons (passive partner, conflicts, and communication problems) were reported to cause decreased sexual interest in European men (Carvalho et al., 2014). Sexual satisfaction was significantly higher among European men who contributed to domestic tasks compared with those who did not (Castellanos-Torres et al., 2013). PE was reported to affect Asian men's overall relationships with their partners (Lee et al., 2013).

The partner's health and satisfaction with the sexual relationship were reported as independent risk factors for ED in European men (Corona et al., 2010). Asian men whose wives sought medical help for sexual problems were more likely to experience sexual dysfunction, particularly ejaculation dysfunction (Zhang et al., 2013). One study reported that the health status of the spouse had no association with sexual satisfaction in Asian men (Kim & Jeon, 2013). Another study reported that sexual desire was not associated with the partner's orgasmic dysfunctions in European men (Kontula & Haavio-Mannila, 2009).

Men's perception of their partner and the partner's behavior were also associated with sexual dysfunctions. The perception of one's partner as very attractive

significantly reduced the likelihood of European men to report a lack of sexual interest (Carvalho et al., 2014). Asian men with nonliberal attitudes toward female sexual initiation and refusal were more likely to experience sexual dysfunction, including erectile dysfunction and HSDD (Zhang et al., 2013). Asian men who assumed their partners were less sexually satisfied had significantly higher chances of PE (Lee et al., 2013). Having a sexually skillful partner was a significant predictor of sexual desire for European men (Kontula & Haavio-Mannila, 2009). European men who had concerns about their partner not initiating sex were more dissatisfied with their overall sex life (Lee et al., 2016).

**Religion and Ethnicity.** Interestingly, a very low prevalence of ED was observed in subjects from two religious minorities in the Asian population: Zhuang and Muslim men. The number of subjects in these ethnic groups was relatively small (Zhang et al., 2017). By ethnicity, 76.7% of Malays, 70.5% of Chinese, 79.3% of Indians, and 66.7% of other ethnicities had ED, but no significant association was reported between ethnicity and ED in Asian men (Khoo et al., 2008).

**Smoking and Alcohol Consumption.** The occurrence of smoking and alcohol consumption was inconsistently reported to be associated with MSD. A few studies reported that smoking was not associated with ED in Asian men (Huang et al., 2014; Rao et al., 2015). Numerous other studies reported that smoking status, duration, and frequency were positively associated with ED in Asian men (Ghalayini et al., 2010; Jeong et al., 2011; Permpongkosol et al., 2008; Tang et al., 2015; Zhang et al., 2017).

The age-adjusted prevalence of ED in Asian men smoking more than 30 cigarettes daily was significantly higher than in men smoking fewer cigarettes or in men who did not smoke (Zhang et al., 2017). The current and former smokers had a higher risk of ED compared with nonsmokers. Former smokers also had a higher risk of ED compared with nonsmokers or current smokers (Ghalayini et al., 2010; Jeong et al., 2011). Being a current smoker was also a significant risk factor for ED in European men (Andersen et al., 2008; Corona et al., 2010). A statistically significant relationship was reported between the duration of smoking and ED among both current and former smokers, especially for those who had smoked cigarettes for more than 30 years (Permpongkosol et al., 2008).

Some studies also reported that alcohol consumption was not associated with ED for Asian men (Huang et al., 2014; Jeong et al., 2011; Rao et al., 2015; Zhang et al., 2017). Others reported that alcohol consumption, duration, and frequency did have an impact on ED

(Permpongkosol et al., 2008; Tang et al., 2015). Bioavailable testosterone (BT) levels were significantly higher in more frequent alcohol consumers who were 35 years of age, as compared to less frequent consumers. In contrast, BT was significantly lower in more frequent alcohol consumers who were 45 years of age, as compared to less frequent consumers. Overall testosterone concentrations were not associated with alcohol use (Holm et al., 2012). Although tea consumption was not associated with ED, caffeine consumption was reported to be associated (Permpongkosol et al., 2008).

**General Health.** For European men, fair or poor health was significantly associated with less frequent sexual intercourse, low sexual satisfaction, ED, difficulty achieving orgasm, HSDD, and declines in the frequency of sexual activities (Carvalho et al., 2014; Castellanos-Torres et al., 2013; Donnelly et al., 2018; Kontula & Haavio-Mannila, 2009; Lee et al., 2016; Mitchell et al., 2013; Sand et al., 2008). The risk factors for ED in Asian men included poor health (Khoo et al., 2008; Tang et al., 2015). Another Asian study reported that current health had no association with sexual satisfaction (Kim & Jeon, 2013).

**Physical Activity.** One study reported that higher physical activity was associated with decreased risk of ED in Asian men (Wong et al., 2009b), while another study instead linked this to sexual dysfunction in European men (Donnelly et al., 2018). Other studies reported that Asian men doing exercise had lower percentages of ED, but that the association was not significant (Huang et al., 2014; Jeong et al., 2011; Permpongkosol et al., 2008).

Difficulty performing activities of daily living and instrumental activities of daily living due to current disease had no association with sexual satisfaction in Asian men (Kim & Jeon, 2013). Sexual desire was not significantly associated with the frequency of exercise in European men (Kontula & Haavio-Mannila, 2009).

**Body Mass Index.** The association between body mass index (BMI) and MSD was inconsistent in Asian and European men. Increased BMI and obesity were significantly associated with ED in Asian (Ghalayini et al., 2010; Wong et al., 2009b) and European men (Andersen et al., 2008; Corona et al., 2010).

Having abnormal BMI levels demonstrated a significant impact on the presence of male pelvic dysfunction or a combination of all three problems (urinary, bowel, and/or sexual dysfunction) in Asian (Kendirci et al., 2014) and European men (Donnelly et al., 2018). Underweight Asian men had the highest prevalence of severe ED, while obese Asian men had the highest prevalence of mild ED (Permpongkosol et al., 2008).



Other studies reported that abnormal increases or decreases in BMI and waist circumference were not significantly associated with the prevalence of ED in Asian men (Çayan et al., 2017; Huang et al., 2014; Jeong et al., 2011; Permpongkosol et al., 2008; Zhang et al., 2017). PE, sexual satisfaction, and desire were not associated with BMI in European men (Andersen et al., 2008; Kontula & Haavio-Mannila, 2009).

**Cardiovascular Diseases.** The presence of cardiovascular disease (CVD) was associated with ED in Asian (Çayan et al., 2017; Permpongkosol et al., 2008; Wong et al., 2009a) and European men (Corona et al., 2010; Lee et al., 2016). Hypertension, one of the most important risk factors of CVD, was also associated with ED (Çayan et al., 2017; Huang et al., 2014; Permpongkosol et al., 2008; Quek et al., 2008; Wong et al., 2009b), PE (Lee et al., 2013; Park et al., 2010), sexual problems (Rao et al., 2015), and pelvic disorders (Kendirci et al., 2014) in Asian men. The more severe forms of ED displayed an increased association with hypertension and CVD (Çayan et al., 2017; Huang et al., 2014). High blood pressure was also significantly associated with less sexual intercourse, frequent masturbation, and ED in European men (Lee et al., 2016).

The presence of previous strokes, atherosclerosis, and coronary artery disease significantly increased the odds of moderate to severe ED in Asian men (Çayan et al., 2017; Huang et al., 2014). The use of beta-blockers and thiazides was independently associated with increased odds of ED in Asian men (Wong et al., 2009a). The risk of moderate to severe ED and pelvic dysfunctions in Asian men increased with the presence of dyslipidemia (Çayan et al., 2017; Kendirci et al., 2014). Other studies reported no association of dyslipidemia with ED (Huang et al., 2014) and PE (Quek et al., 2008) in Asian men. A few studies reported no association between CVD, cerebrovascular diseases, and hypertension with ED in Asian men (Jeong et al., 2011; Zhang et al., 2017).

**Diabetes Mellitus.** The presence of diabetes mellitus was associated with increased odds of ED in Asian (Çayan et al., 2017; Huang et al., 2014; Permpongkosol et al., 2008; Quek et al., 2008; Wong et al., 2009a; Zhang et al., 2017) and European (Corona et al., 2010; Lee et al., 2016) men. Diabetes was also associated with sexual problems (Rao et al., 2015), ejaculation dysfunctions (Lee et al., 2013; Quek et al., 2008), and pelvic dysfunction (Kendirci et al., 2014) in Asian men. Severe forms of ED were more significantly associated with diabetes (Çayan et al., 2017; Huang et al., 2014). One Asian study reported no significant age-adjusted association between diabetes and ED (Ghalayini et al., 2010).

**Lower Urinary Tract Symptoms.** LUTSs were associated with ED in Asian (Çayan et al., 2017; Khoo et al., 2008; Quek et al., 2008; Wong et al., 2009a; 2009b; Zhang et al., 2017) and European men (Corona et al., 2010; Dumbraveanu et al., 2018). The risk factors for ED included genitourinary diseases in Asian men (Tang et al., 2015). The severity of LUTSs determined the severity of ED in a dose–response relationship in Asian and European men, particularly in later years (Çayan et al., 2017; Dumbraveanu et al., 2018; Wong et al., 2009a; 2009b). Nocturia and nocturnal polyuria were associated with ED in both Asian and European men (Dumbraveanu et al., 2018; Quek et al., 2008). LUTSs were also negatively associated with orgasm frequency in European men (Corona et al., 2010).

**Mental Health.** Anxiety before sexual activity was one of the most common comorbid symptoms for sexual difficulties in European men (Carvalho et al., 2014). It had significant associations with ED in European (Jern et al., 2012) and PE in Asian (Park et al., 2010; Quek et al., 2008) men. Erectile problems increased with increasing psychiatric symptoms in European men (Jern et al., 2012).

Being depressed was associated with an increased risk of ED in Asian (Jeong et al., 2011; Khoo et al., 2008; Wong et al., 2009a; Wong et al., 2009b) and European (Corona et al., 2010; Jern et al., 2012) men. A significant association was also observed between PE and depression in Asian men (Park et al., 2010; Quek et al., 2008). In Asian men, shorter intravaginal ejaculation latency time was associated with higher stress levels (Park et al., 2010). Depression and cognitive functions had no association with sexual satisfaction in Asian men (Kim & Jeon, 2013).

Depression was significantly associated with all sexual function parameters (erectile function, libido, ejaculatory function, sexual problems, and sexual satisfaction) in European men (Corona et al., 2010). European men with higher levels of depression were more likely to report a lack of sexual interest (Carvalho et al., 2014) and low sexual satisfaction (Mitchell et al., 2013). Sexual desire was not associated with stress symptoms in European men (Kontula & Haavio-Mannila, 2009).

**Prostatitis.** Men suffering from prostatitis or prostatitis-like symptoms had a significantly higher prevalence of ED in Asia, and this increased with age (Çayan et al., 2017; Hao et al., 2011; Huang et al., 2014; Permpongkosol et al., 2008). A positive association was reported between moderate to severe ED and benign prostatic hyperplasia in Asian men (Huang et al., 2014).

Prostatitis-like symptoms significantly increased the prevalence of PE in Asian men (Lee et al., 2013; Liang

et al., 2010; Park et al., 2010), while the presence of chronic prostatitis increased prevalence to more than double that of the whole population (Liang et al., 2010).

**Other Diseases.** Asian men who had experienced other serious diseases, trauma, or injuries to the spinal cord or pelvic region had higher chances of getting ED than those who had not (Permpongkosol et al., 2008). Arthritis had a significant association with PE in Asian men (Lee et al., 2013), while it was linked to ED, delayed orgasm, and HSDD in European men (Lee et al., 2016). Asthma was also associated with ED, HSDD, low frequency of sexual activities, and delayed orgasm in European men (Lee et al., 2016).

Asian men with PE had a higher prevalence of thyroid disease (hyperthyroidism) (Lee et al., 2013; Park et al., 2010). No association was reported between the prevalence of ED and the presence of peptic ulcers in Asian men (Permpongkosol et al., 2008). Low sexual function was also associated with previous sexually transmitted infections (STIs) in European men (Mitchell et al., 2013). Another study reported no association between a recent STI diagnosis and sexual dysfunctions in European men (Moreau et al., 2016). The number of current diseases had no association with sexual satisfaction in Asian men (Kim & Jeon, 2013).

**Behavior and Self-Esteem.** The importance of sex-life in old age had no association with sexual satisfaction in Asian men (Kim & Jeon, 2013). European men who considered their sexual life to be important had an increased likelihood of high sexual desire (Kontula & Haavio-Mannila, 2009). A high sexual desire among men was significantly associated with sexual self-esteem and self-confidence about erectile function (Carvalho et al., 2014; Kontula & Haavio-Mannila, 2009). Low sexual function was associated with a lack of sexual competence (defined as lack of vigor, regret about the timing, autonomy of the decision, and use of a reliable form of contraception) during first intercourse and with sexual experiences in the past 4 weeks (Mitchell et al., 2013). Asian men who cared more about their sexual life and were sexually satisfied experienced improved erection hardness (Hwang et al., 2010).

**Pornography.** No statistically significant associations between frequency of pornography use and ED, DE, and HSDD were observed in European (Portuguese and Norwegian) men. In the Croatian men surveyed in 2011, the relationship between moderately frequent pornography use and ED was significant (Landripet & Stulhofer, 2015). In the Croatian men surveyed in 2014, no significant associations between pornography use and sexual health disturbances (ED, DE and HSDD) were observed (Landripet & Stulhofer, 2015). European men who found

pornography arousing had an increased likelihood of high sexual desire (Kontula & Haavio-Mannila, 2009). But another study reported that the frequency of pornography use was not associated with a sexual interest in European men (Carvalho et al., 2014). When compared with men who reported decreased or stable frequency of pornography use in the past 12 months, those with increased pornography use did not display higher odds of ED, HSDD, or DE (Landripet & Stulhofer, 2015).

**Mutual Relationship of Sexual Disorders.** In European men, the significant association between ED generally and ED during first intercourse suggested that erectile problems during the first intercourse experience were predictive to some degree of ED problems later in life (Jern et al., 2012). European men with ED had significantly higher odds of personal dissatisfaction with all quality of life attributes, particularly regarding satisfaction with their sex life, overall health, orgasmic problems, and DE (Lee et al., 2016; Moreau et al., 2016; Sand et al., 2008; Traeen & Stigum, 2010). Good erectile function was a positive predictor of high sexual desire among European men (Carvalho et al., 2014; Kontula & Haavio-Mannila, 2009; Traeen & Stigum, 2010).

No significant association was reported between ED and AD in Asian (Kendirci et al., 2014; Tang et al., 2015) and European (Holm et al., 2012) men. ED was significantly associated with late-onset hypogonadism in Asian men (Tang et al., 2015). Higher fasting blood glucose levels and lower follicle-stimulating hormone levels were reported in cases of moderate to severe ED compared to no/mild ED (Huang et al., 2014).

PE was significantly associated with ED, HSDD, and low sexual satisfaction in Asian men (Lee et al., 2013; Park et al., 2010). Good orgasmic functions were a positive predictor of high sexual desire among European men (Carvalho et al., 2014; Kontula & Haavio-Mannila, 2009; Traeen & Stigum, 2010).

European men with sexual dysfunction were significantly less satisfied, and dissatisfaction increased with the number of sexual disorders (Moreau et al., 2016). Sexual satisfaction was lower in Asian men with distressing sexual difficulties compared to individuals with non-distressing sexual difficulties (Hendrickx et al., 2016). European men who reported distressing HSDD also reported a much higher number of other sexual difficulties than men who did not report a lack of sexual interest (Carvalho et al., 2014). Being satisfied with sexual function increased the likelihood of high sexual desire in European men (Kontula & Haavio-Mannila, 2009).

It was also noted that constructs of masculinity (man of honor, control of own life, respect of friends, good job, coping with problems on own, active sex life, financial stability, physically attractive, and successful with

women) did not vary significantly between men with erectile dysfunction and men without erectile dysfunction (Sand et al., 2008).

**Sexual Activity and Dysfunction.** Most of the European men reported that the main reason for not having intercourse was due to personal reasons, followed by MSDs (Beckman et al., 2008). Sexual activities (intercourse and masturbation) were significantly associated with ED, the severity of ED, male pelvic dysfunction, LUTSs, time of ejaculation, distressing sexual difficulties, dissatisfaction, and more than one sexual dysfunction, in both Asian and European men (Çayan et al., 2017; Hendrickx et al., 2016; Kendirci et al., 2014; Korfage et al., 2008; Lee et al., 2013, 2016; Moreau et al., 2016; Park et al., 2010; Quek et al., 2008). One study reported that most of the sexually inactive European men reported that they were not dissatisfied, distressed, or avoiding sex because of sexual difficulties (Mitchell et al., 2013). Sexual desire was not associated with preferring more frequent intercourse in Asian and European men (Carvalho et al., 2014; Kontula & Haavio-Mannila, 2009).

## Discussion

This is the first systematic review to summarize and compare the prevalence of MSDs and associated factors in Asian and European populations. A previous literature review was published on the sexual dysfunction of Asian men that did not report the selection of studies (Ho et al., 2011) and a systematic review that did not compare Asian men with European men (Lewis, 2011).

Although Asian societies are still conservative about the description, diagnosis, and treatment of sexual dysfunctions, an equally significant number of population-based studies were published on various aspects of MSD in Asian men as studies on European men. Out of the 25 Asian studies (Chung et al., 2015; Ghalayini et al., 2010; Hao et al., 2011; Huang et al., 2014; Jeong et al., 2011; Kim et al., 2009; Kim & Jeon, 2013; Lee et al., 2013; Liang et al., 2010; Park et al., 2010; Rao et al., 2015; Tang et al., 2015; Wong et al., 2009a; 2009b; Zhang et al., 2013, 2016, 2017) analyzed, 17 were carried out in East Asian countries and regions (China, Hong Kong, South Korea, and Taiwan) (Chung et al., 2015; Hao et al., 2011; Hwang et al., 2010, 2014; Jeong et al., 2011; Khoo et al., 2008; Kim et al., 2009; Kim & Jeon, 2013; Lee et al., 2013; Liang et al., 2010; Liu et al., 2010; Park et al., 2010; Permpongkosol et al., 2008; Quek et al., 2008; Tang et al., 2015; Wong et al., 2009a; Wong et al., 2009b; Zhang et al., 2016; Zhang et al., 2013, 2017), including 15 studies covering Chinese (Chung et al., 2015; Hao et al., 2011; Huang et al., 2014; Kim et al., 2009; Liang et al., 2010; Tang et al., 2015; Wong et al., 2009a; 2009b;

Zhang et al., 2013, 2016, 2017) and Korean (Jeong et al., 2011; Kim & Jeon, 2013; Lee et al., 2013; Park et al., 2010) populations and three studies took place in South East Asian countries (Malaysia and Thailand). Of the remaining five studies, four were from Western Asia (Jordan and Turkey) (Çayan et al., 2017; Ghalayini et al., 2010; Kendirci et al., 2014; Serefoglu et al., 2011), and only one was from South Asia (India) (Rao et al., 2015). In contrast, in European countries, large studies were recently carried out that included men from many countries (Corona et al., 2010; Lee et al., 2013; Sand et al., 2008). No such recent, wide-ranging study was found for Asian men. Most of the studies carried out on Asian men are small in terms of the sample sizes and number of sexual dysfunctions investigated. As a result, the management policies developed based on the European data have also been applied to the Asian populations.

The prevalence of sexual dysfunction varied due to differences in the ages and time periods investigated and the definitions and data collection strategies adopted (telephone interviews, IAQs, SAQs, and mail questionnaires). Some general observations can be made. The prevalence of low satisfaction, HSDD, and the various types of ED were generally higher in Asian men compared to European men, whereas the prevalence of anorgasmia and PE was higher in European men compared to Asian men. In both Asian and European men, age was an independent positive factor of almost all the MSDs investigated. PE increased with age in Asian men of all ages and in European men <60 years. In European men >60 years, the prevalence of PE decreased with age.

The prevalence of MSD in both Asian and European men was generally greater in questionnaire-based studies than interview-based studies. One instance of the masculinity in most of the societies being portrayed as a sexual superpower and of someone self-reporting their own MSD was disgraceful (Tomlinson, 1998). The ED prevalence reported that was based on IIEF-5 was higher than that of interviews and other questionnaires, both for the Asian and European men (Hao et al., 2011; Tang et al., 2015). Sometimes, of men who reported in self-assessment that they did not have ED, one in four were reported to have mild to moderate ED when evaluated using IIEF-5 (Hwang et al., 2010).

The Asian studies did not report on DE, orgasmic dysfunction, and anejaculation or retrograde ejaculation firstly because, unlike PE, these conditions are poorly understood and considered uncommon forms of male sexual dysfunction (Abdel-Hamid & Saleh, 2011; Butcher et al., 2015). This review reported a high prevalence of DE (up to 52.2%) in European men (Lee et al., 2016). Although treating anejaculation or retrograde ejaculation is important, particularly to men who intend to become fathers, the prevalence of this condition was only reported

in one study on European men (Hendrickx et al., 2016; Mehta & Sigman, 2015). Secondly, for these ejaculatory problems to be reported as a disorder, the men suffering from them were required to have suffered from personal distress (Gray et al., 2018). There is no gold standard for diagnosis of DE, nor is there a specifically defined time of latency, and even physicians from developed countries have an inconsistent practice pattern for diagnosing DE (Abdel-Hamid & Saleh, 2011; Butcher et al., 2015). Thirdly, most men may be more concerned about a decreased time to ejaculation, while an increased time to ejaculation is not considered a sexual dysfunction, but is instead viewed as increased sexual stamina. Although this increased stamina may increase pleasure and intimacy at first, it causes distress, painful intercourse, and decreased sexual activity when the problem persists for a long time.

Orgasmic dysfunctions (early or delayed orgasm) were also only reported in European men. Anorgasmia was also under-reported among Asian men and displayed a considerably low prevalence (Rao et al., 2015). These dysfunctions have no specified time threshold, and although orgasm and ejaculation are two separate phenomena in men, definitions in a few previous studies have overlapped (Castellanos-Torres et al., 2013; Liu et al., 2010; Ruiz-Muñoz et al., 2013; Zhang et al., 2017). It is suggested that only one in four men routinely achieve orgasm in all sexual encounters. Therefore, most of the men perceive it as a normal function that may lower the chances of reporting of abnormal orgasmic delay on assessment. Orgasmic dysfunction also causes distress, painful intercourse, and reduced frequency of sexual intercourse (Jenkins & Mulhall, 2015).

Although low sexual satisfaction is predictive of conservative attitudes about sex, lack of importance attributed to sexual issues, lack of sexual expression, and use of restricted sexual techniques (Haavio-Mannila & Kontula, 1997), interestingly only one of the Asian studies reported this (3.2%–37.6%), which is comparable to European men (4.1%–28.3%) (Beckman et al., 2008; Castellanos-Torres et al., 2013; Corona et al., 2010; Kim & Jeon, 2013; Kontula & Haavio-Mannila, 2009; Korfage et al., 2008; Lee et al., 2016; Ruiz-Muñoz et al., 2013), who are often considered to have more open or progressive attitudes.

The review also reported that only one European study reported on hyperactive sexual desire disorder (Hendrickx et al., 2016). The fact that HSDD was considerably higher in Asian men compared to European men may be due to the former's more conservative background (Montgomery, 2008). It was also suggested that sexual guilt significantly decreased sexual desire in Asian men as compared to Euro-Canadian men (Brotto et al., 2012). Reduced/no sexual pleasure was also not reported among Asian men.

Sexual pleasure is generally given a low level of attention in the field of reproductive health (John et al., 2015).

The prevalence and factors of painful intercourse have rarely been diagnosed among men and are not typically discussed in the routine diagnosis of sexual dysfunction (Heiman, 2002). The present review also showed that it was reported in only one European study.

Both the Asian and European studies reported a significant association between one or more MSDs and sociodemographic factors (age, education, employment, income, area of residence, and marital status), lifestyle habits (smoking and physical activity) and health factors (general health, BMI, CVD, diabetes mellitus, arthritis, and LUTSs). The effects of religion, ethnicity, alcohol, tea and caffeine consumption, prostatitis, thyroid dysfunctions, and spinal cord and pelvic injuries were only studied in Asian men. Likewise, the roles of pornography use, STIs, and asthma were only investigated in European men.

## Limitations

The review was limited to a certain number of published studies, which may create bias because of the high probability that unpublished studies also have significant results. Other sources of bias were that studies published in languages other than English and studies of which the full text could not be found were not included in the review. Most of the Asian studies were on East Asian populations; therefore, these data cannot be generalized to men from all of Asia, as vast cultural, religious, and socioeconomic differences exist across this continent. Ideally, a meta-analysis of the prevalence should be performed, but due to various definitions of MSD and study designs involved, it was not possible.

## Recommendations for Future Research

There is a need to conduct large or multicenter studies on various Asian populations for better assessment and proper treatment of MSDs. It is crucial to emphasize the use of standard definition and criteria of MSDs for valid comparison worldwide along with validated tools for its assessment. Men in Asian populations particularly should be investigated for the prevalence of DE, anejaculation or retrograde ejaculation, orgasmic dysfunction, hyperactive sexual disorder, low sexual satisfaction, reduced sexual pleasure, and painful intercourse. Men should also be investigated for the association of MSDs with religion, ethnicity, alcohol, tea and caffeine consumption, pornography use, STIs, asthma, prostatitis, thyroid dysfunctions, and spinal cord and pelvic injuries. Men should be made aware that sexual dysfunctions are like other systematic

dysfunctions that occur due to genetic and environmental factors, and that they are curable. Healthcare professionals should approach sexual function as a normal bodily process that plays an important part in the quality of life of the individual.

## Conclusions

The prevalence of ED and HSDD was higher in Asian men compared to European men, whereas the prevalence of anorgasmia and PE was higher in European men compared to Asian men. In both Asian and European men, age was an independent positive factor of almost all the MSDs investigated. The other factors were marital status, socioeconomic status, and comorbidities (CVD, LUTSs, prostatitis, diabetes, hypertension, and psychological disorders). The study suggests monitoring changes in sexual functions with age in both Asian and European men. Men with a low socioeconomic and single status who have other diseases should also be investigated for sexual dysfunctions, and vice versa. Considering the differences between Asian and European data on MSDs, further studies are needed to provide a more concrete and detailed explanation of these differences. There is a particular need to conduct large studies on the various Asian populations for the effective management of MSDs.

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No additional data are available.

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