RESEARCH

Open Access



Physicians' knowledge, attitudes, and beliefs regarding practices of male and female surgical sterilization procedures in Lebanon

Jad Najdi¹[®], Alexandre Armache¹[®], Elia Abou Chawareb¹[®], Nassib Abou Heidar²[®], Marwan Zein¹[®], Anthony Fadel³[®], Jimmy Nehme⁴ and Bassel Bachir^{1*}[®]

Abstract

Objective Surgical sterilization, including vasectomy in males and tubal ligation in females, is a highly effective but underutilized contraception method. Adoption rates vary globally mostly due to misconceptions by both the general public and practicing physicians. Our survey aims to explore physicians' knowledge, attitudes and beliefs about surgical sterilization techniques in Lebanon.

Study design A web-based survey was sent to residents and attending physicians of different specialties in Lebanon between April 2022 and April 2023. The survey included 21 multiple-choice questions divided in four parts (demographics, knowledge, attitudes and beliefs) and required around 8 min to complete. Data was analyzed using IBM SPSS Statistics. A descriptive analysis was performed using the chi-square test for categorical variables and ANOVA for continuous variables.

Results One hundred eighty-three physicians specialized in Urology, OB/GYN, Family medicine and Internal medicine filled the survey. The majority were resident physicians (79%), male (57%), single (72%) and did not receive training in family planning (73%). Knowledge assessment showed an average score of 5/7. After setting this as a passing score, 60.7% of participants passed the assessment with higher likelihood of passing among attending physicians (84.6%), OB/GYN physicians (94.4%), married participants (80.8%), and physicians who received training in family planning (91.8%). Lower likelihood of passing was among Family Medicine (60%), and Internal Medicine (72.5%) physicians. Recommendations varied among specialties. Most physicians perceived the general public preferring tubal ligation as a sterilization method (98%).

Conclusion Lebanese primary care physicians have a lower level of knowledge of surgical sterilization procedures compared to specialists. This, coupled with low levels of family planning training and negative perception of patient beliefs may impact attitudes and recommendations. Ongoing education and family planning training is needed to increase awareness among physicians, especially primary care physicians, to allow them to provide more adequate counseling to patients.

Keywords Surgical sterilization, Family planning, Vasectomy, Tubal ligation, Contraception

*Correspondence: Bassel Bachir bb12@aub.edu.lb Full list of author information is available at the end of the article



© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

Introduction

Surgical sterilization, which involves the surgical procedure of blocking or removing reproductive organs, is one of the most effective methods of contraception worldwide [1]. Techniques utilized for surgical sterilization mainly include tubal ligation or risk reducing salpingectomy in females and vasectomy in males. Tubal ligation involves blocking or cutting the fallopian tubes, which prevents the eggs from reaching the uterus for fertilization [2], while risk-reducing salpingectomy involves complete surgical removal of the fallopian tubes with the benefit of reducing the risk for ovarian cancer development [3]. Vasectomy, a simple same-day office procedure, involves cutting or blocking the vas deferens, which prevents sperm from entering the semen that is ejaculated during sexual intercourse [1]. This study specifically focused on tubal ligation and vasectomy as surgical sterilization procedures.

Sterilization is a popular choice of contraception for many couples due to its high effectiveness, long-term benefits, and low maintenance. However, the utilization of sterilization techniques varies depending on factors such as age, race/ethnicity, income, and knowledge/ level of education [4]. In high income countries, extensive data in the literature exists comparing different forms of female surgical sterilization techniques [5]. In the United states alone, tubal ligation is performed more frequently than vasectomy, with approximately 600,000 tubal ligations and 200,000 vasectomies performed each year with a ratio of 3:1 (3 tubal ligations performed for every vasectomy) [5, 6]. When considering the rates of these procedures in low-middle income countries, we find very low utilization of vasectomy with a ratio of 22:1 (22 tubal ligations performed for every vasectomy) [6], attributable mainly to lack of resources, and poor health-seeking behavior among men [7].

In some countries, including Turkey, vasectomy is frowned upon by the general population due to misinformation and misconceptions surrounding the procedure [8, 9]. These misconceptions include beliefs that vasectomy is a sin, that it has a negative impact on men's health and strength, and that it affects sexual functioning. Additionally, cultural factors, such as the perception that contraception is a woman's responsibility, may also contribute to the underutilization of vasectomy as a method of contraception [8, 9].

Interestingly, misconceptions about sterilization techniques are not limited to the general population. Some physicians, including gynecologists, urologists, and primary care physicians, also share and disseminate misconceptions about sterilization techniques. For example, a survey of Nigerian gynecology residents showed that more than three-fifths of the residents believed that bilateral tubal ligation was the more appropriate sterilization procedure for couples seeking contraception [10]. Similarly, a survey of family planning fellowship providers in the US found that only 57% recommended vasectomy over female sterilization [11].

Notably, family planning training in medical school and residency training curricula is often scarce. While didactic and clinical training in most contraception methods is common, there are still significant gaps, particularly when it comes to tubal ligation and vasectomy [12].

Given the effectiveness of sterilization as a method of contraception and the misconceptions surrounding these procedures, leading to highly divergent adoption in different cultures and societies, it is important to understand physicians' knowledge and beliefs about sterilization techniques. Not much is understood about physicians' knowledge and attitudes towards surgical sterilization techniques in Low- and middle-income countries such as Lebanon. Stemming from this gap in the literature, our survey aimed to explore the physicians' understanding and counseling practices regarding male and female sterilization procedures in Lebanon, with the ultimate goal of improving medical education programs and promoting family planning practices.

Materials and methods

Participants

This survey was conducted between April 2022 and April 2023. An e-mail containing a link to access the survey anonymously was sent to residents and attending physicians specialized in Urology, Obstetrics & Gynecology, Family Medicine and other specialties who practice in Lebanon. E-mails reminding the target audience to fill the survey were sent every 3 months for 3 times over the duration of 1 year. A total of 950 practicing physicians received the e-mail. Responses that were excluded from analysis included incomplete surveys, surveys that were filled too rapidly or too slowly (required < 1 min or > 30 min to be filled), and surveys with illogical or incomprehensive answers.

Sample size calculation

Since no pilot study was conducted, we assumed maximum variability (p=0.5). Hence, for a 95% Confidence level and a low margin of error of 5%, the calculated sample size using the formula $n=(Z^2.p.(1-p)/(MOE^2)=384$. To adjust for finite population of 950, the following formula was used with N being the finite population size: n(adjusted)=(n)/(1+[n-1]/N)=274. To note, this sample size is an inflated value since p=0.5 and MOE=5% were used.

Questionnaire

A self-administered, electronic, web-based anonymous questionnaire was developed on Limesurvey and hosted on the American University of Beirut (AUB) servers. The questionnaire consisted of four parts. The first part (Background & Demographics) included questions on demographics, level of training, specialty and marital status. The second part (Knowledge) was a 7-item knowl-edge assessment. The third part (Attitudes) consisted of multiple scenarios where the physician provides a recommendation on the method of surgical sterilization. Finally, the fourth part (Beliefs) investigated the physicians' perception of barriers to surgical sterilization procedures as perceived by the general public (Fig. 1). The questionnaire required an approximate time of 5–10 min to complete.

The questions of the preliminary survey parts 1,3 and 4 were adapted from a similar study from Brazil [13]. Similar questions were also noted in studies investigating the same topic from Nigeria and Malaysia and were included in the survey [10, 14]. The knowledge assessment was adapted from a Lebanese study investigating the same topic among the Lebanese population [15]. Then, a pilot cohort of 10 physicians from different specialties (Urology, Obstetrics and Gynecology, Family medicine) was enrolled to perform a qualitative interview. Using the results of these interviews, the finalized questionnaire was derived (Fig. 1).

Ethical approval

The study was approved on 12 March 2021 by the American University of Beirut Medical Center Institutional Review Board (IRD ID: SBS-2020-0512). All participants were required to consent to participate prior to filling the web-based questionnaire. All participants who do not confirm reading the consent form and signing it could not proceed to the next pages of the web-based questionnaire.

Data management and analysis

Collected data was stored on AUB servers and after data collection was completed, the entire dataset was imported from LimeSurvey into IBM SPSS Statistics, v.28 (IBM Corp., Armonk, N.Y., USA). Statistical significance was set at the alpha level of 0.05. A descriptive analysis was performed on all items of the questionnaire. To test for normality of continuous variables, Q-Q plots and histograms were constructed. After confirming approximate normality of the data, continuous variables were analyzed using the ANOVA (analysis of variance). Categorical variables were analyzed using the Chi-square test. The second part (Knowledge) was incorporated into the questionnaire to assess participants' understanding of surgical sterilization. We categorized the total scores, ranging from 0 to 7, based on the mean into two groups (<5 or \geq 5) to examine variations based on participant's demographics, education level, medical specialty, and whether the participant had received formal family planning training. Any participant receiving a score \geq 5 was considered to have a passing grade.

Benefits & risks

After successful completion of the questionnaire, each participant received a pop-up electronic brochure (Fig. 2) [16, 17] containing educational material on the topic and answering all the questions regarding knowledge of the two surgical sterilization procedures. The potential participation risk is minimal, and confidentiality measures were taken to protect any information obtained from the surveys. Physician identifiers were limited to minor essential identifiers that can in no way be used to trace back participants. There were no mandatory questions in the survey.

Results

Nine hundred and fifty physicians were e-mailed the questionnaire, 205 filled the survey, and a total of 183 complete responses were obtained and used for analysis with a response rate of 21.6%. Around 79% were resident physicians and 21% were attending physicians. There was an equal number of responses from the four targeted specialties (around 20% each), and around 16% were from other specialties. 57% of respondents identified as male physicians while 43% identified as females (male to female ratio 1:0.75), and only around 28% were married at the time they filled the survey. The majority of respondents (73%) did not receive any training in family planning during their medical school or residency training (Table 1).

The average score to the knowledge assessment (Part 2) among all participating physicians was 5/7 (71.4%). 74% correctly chose tubal ligation as the more invasive procedure, 80% correctly answered that tubal ligation is more complex to carry out and 64% correctly chose tubal ligation as the procedure requiring general anesthesia. 57% and 65% correctly identified that neither procedure affects hormonal secretion or affect sexual desire or potency, respectively. Almost two-thirds of respondents (65%) correctly identified that tubal ligation requires hospital admission, and 87% correctly chose that tubal ligation costs more (Table 2). After setting a passing score of 5/7, we found that 111 of the 183 participants passed. The total test score was significantly different among different levels of training, specialties, marital status, and status of receiving a formal training in family planning (p < 0.001).

Surgical sterilization procedures

Part 1: Background and demographics

1.Age	4.Sex
2.Level of training	oMale
oJunior resident (PGY1-PGY2)	oFemale
oSenior resident (>PGY3)	5.Marital status
oAttending physician	oMarried
3.Specialty	oSingle
oInternal Medicine	oDivorced/Widowed
oFamily Medicine	6. Have you received formal training in family
oOB/GYN	planning?
oUrology	oYes
	oNo

Part 2: Knowledge

Select the correct answer choice

	Vasectomy	Tubal Ligation	Both	Neither
More invasive				
More complex to carry out				
Requires General anesthesia				
Affects hormonal secretion				
Affects sexual potency				
Requires hospitalization				
Costs More				

Part 3: Attitudes

Consider the following scenarios and tick the box corresponding to the sterilization procedure you would choose

	Vasectomy	Tubal ligation	Both	Neither
Healthy couple				
Educated couple				
Lack of financial resources				
Female has medical comorbidities				
(CV, renal, pulmo)				
Male has medical comorbidities				
(CV, renal, pulmo)				

Part 4: Beliefs

1.Which of the following is the general public more likely to choose as a method for family planning/sterilization? oVasectomy oTubal ligation 2. What do you think are barriers to female sterilization as perceived by the general population? oReligious beliefs/ Cultural beliefs oLack of knowledge about the procedure/ Anxiety/fear of the procedure

3. What do you think are barriers to male sterilization as perceived by the general population? oReligious beliefs/ Cultural beliefs

oLack of knowledge about the procedure/ Anxiety/fear of the procedure

Fig. 1 Survey questions divided into 4 parts

In total, 45.3% of Junior residents, 63.8% of senior residents, and 84.6% of attendings passed. Out of the physicians in each specialty, 72.5% specializing in internal medicine, 60% in family medicine, 94.4% in Ob/Gyn, 89.2% in Urology, and 30% in other specialties passed. Moreover, 80.8% of married participants, 51.6% of single participants, and 100% of divorced or widowed participants had a score \geq 5. 91.8% of physicians who received a formal family planning training passed, while only 49.3% of physicians who did not receive a formal training did.



Fig. 2 Brochure describing vasectomy and tubal ligation, providing the answers to the knowledge section guestions of the survey

1	/	
Baseline Characteristic	Answer Choices	N (%) or Mean \pm SD
Age	-	31(9)
Level of Training	Junior Resident	75 (41)
	Senior Resident	69 (37.7)
	Attending	39 (21.3)
Specialty	Internal Medicine	40 (21.9)
	Family Medicine	40 (21.9)
	Ob/Gyn	36 (19.7)
	Urology	37 (20.2)
	Other	30 (16.4)
Gender	Male	104 (56.8)
	Female	79 (43.2)
Marital status	Married	52 (28.4)
	Single	128 (69.9)
	Divorced/Widowed	3 (1.6)
Received Training in	No	134 (73.2)
Family Planning	Yes	49 (26.8)

Table 1	Baseline characteristics and demographics of
responde	ents to the survey

When comparing both gender groups, there was not a significant difference between males and females, each having a passing rate close to 61% (Table 3).

Regarding recommendations, 61% and 59% of physicians would recommend both procedures for a healthy or educated couple, respectively. 59% and 77% would recommend vasectomy to a couple with limited financial resources or a couple where the wife has medical comorbidities, respectively. In addition, 51% would recommend tubal ligation to a couple where the husband has medical comorbidities (Table 4). Urologists were more likely to recommend vasectomy to all patients with percentages ranging from 70% if the husband has medical comorbidities to 97% if the wife has medical comorbidities. Family medicine and OB/GYN physicians were more likely to recommend both procedures to healthy or educated couples but would prefer vasectomy if the couple has limited financial resources or if the wife has medical comorbidities; and would recommend tubal ligation if the husband has medical comorbidities. Internal medicine had the highest rates of recommending against either procedure, ranging from 20% in cases where the wife has comorbidities, to 37% in case of a healthy couple (Table 1S).

For perceptions, a striking 98% believed that the general public is more likely to choose tubal ligation as a method for surgical sterilization. 46% believed that the main barrier to tubal ligation is lack of knowledge or fear of the procedure, while 48% believed that both cultural/ religious beliefs in addition to lack of knowledge and fear of the procedure are barriers to male sterilization (Table 5).

 Table 2
 Answers to the 7-item knowledge assessment of surgical sterilization procedures

Knowledge question	Answer Choices	N (%)
More invasive	Both	35 (19.1)
	Neither	1 (0.5)
	Tubal Ligation	136 (74.3)
	Vasectomy	11 (6)
More Complex to Carry Out	Both	19 (10.4)
	Neither	2 (1.1)
	Tubal Ligation	146 (79.8)
	Vasectomy	16 (8.7)
Requires General Anesthesia	Both	49 (26.8)
	Neither	15 (8.2)
	Tubal Ligation	117 (63.9)
	Vasectomy	2 (1.1)
Affects Hormonal Secretion	Both	51 (27.9)
	Neither	105 (57.4)
	Tubal Ligation	13 (7.1)
	Vasectomy	14 (7.7)
Affects Sexual Desire/Sexual Potency	Both	37 (20.2)
	Neither	119 (65)
	Tubal Ligation	13 (7.1)
	Vasectomy	14 (7.7)
Requires Hospital Admission	Both	45 (24.6)
	Neither	15 (8.2)
	Tubal Ligation	119 (65)
	Vasectomy	4 (2.2)
Costs More	Both	8 (4.4)
	Neither	6 (3.3)
	Tubal Ligation	159 (86.9)
	Vasectomy	10 (5 5)

Discussion

Our study provides valuable insight on the knowledge, recommendations and perception of Lebanese physicians of different specialties on the topic of surgical sterilization, procedures that remain under-utilized in our region, but also globally [18]. Our findings highlight that a higher level of training in any specialty, and that having received formal training in family planning, both confer a significantly higher score on the Knowledge section of the questionnaire (Table 3). In addition, the overall moderate level of knowledge observed among physicians in our study aligns with previous research [10].

Studies have shown that gaps in knowledge exist among healthcare professionals, particularly in areas such as the effectiveness, safety, and access to different methods of surgical sterilization [18, 19]. In one study from Rhode Island, researchers found that while 94% correctly stated that vasectomy is safer than tubal ligation, only 18% were aware of a state funded No Cost Vasectomy Program and only 7.5% reported referring patients to that program [18].

In another cross-sectional study in Nigeria, a survey among healthcare workers showed that 17.3% of participants state that vasectomy is not safer than tubal ligation, 9.7% believed that vasectomy affects a man's sex drive, and 11.3% were considered to have "poor" knowledge about vasectomy [19].

Our data additionally reveals that urologists and OB/ GYN physicians have a higher degree of knowledge of surgical sterilization procedures than physicians of other specialties, which is reasonable as these physicians are the ones who perform vasectomy and tubal ligation. The lower level of knowledge among primary care physicians including Family physicians, who are often the first to be consulted on fertility matters by patients, underscores the need for ongoing education and training to enhance providers' knowledge and ensure the delivery of accurate and up-to-date information to patients.

Moreover, the only study investigating the topic of surgical sterilization procedures in Lebanon revealed a low level of knowledge on the subject and a lack of interest in surgical sterilization among Lebanese citizens [15]; which further highlights the need for education and awareness on the topic, not only to physicians, but also to the general public through various media outlets.

The finding that physicians in our study were more likely to recommend both tubal ligation and vasectomy for healthy or educated couples is consistent with previous studies, indicating that these procedures are generally regarded as safe and effective methods of permanent contraception. For example, in a study from Brazil, physicians of different specialties were found to recommend both procedures equally often; however, physicians who perform one procedure or the other were more likely to recommend the procedure they perform [13]. Another study from Egypt revealed that 52% of physicians perceive vasectomy positively, but only round 25% would recommend it to a couple seeking surgical sterilization [20].

In our study, we found that one factor influencing the recommendation of one procedure over the other is the physician's specialty. For instance, urologists, due to their expertise in male reproductive health, may be more inclined to recommend vasectomy. On the other hand, family medicine and OB/GYN physicians, who often may have a broader scope of reproductive healthcare, may consider multiple factors when making recommendations. Another important factor is the particulars of the society and the culture in the country where the physician is practicing. For instance, Egyptian physicians are less likely to recommend vasectomy due to religious factors related to male's duty in **Table 3** Comparing scores of physicians to the 7-item knowledge assessment of surgical sterilization procedures according to baseline characteristics

Baseline Characteristic	Answer Choices	Total Test Scores		P-value
		<5	≥5	
		N (%) or Mean±SD	N (%) or Mean±SD	
Age	-	28 (6)	33 (9)	< 0.001
Level of training	Junior Resident	41 (54.7)	34 (45.3)	< 0.001
	Senior Resident	25 (36.2)	44 (63.8)	
	Attending	6 (15.4)	33 (84.6)	
Specialty	Internal Medicine	29 (72.5)	11 (27.5)	< 0.001
	Family Medicine	16 (40)	24 (60)	
	Ob/Gyn	2 (5.6)	34 (94.4)	
	Urology	4 (10.8)	33 (89.2)	
	Other	21 (70)	9 (30)	
Gender	Male	41 (39.4)	63 (60.6)	0.98
	Female	31 (39.2)	48 (60.8)	
Marital Status	Married	10 (19.2)	42 (80.8)	< 0.001
	Single	62 (48.4)	66 (51.6)	
	Divorced/Widowed	0 (0)	3 (100)	
Family Planning Training	No	68 (50.7)	66 (49.3)	< 0.001
	Yes	4 (8.2)	45 (91.8)	

 Table 4
 Results of which surgical sterilization procedure physicians would recommend in 5 different scenarios

Scenario for recommendation	Answer Choices	N (%)
Healthy Couple	Both	111 (60.7)
	Neither	16 (8.7)
	Tubal ligation	10 (5.5)
	Vasectomy	46 (25.1)
Educated Couple	Both	108 (59)
	Neither	21 (11.5)
	Tubal ligation	10 (5.5)
	Vasectomy	44 (24)
Couple with Limited Financial Resources	Both	43 (23.5)
	Neither	23 (12.6)
	Tubal ligation	10 (5.5)
	Vasectomy	107 (58.5)
Couple where the wife has Medical Comorbidities	Both	23 (12.6)
	Neither	16 (8.7)
	Tubal ligation	4 (2.2)
	Vasectomy	140 (76.5)
Couple where the husband has Medical Comorbidities	Both	37 (20.2)
	Neither	16 (8.7)
	Tubal ligation	93 (50.8)
	Vasectomy	37 (20.2)

reproducing [20]. Moreover, in the United States, two papers by Shih et al. showed that vasectomy remains less widely performed than tubal ligation; particularly in relation to religious and cultural beliefs, especially among the Black and Latino communities [21, 22]. Our data aligns with findings in the literature regarding

Table 5 Perception of physicians regarding the preference and barriers to surgical sterilization procedures among the general public

Question	Answer Choices	N (%)
General Public More Likely to Choose as a Method for Family Plan-	Vasectomy	4 (2.2)
ning/Sterilization	Tubal Ligation	179 (97.8)
Barriers to Female Sterilization	Religious/Cultural Beliefs	32 (17.5)
	Lack of Knowledge/fear of procedure	85 (46.4)
	Both	66 (33.1)
Barriers to Male Sterilization	Religious/Cultural Beliefs	89 (48.6)
	Lack of Knowledge/fear of procedure	7 (3.8)
	Both	87 (47.5)

barriers to male surgical sterilization. Males in our region are likely to reject vasectomy due to lack of knowledge of the procedure, misconceptions regarding reversibility and impact on sexual desire, but also due to religious beliefs that capitalize on the male's need to conceive, often from multiple female partners [15]. For example, in a study from Saudi Arabia, a survey was done on 243 men which showed that only 13% of respondents knew that vasectomy is a male contraception method, and 62% perceived this method as associated with complications [23]. However, this study was limited to men only, compared to our sample which reflects attitudes and knowledge of all genders in society.

The identified barriers to surgical sterilization emphasize the need for targeted interventions to improve awareness, dispel misconceptions, and address cultural/religious considerations in order to promote informed decision-making and access to both tubal ligation and vasectomy as viable options of contraception. The ministries of health and education can ideally take the lead on a national level, making family planning training a requirement within reproductive health courses across all medical schools in the country. Further advanced training can be implemented for primary healthcare providers (Family medicine and Internal medicine).

Finally, our study's strengths include that: it represents the only and largest survey of physicians on an understudied topic in our region, namely surgical sterilization procedures done in Lebanon. It provides a diverse range of perspectives from different specialties involved in family planning, and an objective measure of knowledge which can be used to monitor the impact of any interventional measure employed in the future. However, our study also has several limitations. Our final sample size (183) was smaller than the calculated sample size (274) which decreases the power of the study and may increase the risk of type II errors.

This may also affect the generalizability of our results. Additionally, our target population was restricted to physicians involved in counseling about contraception, leading to a relatively small sample size which may not be able to capture the diversity of opinions and knowledge within the different specialties. Moreover, our study relied on self-reported data which can introduce response bias. It is also important to mention that most respondents were resident physicians (79%) which may skew the data (specifically the knowledge assessment). Finally, our study was conducted in Lebanon where sociocultural factors and healthcare practices may be different from other regions, hence affecting the generalizability of our findings. Future research should aim to include a larger and more diverse sample to enhance generalizability.

Conclusion

Our findings highlight a lower level of understanding of surgical sterilization procedures among Lebanese primary care physicians (Family and Internal medicine) when compared to specialists (Urology and OB/GYN). This knowledge gap, alongside limited training in family planning and negative perceptions of patient attitudes among the whole cohort, could influence medical viewpoints and guidance.

These findings infer the need for ongoing education and training for physicians, especially primary care physicians, on the matter and the implementation of Family planning programs.

Supplementary Information

The online version contains supplementary material available at https://doi. org/10.1186/s40834-025-00336-9.

Supplementary Material 1.

Authors' contributions

J.N. contributed to design of the study, data collection, data analysis and interpretation and writing of the manuscript. A.A. contributed to design of

the study, data collection and writing of the manuscript. E.A.C. contributed to data collection, data analysis and interpretation and writing of the manuscript. N.A.H contributed to design of the study, data collection and writing of the manuscript. M.Z. contributed to data collection and writing of the manuscript. A.F. contributed to data collection and data analysis and interpretation. J.N. contributed to data collection and data analysis and interpretation. J.N. contributed to data collection and writing of the manuscript. B.B. contributed to data collection and writing of the manuscript. B.B. contributed to data collection and writing of the manuscript. A.F. contributed to data collection and writing of the manuscript. B.B. contributed to data collection and writing of the manuscript. B.B. contributed to design of the study, data analysis and interpretation, writing of the manuscript, revising the final manuscript and coordinating between authors. All authors approved the final manuscript draft before submission. All authors have contributed to the final draft and understand that they are held accountable for their contributions.

Funding

The authors report no involvement in the research by any sponsor that could have influenced the outcome of this work. This study was an unfunded work.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The study was approved by the American University of Beirut Institutional Review Board. All participants consented to participate prior to filling the web-based questionnaire. Responses were anonymously collected and stored electronically through the institution's web database on LimeSurvey.

Competing interests

The authors declare no competing interests.

Author details

¹Department of Surgery, Division of Urology, American University of Beirut Medical Center, Riad El-Solh, Beirut 1107 2020, Lebanon. ²Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA. ³Mayo Clinic Department of Urology, Rochester, MN, USA. ⁴Henry Ford Hospital Department of Internal Medicine, Detroit, MI, USA.

Received: 6 August 2024 Accepted: 14 January 2025 Published online: 24 January 2025

References

- Stormont G, Deibert CM. Vasectomy. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2023. StatPearls Publishing LLC.; 2023.
- Sung S, Abramovitz A. Tubal Ligation. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2023. StatPearls Publishing LLC.; 2023.
- Zerden ML, Castellano T, Doll KM, Stuart GS, Munoz MC, Boggess KA. Risk-reducing Salpingectomy Versus Standard Tubal sterilization: lessons from Offering Women options for interval sterilization. South Med J. 2018;111(3):173–7.
- Shattuck D, Wesson J, Nsengiyumva T, Kagabo L, Bristow H, Zan T, et al. Who chooses vasectomy in Rwanda? Survey data from couples who chose vasectomy, 2010–2012. Contraception. 2014;89(6):564–71.
- Gormley R, Vickers B, Cheng B, Norman WV. Comparing options for females seeking permanent contraception in high resource countries: a systematic review. Reprod Health. 2021;18(1):154.
- Jacobstein R, Radloff S, Khan F, Mimno K, Pal M, Snell J et al. Down but not out: Vasectomy is Faring poorly almost Everywhere-We can do better to make it a true method option. Glob Health Sci Pract. 2023;11(1):e2200369.
- Nyalela M, Dlungwane T. Men's utilisation of sexual and reproductive health services in low- and middle-income countries: a narrative review. S Afr J Infect Dis. 2023;38(1):473.
- Gunenc Z, Bingol B, Gedikbasi A, Yesildaglar N, Erkaya S. Opinions concerning male and female sterilisation in Turkey. Eur J Contracept Reprod Health Care. 2009;14(5):375–8.
- Kısa S, Savaş E, Zeyneloğlu S, Dönmez S. Opinions and attitudes about vasectomy of married couples living in Turkey. Am J Mens Health. 2017;11(3):531–41.

- Ebeigbe PN, Igberase GO, Eigbefoh J. Vasectomy: a survey of attitudes, counseling patterns and acceptance among Nigerian resident gynaecologists. Ghana Med J. 2011;45(3):101–4.
- 11. Nguyen BT, Jochim AL, Shih GH. Offering the full range of contraceptive options: a survey of interest in vasectomy training in the US family planning community. Contraception. 2017;95(5):500–4.
- Herbitter C, Greenberg M, Fletcher J, Query C, Dalby J, Gold M. Family planning training in US family medicine residencies. Fam Med. 2011;43(8):574–81.
- Bailey PE, de Castro MP, Araujo MD, de Castro BM, Janowitz B. Physicians' attitudes, recommendations and practice of male and female sterilization in São Paulo. Contraception. 1991;44(2):191–207.
- Ohn Mar S, Ali O, Sandheep S, Husayni Z, Zuhri M. Attitudes towards vasectomy and its acceptance as a method of contraception among clinical-year medical students in a Malaysian private medical college. Singap Med J. 2019;60(2):97–103.
- Shahrour Z, Yassin A. Knowledge and attitude regardingvasectomy andtubal, ligation among the Lebanese population. BAU J Health Wellbeing. 2018;1(3):60.
- Services WF, Can A. Woman Get Pregnant with her Tied Tubes? 2023. Available from: https://worldfertilityservices.com/tag/tubal-ligation-proce dure/.
- 17. (MFMER), MFfMEaR. Vasectomy 1998–2023. Available from: https://www. mayoclinic.org/tests-procedures/vasectomy/about/pac-20384580.
- Young EE, Nguyen BT, Weiss-Laxer NS, Sigman M, Nolan P. Factors associated with family planning and vasectomy discussions: results from a health provider survey. Med Health R I. 2010;93(2):48–50.
- Ezeoke GG, Akera-Adegboyega GA, Abdul IF, Olabinjo AO, Lawal BO, Adeniran AS. Evaluation of Knowledge and Attitude to Uptake of Vasectomy among Male Health Care Workers in a Tertiary Health Facility: A Cross-sectional Study. Texila Int J Public Health. 2022;10(2).
- Hassanin AM, Hamed HA, Al-Inany H, Fawzy EA. A study of physicians' interest in advising (recommending) vasectomy in Egypt. Middle East Fertility Soc J. 2017;22(4):305–8.
- Shih G, Turok DK, Parker WJ. Vasectomy: the other (better) form of sterilization. Contraception. 2011;83(4):310–5.
- 22. Shih G, Zhang Y, Bukowski K, Chen A. Bringing men to the table: sterilization can be for him or for her. Clin Obstet Gynecol. 2014;57(4):731–40.
- Sait M, Aljarbou A, Almannie R, Binsaleh S. Knowledge, attitudes, and perception patterns of contraception methods: cross-sectional study among Saudi males. Urol Ann. 2021;13(3):243–53.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.