Improving Erectile Dysfunction Management Among Asian Men With Diabetes Using the Knowledge Translation Intervention

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ABSTRACT

PURPOSE Erectile dysfunction (ED) is frequently undermanaged due to communication barriers, particularly among Asian men. We looked at how ED discussion and treatment were affected by the patient's prompt sheet and the Knowledge Translation Tools in the Management of Erectile Dysfunction (LASTED).

METHODS We conducted a quasi-experimental study in a primary care clinic in Kedah, Malaysia involving 120 Asian men with diabetes. In the intervention group, patients were given a prompt sheet to indicate their intention to discuss or receive ED treatment, and physicians were provided with LASTED to assist with ED consultation. The control group patients received standard care from their physicians.

RESULTS The intervention increased the initiation of ED discussion up to 66.7% compared with 8.3% in the control group. In the intervention group, 57.5% of patients were prescribed phosphodiesterase-5 inhibitors and men with ED of moderate severity were more likely to be prescribed oral ED medication. Use of the LASTED flipchart was associated with prescription of phosphodiesterase-5 inhibitors ($P = .011$) and patient satisfaction with ED consultation ($P < .001$).

CONCLUSION Our study suggests that using the LASTED flipchart and patient's prompt sheet together may encourage ED conversation and medication prescription particularly when working with Asian men who frequently view ED as a taboo subject.

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INTRODUCTION

Erectile dysfunction (ED) is the most frequent male sexual dysfunction encountered worldwide, especially among men with type 2 diabetes.[1,2] The risk of developing ED is significantly associated with age, duration of type 2 diabetes, lower physical activity, microvascular complications, and depression.[3-5] Despite the high prevalence of ED, it is still underdiagnosed and undertreated.[6] It is alarming that many men with ED do not seek professional help or voice their concerns despite wishing to be treated.[7-9] In many cases, this is a result of cultural perceptions of sex and shame upon seeing a female physician.[10-13] Barriers among physicians in delivering services related to sexual health include a lack of knowledge and confidence in ED management.[14] Despite our focus on Asian men with type 2 diabetes, there is substantial cultural diversity among those with sexual dysfunction across the continents;[15] the lack of communication between physician and patient is not unique to Asians. A global study showed that only 9% of men had been asked about their sexual health by a doctor.[16]

Therefore, developing cost-effective interventions is essential to removing obstacles to efficient ED management. Use of knowledge translation (KT) tools involves a dynamic and iterative process designed to strengthen knowledge applications in the health care system.[17] It helps to improve patient knowledge by simplifying sophisticated medical information, thus enhancing their understanding of risk.[18] The KT tool in the form of a patient prompt sheet provides an organized delivery of information and questions designed to aid the patient in discussing a difficult topic with their doctor. The use of an ED prompt sheet (Supplemental Appendix 1) aided in communication and helped patients overcome their hesitation

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to bring up sexual dysfunction.[19] As a result, patients discussed sexual health problems in more effective and patient-centered consultations.[20]

There is a lack of knowledge regarding the use of flipcharts to help doctors deliver ED information during clinical consultations. Hence, we developed a flipchart called "Knowledge Translation Tools in the Management of Erectile Dysfunction" (LASTED) to assist physicians in primary care clinics (Supplemental Appendix 2). In the primary care setting, we evaluated if the use of a patient prompt sheet combined with the LASTED flipchart changed discussions about ED and prescription of phosphodiesterase-5 (PDE5) inhibitors for Asian men with diabetes.

METHODS

Development of LASTED

The development of the LASTED flipchart was based on a literature review, guidelines,[21,22] and discussions with experts in men's health, including urologists, family physicians, and medical educators. The LASTED flipchart is a printed infographic that has been designed and validated in Malay language and English.

Study Design and Setting

This was a non-equivalent group type of quasi-experimental design conducted in a public primary care clinic in Kedah, Malaysia. Patients eligible for inclusion were men with type 2 diabetes aged 18 years or more. Patients with cognitive impairment and psychiatric disorders were excluded. Seven physicians and 125 patients consented to participate in the study.

Control and Intervention Groups

Participating physicians received a brief introduction to the fundamentals of ED treatment before the data collection to ensure familiarity with the subject. Data collection for the control group took place in September 2021 and for intervention group in October 2021. After data collection of the control group was completed, the physicians were introduced and briefed on the LASTED flipchart.

At the clinic, men of both groups were directed to a common station for routine blood pressure, weight, and random capillary glucose measurements, before the consultation with the physician. After the consultation, patients returned to the common station to complete the data collection sheet, which included demographic information and the 5-item International Index of Erectile Function (IIEF-5).[23,24] The total IIEF-5 score defined 4 groups: no ED (score 22-25); mild ED (score 17-21); moderate ED (score 8-16); and severe ED/not sexually active (score 1-7). Patients were also asked about initiation of an ED discussion, prescription of PDE5 inhibitors, use of LASTED flipchart (for the intervention group), and satisfaction with the consultation overall.

In the control group, if ED was discussed during the consultation, it occurred with mutual agreement of both parties. No prompt sheet or LASTED flipchart was used.

In the intervention group, patients received the prompt sheet at the common station before consultation with the physician. The prompt sheet contained brief information on ED and options for ED discussion.[17] The 4 options were: "I do not want to discuss ED;" "I want to discuss the risk of ED;" "I want to discuss treatment of ED;" and "I want to discuss the severity of ED." The patients were asked to give the completed prompt sheet to their physician at the beginning of the consultation. The consultation then proceeded with the physician using the LASTED flipchart based on the options selected on the prompt sheet.

Data Analysis

Data were analyzed using SPPS version 26 (IBM Corp). The association between variables was analyzed using the χ^2 and Fisher's exact tests. Logistic regression was conducted to examine the associated factors for ED discussion and prescription of PDE5 inhibitors with a 95% CI. A *P* value less than .05 was considered to have a significant association.

Ethical Consideration

The Human Research Ethics Committee of The National University of Malaysia (FF-2020-424) and Medical Research and Ethics Committee (NMRR-20-1985-55688 IIR) approved this study.

RESULTS

A total of 125 men with diabetes were screened for study eligibility. Four refused to participate due to time constraints, and 1 patient was symptomatic for hyperglycemia. We recruited 60 patients for each arm resulting in a response rate of 96%. The mean age of participants was 59.4 (SD = 10.7) years, and 76.7% had ED. There were no significant sociodemographic differences between the control and intervention groups (Table 1).

In the intervention group, 66.7% of patients discussed ED-related issues with their physician, compared with only 8.3% of the control group (Table 2). Those who received ED KT tools were 8 times more likely to discuss ED issues than the control group (*P* <.001). Prescriptions for PDE5 inhibitors were provided to 57.5% of patients in the intervention group, but none in the control group (Table 2). Patients with moderate ED were more likely to be prescribed PDE5 inhibitors compared with those having mild ED (Table 3).

Physicians used the LASTED flipchart in 82.5% of intervention group consultations. Use of the LASTED flipchart was significantly associated with patient satisfaction with ED discussion (*P* <.001) (Table 4). All the intervention group patients considered the LASTED flipchart useful and were satisfied (extremely satisfied and satisfied) with the consultation (Table 4). Of those consulted using the

Table 1. Sociodemographic Characteristics of Participants (N = 120)

Characteristic	Total No. (%)	Groups (n = 60 per group) Control No. (%)	Intervention No. (%)	*P* Value
Age, y				
<40	10 (8.4)	5 (8.3)	5 (8.3)	.980[a]
40-59	37 (30.8)	19 (31.7)	18 (30.8)	
≥60	73 (60.8)	36 (60.0)	37 (60.8)	
Ethnicity				
Malay	101 (84.2)	48 (80.0)	53 (88.3)	.211[a]
Non-Malay	19 (15.8)	12 (20.0)	7 (11.7)	
Employment				
Employed	46 (38.3)	27 (45.0)	19 (31.7)	.133[a]
Not employed	74 (61.7)	33 (55.0)	41 (68.3)	
Education				
Primary	9 (7.5)	6 (10.0)	3 (5.0)	.099[b]
Secondary	79 (65.8)	43 (71.7)	36 (60.0)	
Tertiary	32 (26.7)	11 (18.3)	21 (35.0)	
Monthly household income, MYR				
<3,710	106 (88.4)	53 (88.3)	53 (88.3)	.613[b]
3,710-7549	10 (8.3)	4 (6.7)	6 (10.0)	
>7,550	4 (3.3)	3 (5.0)	1 (1.7)	
Marital status				
Single	7 (5.8)	3 (5.0)	4 (6.7)	.786[b]
Married	110 (91.7)	56 (93.3)	54 (90.0)	
Widower	3 (2.5)	1 (1.7)	2 (3.3)	
Severity of ED				
None	28 (23.3)	18 (30.0)	10 (16.7)	.098[a]
Mild	38 (31.7)	21 (35.0)	17 (28.3)	
Moderate	40 (33.3)	14 (23.3)	26 (43.3)	
Severe	14 (11.7)	7 (11.7)	7 (11.7)	

ED = erectile dysfunction; MYR = Malaysian Ringgit currency.

[a] χ^2 test.
[b] Fisher-Exact test.

Table 2. Initiation of Discussion and Prescription of a PDE5 Inhibitor Between Groups (N = 120)

Characteristic	Total No. (%)	Groups (n = 60 per group) Control No. (%)	Intervention No. (%)	*P* Value
Initiation of ED discussion (n = 120)				
Yes	45 (37.5)	5 (8.3)	40 (66.7)	<.001[a]
No	75 (62.5)	55 (91.7)	20 (33.3)	
PDE5 inhibitor prescription (n = 45)				
Yes	23 (51.1)	0 (0.0)	23 (57.5)	.022[b]
No	22 (48.9)	5 (100.0)	17 (42.5)	

ED = erectile dysfunction; PDE5 = phosphodiesterase-5.

[a] χ^2 test.
[b] Fisher exact test.

LASTED flipchart, 66.7% received PDE5 inhibitor prescriptions compared with only 14.3% of those consulted without use of the LASTED flipchart (*P* = .011) (Table 4).

Table 5 summarizes the discussion topics during the consultations using the LASTED flipchart in the intervention group. Only 17.5% discussed the cardiovascular risk of ED despite the vital link between ED and cardiovascular diseases.

DISCUSSION

The results of our study found that integrating a patient prompt sheet and a physician LASTED flipchart can be a promising strategy to enhance ED-related communication as compared with using a prompt sheet alone.[19] The prompt sheet alerted clinicians to the patient's receptiveness to sexual health questions while the LASTED flipchart addressed the physician's perceived competence in managing patients with ED.[25] This comprehensive strategy in a time-constrained primary care visit may improve ED screening and management.

Our study reported that use of LASTED flipchart during an ED consultation may improve overall patient satisfaction. To the best of our knowledge, no previous study has assessed the impact of an ED flipchart on ED management. Earlier studies on flipcharts evaluated the effect of knowledge in nutrition education[26] and medication adherence[27] but did not explore user satisfaction. The LASTED flipchart may improve patient satisfaction as it provides a visually engaging tool to help them actively participate in the discussion. Satisfaction could also be attributed to the consultation outcome of a PDE5 inhibitor prescription as patients feel their sexual problems are being addressed and treated.

However, KT tools must be adapted to diverse cultures because cultural values substantially influence discussion of ED.[15] Asian men are more conservative about discussing sexuality than European men, despite having a higher rate of sexual dysfunction.[28,29] Malaysian men and those from neighboring Asian countries like China, Japan, Korea, and Taiwan may share similar characteristics related to sexual health.[30] A cross-cultural adaptation of this KT tool may yield outcomes similar than those in this study, especially in Asian populations and among Asian immigrants residing in the West.

The use of PDE5 inhibitors among Asians particularly in Malysia is low as this medicine is not widely available in public primary care clinics and physicians are not familiar with the drug.[31] The current study found an increase in prescription of PDE5 inhibitors especially in men with moderate ED which

Table 3. Simple Logistic Regression of Associated Factors for Initiation of Discussion and Prescription of a PDE5 Inhibitor in the Intervention Group (N = 60)

	Initiation of Discussion (n = 60)		PDE5 Inhibitor Prescription (n = 40)	
Characteristic	**Crude OR (95% CI)**	***P* Value**	**Crude OR (95% CI)**	***P* Value**
Age, y				
<40	Ref	...	Ref	...
40-59	5.25 (0.64-43.13)	.123	1.53 (0.13-17.33)	.727
≥60	2.77 (0.41-18.74)	.296	3.40 (0.35-33.40)	.294
Ethnicity				
Malay	Ref	...	Ref	...
Non-Malay	3.35 (0.38-29.96)	.279	2.39 (0.48-11.80)	.286
Employment				
Employed	Ref	...	Ref	
Not employed	1.26 (0.40-3.93)	.695	1.54 (0.49-4.85)	.465
Education				
Primary	Ref 1	...	Ref	...
Secondary	0.89 (0.73-10.72)	.923	1.43 (0.19-17.23)	.779
Tertiary	1.25 (0.95-16.50)	.865	1.00 (0.08-13.01)	1.000
Monthly household income, MYR				
<3,710	Ref	...	Ref	...
≥3,710	1.29 (0.23-7.29)	.777	0.24 (0.03-2.09)	.194
Marital status				
Married	Ref	...	Ref	...
Single	2.71 (0.29-24.95)	.378	0.29 (0.32-2.66)	.274
Severity of ED				
Mild	Ref	...	Ref	...
Moderate	1.55 (0.49-4.80)	.450	6.00 (1.73-20.82)	.004[a]
Severe	4.13 (0.43-39.21)	.217	3.30 (0.55-19.65)	.190

ED = erectile dysfunction; MYR = Malaysian Ringgit currency; OR = odds ratio; PDE5 = phosphodiesterase-5.

[a] *P* value < .05

Table 4. Use of LASTED on Discussion Satisfaction and Prescription of PDE5 Inhibitors in the Intervention Group (N = 40)

		Use of LASTED		
Outcomes	**Total No. (%)**	**Yes (n = 33) No. (%)**	**No (n = 7) No. (%)**	***P* Value**
Discussion satisfaction				
Extremely satisfied	13 (32.5)	13 (39.4)	0 (0.0)	<.001[b]
Satisfied	22 (55.0)	20 (60.6)	2 (28.5)	
Not sure	3 (7.5)	0 (0.0)	3 (42.8)	
Not satisfied	2 (5.0)	0 (0.0)	2 (28.5)	
PDE5 inhibitor prescription				
Yes	23 (57.5)	22 (66.7)	1 (14.3)	.011[a]
No	17 (42.5)	11 (33.3)	6 (85.7)	

LASTED = Knowledge Translation Tools in the Management of Erectile Dysfunction; PDE5 = phosphodiesterase-5.

[a] χ^2 test.
[b] Fisher exact test.

was not assessed in the previous study.[19] ED is associated with increasing age[32] and presence of comorbidities such as cardiovascular diseases,[2] and in some cases, PDE5 inhibitors may not be the first-line or safest option for this population. Conversely, those with mild ED can typically resume sexual activity without oral medicines.

Similar to a previous study, [33] the self-reported ED in this study was low. Patients might be ignoring this sexual problem due to a lack of knowledge regarding the diagnosis and treatment of ED. Therefore, patients might not volunteer to discuss ED-related concerns during clinic encounters. Active screening by health care workers with KT tools might be beneficial to overcome this issue.

Strength And Limitation

The effectiveness of combining ED interventions to address patient and physician barriers in the same setting was investigated for the first time in this study. The interventions provide a strategic approach to tackle barriers to discussion of ED, especially among populations where sexual health is still taboo. There are some limitations that may affect the interpretation of the results of this study. The control and intervention groups were carried out at the same study site, which might cause cross-contamination of information. Hence, different time periods of data collection for the control and intervention groups were used. Also, with no blinding in this study, the physicians were only exposed to the LASTED flipchart and prompt sheet after the data collection for the control group had been completed. Apart from that, the rate of prescribing of PDE5 inhibitors may not equal the number of prescriptions that were filled and taken by the patient as that is hard to monitor. Therefore, we suggest a follow-up study to analyze the rate of prescribing of PDE5 inhibitors and consumption to better understand the effect of LASTED on ED treatment.

CONCLUSION

Combining the LASTED flipchart and prompt sheet as KT tools may improve ED discussion and prescription of PDE5 inhibitors. Knowledge translation tools are potentially a cost-effective strategy in ED management to break communication barriers between patients and physicians. This study has shed light on ED management frameworks by addressing patient and physician factors in the same setting.

Table 5. Topics and Types of Treatment Discussed in the Intervention Group (N = 40)

Outcomes	Total No. (%)	Use of LASTED	
		Yes (n = 33) No. (%)	No (n = 7) No. (%)
Topics discussed			
Causes of ED	23 (57.5)	17 (51.5)	6 (85.7)
Symptoms of ED	16 (40.0)	13 (39.4)	3 (42.9)
Severity of ED	12 (30.0)	11 (33.3)	1 (14.3)
Treatment of ED	32 (80.0)	28 (84.0)	4 (57.1)
Cardiac risk of ED	7 (17.5)	6 (18.2)	1 (14.3)
Others	3 (7.5)	3 (9.1)	0 (0.0)
Type of treatment discussed			
Lifestyle	13 (32.5)	10 (30.3)	3 (42.9)
Oral medication	35 (87.5)	31 (93.9)	4 (57.1)
Vacuum erection device	13 (32.5)	13 (39.4)	0 (0.0)
Intracavernous injections	10 (25.0)	10 (30.3)	0 (0.0)
Penile prosthesis	6 (15.0)	6 (18.2)	0 (0.0)

ED = erectile dysfunction; LASTED = Knowledge Translation Tools in the Management of Erectile Dysfunction.

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Key words: diabetes mellitus; erectile dysfunction; knowledge translation; sexual health

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Supplemental materials

REFERENCES

1. Kessler A, Sollie S, Challacombe B, Briggs K, Van Hemelrijck M. The global prevalence of erectile dysfunction: a review. *BJU Int*. 2019;124(4):587-599. 10.1111/bju.14813
2. Ab Rahman AA, Al-Sadat N, Yun Low W. Prevalence of erectile dysfunction in primary care setting, Malaysia. *J Men's Health*. 2011;8(SUPPL. 1):S50-S53. 10.1016/S1875-6867(11)60021-3
3. Zheng H, Fan W, Li G, Tam T. Predictors for erectile dysfunction among diabetics. *Diabetes Res Clin Pract*. 2006;71(3):313-319. 10.1016/j.diabres.2005.07.011
4. Nisahan B, Kumanan T, Rajeshkannan N, Peranantharajah T, Aravinthan M. Erectile dysfunction and associated factors among men with diabetes mellitus from a tertiary diabetic center in Northern Sri Lanka. *BMC Res Notes*. 2019;12(1):210. 10.1186/s13104-019-4244-x
5. Seid A, Gerensea H, Tarko S, Zenebe Y, Mezemir R. Prevalence and determinants of erectile dysfunction among diabetic patients attending in hospitals of central and northwestern zone of Tigray, northern Ethiopia: a cross-sectional study. *BMC Endocr Disord*. 2017;17(1):16. 10.1186/s12902-017-0167-5
6. McKinlay JB. The worldwide prevalence and epidemiology of erectile dysfunction. *Int J Impot Res*. 2000;12(Suppl 4):S6-S11. 10.1038/sj.ijir.3900567
7. Papaharitou S, Athanasiadis L, Nakopoulou E, et al. Erectile dysfunction and premature ejaculation are the most frequently self-reported sexual concerns: profiles of 9,536 men calling a helpline. *Eur Urol*. 2006;49(3):557-563. 10.1016/j.eururo.2005.09.023
8. Kubin M, Wagner G, Fugl-Meyer AR. Epidemiology of erectile dysfunction. *Int J Impot Res*. 2003;15(1):63-71. 10.1038/sj.ijir.3900949
9. Lo WH, Fu SN, Wong CKH, Chen ES. Prevalence, correlates, attitude and treatment seeking of erectile dysfunction among type 2 diabetic Chinese men attending primary care outpatient clinics. *Asian J Androl*. 2014;16(5):755-760. 10.4103/1008-682X.127823
10. Almigbal TH, Schattner P. The willingness of Saudi men with type 2 diabetes to discuss erectile dysfunction with their physicians and the factors that influence this. *PLoS One*. 2018;13(7):e0201105. 10.1371/journal.pone.0201105
11. Gülpinar O, Haliloğlu AH, Abdulmajed MI, Bogga MS, Yaman O. Help-seeking interval in erectile dysfunction: analysis of attitudes, beliefs, and factors affecting treatment-seeking interval in Turkish men with previously untreated erectile dysfunction. *J Androl*. 2012;33(4):624-628. 10.2164/jandrol.111.013946
12. Gott M, Hinchliff S. Barriers to seeking treatment for sexual problems in primary care: a qualitative study with older people. *Fam Pract*. 2003;20(6):690-695. 10.1093/fampra/cmg612
13. Salehian R, Naserbakht M, Mazaheri A, Karvandi M. Perceived barriers to addressing sexual issues among cardiovascular patients. *Iran J Psychiatry Behav Sci*. 2017;11(2):e7223. 10.5812/ijpbs.7223
14. Tay CL, Rahim A, Abdul B, Tan CK, Tan MZ. Knowledge, attitude, confidence, and barriers in the practice of erectile dysfunction screening among primary health - care providers in Taiping Perak, Malaysia. *Urol Sci*. 2019;30(4):170-176. 10.4103/UROS.UROS_1_19
15. Bhavsar V, Bhugra D. Cultural factors and sexual dysfunction in clinical practice. *Adv Psychiatr Treat*. 2013;19(2):144-152. 10.1192/apt.bp.111.009852
16. Moreira ED, Brock G, Glasser DB, et al. Help-seeking behaviour for sexual problems: the global study of sexual attitudes and behaviors. *Int J Clin Pract*. 2005;59(1):6-16. 10.1111/j.1742-1241.2005.00382.x
17. Canadian Institute for Health Research (CIHR). Knowledge Translation Definition. https://cihr-irsc.gc.ca/e/45321.html
18. Moore AE, Straus SE, Kasperavicius D, et al. Knowledge translation tools in preventive health care. *Can Fam Physician*. 2017;63(11):853-858.
19. Khalid NM, Tong SF, Monoto EMM. The effectiveness of "prompt sheet" in initiating a discussion of sexual dysfunction among male patients with diabetes in a primary care setting: an open-label control trial. *J Men's Health*. 2022;18(6):1-8. 10.31083/j.jomh1806125
20. Albada A, van Dulmen S, Ausems MGEM, Bensing JM. A pre-visit website with question prompt sheet for counselees facilitates communication in the first consultation for breast cancer genetic counseling: findings from a randomized controlled trial. *Genet Med*. 2012;14(5):535-542. 10.1038/gim.2011.42
21. Burnett AL, Nehra A, Breau RH, et al. Erectile dysfunction: AUA guideline - Unabridged. *J Urol*. 2018;(200):633.
22. Wespes E, Amar E, Hatzichristou D, et al; EAU. EAU Guidelines on erectile dysfunction: an update. *Eur Urol*. 2006;49(5):806-815. 10.1016/j.eururo.2006.01.028
23. Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Peña BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. *Int J Impot Res*. 1999;11(6):319-326. 10.1038/sj.ijir.3900472
24. Lim TO, Das A, Rampal S, et al. Cross-cultural adaptation and validation of the English version of the International Index of Erectile Function (IIEF) for use in Malaysia. *Int J Impot Res*. 2003;15(5):329-336. 10.1038/sj.ijir.3901009
25. Tong SF, Low WY, Ismail SB, Trevena L, Wilcock S. Determinants of doctors' decisions to inquire about sexual dysfunction in Malaysian primary care settings. *Transl Androl Urol*. 2013;2(4):281-290. 10.3978/j.issn.2223-4683.2013.09.14
26. Raikar K, Thakur A, Mangal A, Vaghela JF, Banerjee S, Gupta V. A study to assess the effectiveness using flipchart among school - going adolescent girls. Published online 2020:1-7. 10.4103/jehp.jehp
27. de Souza ACC, Moreira TMM, Oliveira ES, et al. Effectiveness of educational technology in promoting quality of life and treatment adherence in hypertensive people. *PLoS One*. 2016;11(11):e0165311. 10.1371/journal.pone.0165311
28. Nicolosi A, Glasser DB, Kim SC, Marumo K, Laumann EO; GSSAB Investigators' Group. Sexual behaviour and dysfunction and help-seeking patterns in adults aged 40-80 years in the urban population of Asian countries. *BJU Int*. 2005;95(4):609-614. 10.1111/j.1464-410X.2005.05348.x

29. Irfan M, Hussain NHN, Noor NM, Mohamed M, Sidi H, Ismail SB. Epidemiology of male sexual dysfunction in Asian and European regions: a systematic review. *Am J Mens Health*. 2020;14(4):1557988320937200. 10.1177/1557988320937200

30. Tan HM, Low WY, Ng CJ, et al. Prevalence and correlates of erectile dysfunction (ED) and treatment seeking for ED in Asian Men: the Asian Men's Attitudes to Life Events and Sexuality (MALES) study. *J Sex Med*. 2007;4(6):1582-1592. 10.1111/j.1743-6109.2007.00602.x

31. Pharmaceutical Services Programme Ministry of Health Malaysia. Malaysian Statistics On Medicines 2015-2016. Published 2020. https://www.pharmacy.gov.my/v2/ms/dokumen/malaysian-statistics-medicines.html

32. Nordin RB, Soni T, Kaur A, Loh KP, Miranda S. Prevalence and predictors of erectile dysfunction in adult male outpatient clinic attendees in Johor, Malaysia. *Singapore Med J*. 2019;60(1):40-47. 10.11622/smedj.2018049

33. Frost M, Wraae K, Gudex C, et al. Chronic diseases in elderly men: underreporting and underdiagnosis. *Age Ageing*. 2012;41(2):177-183. 10.1093/ageing/afr153