

# BMJ Open Sexual health-seeking behaviour and associated factors in men with diabetes mellitus attending the northwest Amhara region hospitals, Ethiopia: a cross-sectional study

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**To cite:** Mekonnen EG, Gonete AT, Takele WW. Sexual health-seeking behaviour and associated factors in men with diabetes mellitus attending the northwest Amhara region hospitals, Ethiopia: a cross-sectional study. *BMJ Open* 2022;**12**:e049584. doi:10.1136/bmjopen-2021-049584

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-049584>).

Received 08 February 2021  
Accepted 13 December 2021



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## ABSTRACT

**Objective** To assess the sexual health-seeking behaviour and identify the associated factors in men with diabetes mellitus attending in the northwest Amhara region hospitals, Ethiopia.

**Design** Hospital-based cross-sectional study.

**Setting** The study was conducted in the northwest Amhara region hospitals between 20 February and 30 April 2020.

**Participants** A total of 389 men with diabetes were approached using a systematic random sampling technique. A face-to-face interviewer-administered questionnaire was used. The binary logistic regression was employed to identify factors contributing to sexual health-seeking behaviour. Odds Ratio with its corresponding 95% CI was used to measure the association. Factors with a p value  $\leq 0.05$  in multivariable logistic regression were deemed as significant factors.

**Outcome measures** Participants were interviewed to respond whether they had sought sexual health service since they were notified to have diabetes mellitus.

**Results** A quarter of men with diabetes (25%; 23.4%–27.6%) has sought sexual health service since they were diagnosed with diabetes mellitus. The odds of seeking sexual health service was reduced by 67% in participants who were not able to read and write (adjusted odds ratio (AOR)=0.33; 0.1–0.87) and 71% in participants who have attended primary/secondary education (AOR=0.29; 0.1–0.67) than those who have a diploma and above. Experiencing sexual dysfunction was also significantly associated with an increased odds of seeking sexual health service (AOR=7.1; 2.1–23).

**Conclusions** The study remarks that just one-fourth of men with diabetes had sought sexual health services. Participants with lower educational status are less likely to seek sexual health services. Patients who have experienced sexual dysfunction sought the service well compared with their counterparts. Therefore, special emphasis should be given to men with lower educational status. Similarly, counselling patients to seek sexual health service before experiencing sexual dysfunction would help to improve sexual health-seeking behaviour.

## Strengths and limitations of this study

- The study highlighted the sexual health-seeking behaviour of men with diabetes, who are the most under-recognised and susceptible population for different sexual and reproductive health problems.
- The study might introduce social desirability bias associated with the nature of the data collection technique (face-to-face interview) and the sensitivity of some variables like sexual history.
- It would have been better to explore the participant's knowledge and perceptions towards sexual health qualitatively.

## INTRODUCTION

Diabetes mellitus (DM), a growing public health concern globally, is jeopardising the lives of several individuals. The number of people with diabetes is expected to be increased to 642 million by the year 2040, according to the International Diabetic Association's estimate.<sup>1</sup> The WHO report indicated that more than 2.5 million individuals had diabetes in the year 2015 alone in Ethiopia.<sup>1</sup> Besides the growing burden of DM, patients, particularly men, are at higher risk of developing different sexual problems like sexual dysfunction (SD) associated with psychogenic, haemodynamic, neurogenic, and hormonal complications.<sup>2–4</sup> Likewise, patients with diabetes are also more liable to sexually transmitted infections (STIs) related to immunosuppression and high blood glucose level.<sup>5,6</sup> SD is a growing problem among patients with diabetes; where the risk is threefold higher among people with DM than healthy individuals and occur at an earlier age with its severest form.<sup>4,7</sup> The prevalence of SD among this group population ranges from 53% to 69.5% in Ethiopia.<sup>8,9</sup>

Although more than half of all sexually active male patients with diabetes had experienced at least one sexual problem, less than a fifth of them had an attempt to seek sexual and reproductive health (SRH) care.<sup>10</sup> The SRH services are inaccessible or of poor quality and underused in many countries among men with chronic disease as the issue is culturally sensitive to disclose and underway discussions.<sup>11 12</sup>

SRH problems account for 18% of the total global burden of disease.<sup>11-13</sup> The goal of SRH service was intended to deliver care for both women and men; nevertheless, it remains low and fails to meet the SRH service demand of men.<sup>12 13</sup> The poor service utilisation is even more worse in patients with chronic diseases.<sup>2</sup> The progress towards scaling up the SRH care has been compromised by the increasing influence of conservative political, religious, and cultural forces worldwide.<sup>11</sup> In particular, in countries like Ethiopia, the service demand is highly threatened by the strong cultural, social, and religious bond.<sup>14</sup>

Help-seeking behaviour would provide a means to improve access to treatment and reduce human suffering. However, low levels of health-seeking and lack of professional consensus regarding the standard sexual healthcare are barriers for men with diabetes receiving adequate SRH service.<sup>10 13</sup> Healthcare providers are not clear with messages about the types of services that men need to receive, how often they should get, and which group of individuals need particular emphasis.<sup>13</sup> Indeed, <10% of chronic patients had been interviewed about their sexual health in their routine follow-up visits.<sup>10</sup>

Although positive progress is observed in the universal health coverage, the unmet need for SRH service among men with diabetes is substantial that requires urgent attention and innovative solutions. In general, regardless of their health status, men are a segment of the population with less access to SRH care. Specifically, men with DM are most vulnerable to different SRH challenges associated with their illness. Evidence exhibiting the burden and related factors are imperative to strengthen and facilitate the intended care delivered to this group of the population. However, there is a small body of evidence regarding their health-seeking behaviour and contributing factors. Therefore, this study was designed to determine the sexual health-seeking behaviour and contributing factors among men with diabetes. In doing so, decision-makers working on SRH services will uptake the evidence to improve service utilisation. It will also help to realise the universal health coverage in the country.

## METHODS AND MATERIALS

### Patient and public involvement

Men with DM were included in this study by providing their valuable information. However, they have never been participated in conducting the study, designing the protocol and data collection tools, reporting the results, and disseminating the study's findings.

### Study design, period, and setting

A hospital-based cross-sectional study was conducted between the 20 February and 30 April 2020 among men with DM attending in the northwest Amhara region hospitals, Ethiopia. Participants were accessed and recruited while visiting the chronic out-patient departments (OPD) of the Felege Hiwote Comprehensive and Specialized Hospital (FHCSH), Debre Markos Referral Hospital, and Debre Tabor Referral Hospital. The chronic OPD is one of the other structured departments in each health institution, where patients with diabetes account for the most significant proportion (40%) of all chronic out-patient visitors. The study was prepared and reported using the Strengthening the Reporting of Observational Studies in Epidemiology.<sup>15</sup>

### Sample size estimation, sampling procedures, and sampling techniques

The sample size was estimated using Epi info V.7 software considering various statistical assumptions. A pilot study was conducted at the University of Gondar Comprehensive Specialized Referral Hospital by recruiting 50 patients with diabetes to estimate the prevalence of sexual health-seeking behaviour. The level of health-seeking was found to be 18%, and thus, 'P' was 0.18. Other additional assumptions like: (1) margin of error (d): 4%; (2) a standard Z-score of 1.96 corresponding to 95% CI; and (3) 10% none response were considered. Thus, the final sample size was 389 men with diabetes.

A stratified sampling followed by a systematic sampling technique was employed. First, the estimated sample size was proportionally allocated to the three hospitals, considering their monthly patient flow. Then, participants were selected using a systematic random sampling technique using the kth interval calculated as  $k = \frac{N}{n}$  (where 'N' was the total number of men with diabetes visiting per month in each hospital). About 401, 305 and 340 patients have visited the FHCSH, Debre Markos Referral Hospital and Debre Tabor General Hospital, respectively; accordingly, 149, 114 and 126 participants were drawn from FHCSH, Debre Markos Referral Hospital and Debre Tabor Referral Hospital, respectively. The estimated interval (k) was approximately three in each hospital; therefore, participants were approached in every three individuals.

### Study population

Men patients diagnosed with diabetes and who were visiting the chronic OPDs for monthly follow-up during the data collection period in the included hospitals were invited and enrolled. Before the enrolment, the patient's general insight and sexual activity were checked; patients who were disoriented and unable to communicate were excluded.

### Variables of the study

#### Outcome variable

*Good sexual health-seeking behaviour:* if a respondent has ever sought SRH services after being diagnosed with DM.

### Independent variables

**SD:** the 14-items scale of the Change in the Sexual Functioning (CSFQ) was used, where each item was scored between 0 and 5 scale.<sup>16</sup> The total score of this instrument varies from 0 to 70. Accordingly, participants who scored below 47 were categorised as having SD

**Couples satisfaction in their relationship:** a score of above 20 from the relationship assessment scale was considered satisfied.<sup>17</sup>

**Comorbid illness:** participants who have one or more additional confirmed chronic diseases (hypertension, cardiac disease, dyslipidaemia, psychosis, renal disease, HIV, cancer, asthma and multiple sclerosis) were deemed to have comorbid illnesses.

**Diabetic complication:** the existence of one or more diabetic-related complications, such as retinopathy, neuropathy, nephropathy and diabetic foot ulcer, was considered as having DM complications.

**Poor glycaemic control:** fasting blood glucose level of greater than 130mg/dL, or most recent HgA1c of >9.0%.<sup>18</sup>

**Alcoholic:** the daily alcohol consumption of respondents was calculated by taking the average alcohol percentage (%/mL) of each drink multiplied by the volume (mL) of the drink and volumetric mass density (which is 0.8g/mL). Participants were categorised as 'alcoholic', provided they consumed more than 12g ethanol daily for the past 6 months.<sup>19</sup>

**Smoker:** a respondent who smokes  $\geq 12$  cigarettes per day for the last 6 months.<sup>20</sup>

### Data collection tool, procedure, and quality control

A face-to-face interviewer-administered and pretested questionnaire was used. The tool was prepared in English, translated to the Amharic (the local language) and translated back into English to ensure consistency. The questionnaire comprised five sections: sociodemographic characteristics; medical and behavioural-related factors; psychosocial factors; CSFQ; and sexual health-seeking behaviour. Two data collectors (nurses) and one supervisor (public health) were recruited and assigned to each hospital.

The quality of data was assured through a careful design of the questionnaire. Data collectors and supervisors were also trained for 2 days on the purpose of the study, the detailed content of the questionnaire, the data collection procedure, participant selection, and the rights of study participants within the umbrella of research ethics. Supervisors checked the collected data for completeness and consistency throughout the data collection period.

### Data processing and analysis

The data were entered into Epi Data V.3.1 and then exported to SPSS V.21.0 for analysis after checking any inconsistency, coding errors, missing value, and incompleteness.

The wealth status of the participants was analysed through the principal component analysis. All

categorical and continuous variables were categorised to be between '0' and '1' for the factor analysis. Statistical assumptions of factor analysis were checked. Then, all eligible factor scores were computed using the regression-based method to generate one variable, wealth status. Following this, the final scores were ranked to five quantiles as first, second, third, fourth, and fifth. Finally, ranks were coded as richest, rich, middle, poorer, and poorest.

The outcome variable of interest was the sexual health-seeking behaviour of men with diabetes. The behaviour was measured as a dichotomous response ('1' if a study participant has sought SRH service since he was diagnosed with DM and '0' if the answer was 'I have never sought SRH service'). Before deciding on the appropriate measures of central tendency for variables like age and number of years that patient had lived with DM, the distributional assumption of normality was evaluated using the Shapiro-Wilk statistic and Kolmogorov-Smirnov. Frequency, percentage, mean, and SD were used to descriptively summarise study participants' background characteristics. The summary measures were reported in tables and texts.

The binary logistic regression was applied to model the outcome variable and to investigate factors associated with the odds of seeking SRH services. Adjusted OR with the corresponding 95% CI was used to measure the strength and direction of the association. Variables with a p value of <0.2 in the bivariable analysis were included in the multivariable logistic regression model, and a p value of  $\leq 0.05$  was used as an indicator of statistical significance. The overall fitness of the final model was assessed using Hosmer and Lemeshow test. The variance inflation factor and rank correlation were used to diagnose the problem of multicollinearity.

## RESULTS

### Sociodemographic characteristics of participants

A total of 389 participants were enrolled in the study, making a response of 96.7%. Participant's mean ( $\pm$ SD) age was 47.93 ( $\pm 15.01$ ) years. The majority (88.9%) of participants were orthodox Christian followers. Close to two-thirds (63.3%) of respondents lived in urban areas. Moreover, slightly more than a quarter (25.8%) and a third (36.7%) of participants have attended secondary education and had private work, respectively (table 1).

### Health and psychosocial factors

The median duration of the participants who lived with diabetes was 8.22 years, ranging from 1 to 30 years. The proportion of patients with type I diabetes was 50%. Neuropathy was the most frequently observed diabetic complication at 16.5%. Further, hyperlipidaemia (16%) was the highest comorbid illness behind hypertension (37.2%) (table 2).

**Table 1** Sociodemographic characteristics of men with diabetes mellitus attending the northwest Amhara region hospitals, 2020 (n=376)

Characteristics	Number	Percentage
<b>Age in years</b>		
<40	127	33.8
40–50	77	20.5
>50	172	45.7
<b>Religion</b>		
Orthodox	334	88.9
Muslim	36	9.7
Protestant	6	1.4
<b>Current marital status</b>		
Single	35	9.3
Married	323	85.9
Divorced	8	2.1
Widowed	10	2.7
<b>Educational status</b>		
Cannot read and write	78	20.7
Grade 1–8	88	23.4
Grade 8–12	97	25.8
Diploma	20	5.4
Degree and above	93	24.7
<b>Occupation</b>		
Government employee	80	21.3
Private work	138	36.7
Farmer	102	27.1
Student	14	3.7
Job seeker	7	1.9
Retired	35	9.3
<b>Wealth quantile</b>		
Poorest	79	21
Poor	102	27
Middle	97	26
Rich	61	16.2
Richest	37	9.8

### Perceived reasons for not seeking sexual health

Relationship instability, divorce and fertility problems were the major problems that the participant encountered. Of all participants seeking professional help, just over one-third (34.04%) reported having a relationship problem/instability associated with sexual difficulty. Even though most of the participants witnessed, different social and health problems like divorce and infertility linked with the disruption of sexual health, about half (50.4%) of them failed to seek professional help.

Sixty percent of respondents had never sought sexual health service as they assume SRH service is tailored only for individuals who exhibited sexual problem(s). Feeling

**Table 2** Health and psychosocial factors of men with diabetes recruited from the northwest Amhara regional hospitals, Ethiopia 2020 (n=376)

Characteristics	Frequency (n)	Percentage (%)
<b>Duration of diagnosis in years</b>		
Short (<5)	147	39.1
Long (≥5)	229	60.9
<b>Metabolic control</b>		
Controlled	84	22.3
Uncontrolled	292	77.7
<b>Having comorbid illnesses</b>		
Yes	191	50.8
No	185	49.2
<b>Diabetic complications</b>		
Yes	123	32.7
No	253	67.3
<b>Physical activity</b>		
Yes	282	75
No	94	25
<b>Alcohol</b>		
Yes	220	58.5
No	156	41.5
<b>Couples satisfaction</b>		
Satisfied	345	91.8
Un-satisfied	31	8.2

ashamed and believing sexual problems have no solution/remedy were the two principal perceived reasons that stopped participants from seeking sexual health.

### Sexual health-seeking behaviour

A quarter (25%, 95 CI (23.4% to 27.6%)) of men with DM had ever sought sexual health service, of whom the vast majority (97.9%) have claimed to have SD

### Factors associated with sexual health-seeking behaviour

The summary result that describes the association of seeking sexual health service and predefined background characteristics of men having diabetes are summarised in [table 3](#). After adjusting for the potential confounding variables, the likelihood of seeking sexual health service among men with diabetes was 67% lower in participants who cannot read and write (adjusted odds ratio (AOR)=0.33; 95% CI: 0.1 to 0.87) than those whose educational status was at least diploma level. Similarly, the odds of seeking sexual health service in participants who have attended either primary or secondary education was reduced by 71% (AOR=0.29; 95% CI: 0.1 to 0.67) compared with those whose educational status was at least diploma level. The likelihood of sexual health-seeking behaviour was 7.1 times higher among participants who have exhibited SD disorder compared with those who do not (AOR=7.1; 95% CI: 2.1 to 23).

**Table 3** Factors associated with sexual help-seeking behaviour among men with DM attending in the northwest Amhara regional hospitals, 2020 (n=376)

Characteristics	Ever sought sexual healthcare		Odds ratio (95% CI)	
	Yes	No	COR	AOR
Age in year	N/A	N/A	–	1 (0.98–1.03)
Resident				
Rural	43	95	1	1
Urban	143	91	3.75 (2.1 to 6.32)	2.07 (0.7–6.1)
Education				
Cannot read and write	24	54	0.22 (0.11 to 0.83)	0.33 (0.1–0.87)
Primary and secondary	88	97	0.2 (0.17 to 0.76)	0.29 (0.1–0.67)
Diploma and above	93	20	1	1
Comorbid illnesses				
No	20	172	0.16 (0.09 to 0.28)	0.53 (0.25–1.11)
Yes	75	109	1	1
Duration of diagnosis	N/A	N/A	–	1.01 (0.95–1.06)
Metabolic control				
<130mg/dL	10	79	0.28 (0.07 to 0.42)	0.54 (0.22–1.31)
≥130mg/dL	88	199	1	1
SD				
No	5	110	1	1
Yes	92	169	12.1 (6.68 to 34.78)	7.1 (2.1–23.0)
Existence of complications				
No	45	213	1	1
Yes	51	67	3.45 (2.13 to 5.56)	1.45 (0.28–2.19)

Hosmer and Lemshow goodness of fit (p value=0.49). '1'=reference category. AOR, adjusted odds ratio; COR, crude odds ratio; N/A, not applicable.

## DISCUSSION

SRH service is the crucial element of healthcare in which its wide range of access is an individual's human right.<sup>11</sup> Sexual problems are often associated with different chronic diseases; patients with diabetes, in particular, have several SRH challenges like STIs and SD (sexual arousal, satisfaction, desire, etc). Conducting studies to show the magnitude of poor sexual health-seeking behaviour for the most responsible bodies will help in designing interventions to improve this behaviour before the problem damage the mental and psychological health of vulnerable individuals.<sup>21</sup> Regardless of having sexual problems, men with DM deserves sexual health counselling, health education and partner communication to develop safe and pleasurable sexual life.<sup>22</sup> This study was, therefore, aimed to look at the health-seeking behaviour and contributing factors among men with DM.

The study indicates that a quarter (25%) of men with diabetes have sought sexual health service, depicting a significant number of men with DM are not seeking sexual health service despite the high vulnerability.

The health-seeking behaviour of men is higher among urban residents than rural participants. The better and easy access to existing healthcare services in urban areas

than rural areas might be the reason for the observed heterogeneity.<sup>23</sup> Ethiopia is a country where the rural population makes up about 78.8% of the total population; thus, the current evidence helps to emphasise this segment of population in the healthcare system. The low level of health-seeking in the rural population would significantly contribute to the poor SRH service utilisation of the people in the country at large.<sup>24</sup> In general, the finding implies the need to expand a wide range of health service accessibility and improve awareness creation strategies with a special focus in rural areas to improve the health-seeking behaviour of men with diabetes.

Participants with lower educational status (secondary and lower) were less likely to seek sexual health services than those who attained a diploma and above. The finding is supported by another study that shows being uneducated and having poor knowledge about SRH services are the most common barriers of utilising SRH services.<sup>23</sup> It is utterly understood that education is crucial to boost knowledge and analyse the risks of not utilising healthcare that ultimately enhances the individual's decision-making power.<sup>25</sup> Similarly, previous studies revealed that the person's sexual health knowledge and awareness increases with educational level, and poor



utilisation of different health services are associated with low health literacy.<sup>23 26</sup> Moreover, educated individuals are also less likely to be influenced by harmful cultural and social misbeliefs that are the most significant bottlenecks of SRH service utilisation in developing countries like Ethiopia, where the vast majority of things are tied with cultural beliefs.<sup>27</sup> The study implies that with the low educational coverage in Ethiopia, a high number of men with diabetes could be affected by the adverse consequences of low sexual health-seeking behaviour, including infertility, relationship instability, and psychological health problems.<sup>28</sup> In light of this, providing comprehensive health education to improve patient's health literacy is recommended to enhance their sexual health-seeking behaviour. Therefore, the associated adverse health impacts of sexual problems could be tackled.

Consistent with the previous evidence, participants with SD were more likely to seek sexual health services.<sup>22 29</sup> Several individuals have a miss perception about sexual health services and when to seek help. Seeking professional help for screening and counselling services before experiencing a problem is unusual, particularly in developing countries like Ethiopia, due to high cultural taboos, fear of judgments, and low awareness.<sup>30</sup> In the current study, respondents with SD have different social (marital instability and divorce) and health (infertility) problems that might increase their drive to seek sexual health services. Although seeking help once experiencing a problem is still appreciated, the better would be improving the sexual health-seeking behaviour of vulnerable individuals like men with diabetes to prevent reproductive and associated health sequelae. Therefore, a well-designed SRH education is again recommended.

The study is not believed to be free from some limitations. Due to the nature of the data collection technique and the sensitivity of some variables (eg, SD), the study might have introduced a bias; notably, social desirability bias though some measures such as interviewing participants privately have been used to minimise it. In addition, the perceived risk and susceptibility of the participants about the sexual problems were the areas that need to be explored qualitatively to understand the participant's view, which is not considered in this study.

## CONCLUSIONS

The study demonstrated that just one-fourth of men with diabetes had sought sexual health services. Participants with lower educational status have failed to seek sexual health services. On the flip side, men with diabetes who have experienced SD sought the service better than their counterparts. Providing special emphasis for men with low educational level would improve sexual health-seeking behaviour. Patients should be advised to seek sexual health services though they did not experience SD, explaining their susceptibility. Future researchers are recommended to explore the individual's perception through a qualitative research approach to understand

the contributing factors that affect sexual health-seeking behaviour.

**Acknowledgements** We are grateful to the data collectors and study participants who have contributed to this work. We are also delighted to extend our gratitude to the international institute of primary healthcare Ethiopia (IIPHC-E) for launching a scientific manuscript writing workshop and helping us through preparing this manuscript.

**Contributors** EGM and WWT were responsible for study conceptualisation. Formal analysis was performed by WWT, EGM and ATG. Investigation was done by ATG, EGM and WWT. WWT, EGM and ATG were responsible for study methodology. Project administration was done by ATG, EGM and WWT. Validation was performed by WWT, EGM and ATG. EGM and WWT wrote the original draft. Writing review and editing were done by ATG, EGM and WWT. EGM is responsible for the overall content as the guarantor.

**Funding** This work received funds from the University of Gondar. However, the University has no role in data collection, analyses and other study work.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** This study involves human participants and was approved by the ethical review board of the University of Gondar, College of Medicine and Health Sciences approved the study (ref V/P/RCS/04/620/2020). Each respective hospital was approached with a support letter written by the University, and a permission letter was obtained from them. Oral informed consent was taken from each study participant, as the study did not apply any invasive procedures like body fluid samples. All study participants were informed that participation was on a voluntary basis and oriented about their full right to withdraw at any time of need during the interview process. Moreover, they were informed that all information taken from them will be kept confidential, and the entire data collected will only be used for the current study. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request. All data relevant to the study are included in the article or uploaded as supplementary information. All data relevant to the study are included in the article or uploaded as supplementary information and the data are available upon reasonable request.

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## REFERENCES

- 1 WHOAf. Global report on diabetes [Internet], 2016. Available: [https://apps.who.int/iris/bitstream/handle/10665/204874/WHO\\_NMH\\_NVI\\_16.3\\_eng.pdf?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/204874/WHO_NMH_NVI_16.3_eng.pdf?sequence=1)
- 2 Colson M-H. Sexual dysfunction and chronic illness. Part 1. epidemiology, impact and significance. *Sexologies* 2016;25:e5-11.
- 3 Jackson G. Sexual dysfunction and diabetes. *Int J Clin Pract* 2004;58:358-62.
- 4 Kolodny RC, Kahn CB, Goldstein HH, et al. Sexual dysfunction in diabetic men 2000;23:306-9.
- 5 Nyirjesy P, Sobel JD. Genital mycotic infections in patients with diabetes. *Postgrad Med* 2013;125:33-46.
- 6 Hirji I, Andersson SW, Guo Z, et al. Incidence of genital infection among patients with type 2 diabetes in the UK general practice research database. *J Diabetes Complications* 2012;26:501-5.
- 7 Burke JP, Jacobson DJ, McGree ME, et al. Diabetes and sexual dysfunction: results from the Olmsted County study of urinary symptoms and health status among men. *J Urol* 2007;177:1438-42.

- 8 Asefa A, Nigussie T, Henok A, *et al.* Prevalence of sexual dysfunction and related factors among diabetes mellitus patients in Southwest Ethiopia. *BMC Endocr Disord* 2019;19:141.
- 9 Getie Mekonnen E, Yeshita HY, Bishaw Geremew A. Sexual dysfunction among men with diabetes mellitus attending chronic out-patient department at the three hospitals of northwest Amhara region, Ethiopia: prevalence and associated factors. *PLoS One* 2021;16:e0256015.
- 10 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;59:6–16.
- 11 Glasier A, Gülmezoglu AM, Schmid GP, *et al.* Sexual and reproductive health: a matter of life and death. *Lancet* 2006;368:1595–607.
- 12 Singh S, Darroch JE, Vlassof M. *Adding it up: the benefits of investing in sexual and reproductive health care.* New York, 2003.
- 13 Kalmuss D, Tatum C. Patterns of men's use of sexual and reproductive health services. *Perspect Sex Reprod Health* 2007;39:74–81.
- 14 Gebreyesus H, Teweldemedhin M, Mamo A. Determinants of reproductive health services utilization among rural female adolescents in Asgede-Tsimbla district Northern Ethiopia: a community based cross-sectional study. *Reprod Health* 2019;16:4.
- 15 Knottnerus A, Tugwell P. STROBE-a checklist to Strengthen the Reporting of Observational Studies in Epidemiology. *J Clin Epidemiol* 2008;61:323.
- 16 AH C. Reliability and construct validity of the changes in sexual functioning questionnaire short-form (CSFQ-14). *Sex Marital Therapy* 2006;32:43–52.
- 17 Funk JL, Rogge RD. Testing the ruler with item response theory: increasing precision of measurement for relationship satisfaction with the couples satisfaction index. *J Fam Psychol* 2007;21:572–83.
- 18 ROMEO JH, SEFTEL &NA; AD, MADHUN ZT, *et al.* Sexual function in men with diabetes type 2. *J Urol* 2000;75:788–91.
- 19 Muturi N. Alcohol consumption and reproductive health risks in rural central Kenya. *Sex Reprod Healthc* 2014;5:41–6.
- 20 McCabe MP, Sharlip ID, Lewis R, *et al.* Risk factors for sexual dysfunction among women and men: a consensus statement from the fourth International consultation on sexual medicine 2015. *J Sex Med* 2016;13:153–67.
- 21 Verschuren JEA, Enzlin P, Dijkstra PU, *et al.* Chronic disease and sexuality: a generic conceptual framework. *J Sex Res* 2010;47:153–70.
- 22 Kedde H, van de Wiel H, Schultz WW, *et al.* Sexual health problems and associated help-seeking behavior of people with physical disabilities and chronic diseases. *J Sex Marital Ther* 2012;38:63–78.
- 23 Tirado V, Chu J, Hanson C, *et al.* Barriers and facilitators for the sexual and reproductive health and rights of young people in refugee contexts globally: a scoping review. *PLoS One* 2020;15:e0236316.
- 24 Dorosh P, Schmidt E. *The rural-urban transformation in Ethiopia.* Citeseer, 2010.
- 25 Smith SK, Dixon A, Trevena L, *et al.* Exploring patient involvement in healthcare decision making across different education and functional health literacy groups. *Soc Sci Med* 2009;69:1805–12.
- 26 Cho YI, Lee S-YD, Arozullah AM, *et al.* Effects of health literacy on health status and health service utilization amongst the elderly. *Soc Sci Med* 2008;66:1809–16.
- 27 Rawson H, Liamputtong P. Influence of traditional Vietnamese culture on the utilisation of mainstream health services for sexual health issues by second-generation Vietnamese Australian young women. *Sex Health* 2009;6:75–81.
- 28 Ethiopia - Literacy rate, adult total (% of people ages 15 and above) 2019 <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?locations=ET>
- 29 Catania JA, Pollack L, McDermott LJ, *et al.* Help-seeking behaviors of people with sexual problems. *Arch Sex Behav* 1990;19:235–50.
- 30 Schaller S, Traeen B, Lundin Kvaalem I. Barriers and facilitating factors in help-seeking: a qualitative study on how older adults experience talking about sexual issues with healthcare personnel. *Int J Sex Health* 2020;32:65–80.