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'If we take the engine out, how will the car go?': beliefs, understanding and access to vasectomy services in Timor-Leste

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ABSTRACT

Vasectomy is a safe, highly effective and affordable method of permanent contraception, and one of the few currently available contraceptive methods for men. Despite this, vasectomy uptake remains overall low, making up just 2% of the global contraceptive method mix. To better understand access to vasectomy in a country with negligible uptake, we conducted participatory and operational research in the Democratic Republic of Timor-Leste (Timor-Leste). We held 14 participatory group discussions with 175 community participants (84 men, 91 women; aged 18–72) across seven municipalities (Ainaro, Baucau, Bobonaro, Dili, Lautem, Manufahi, and Oecusse), and individual in-depth interviews with 24 healthcare providers (16 women, 8 men; aged 25–56 years). Data were analysed using reflexive thematic analysis. Community awareness and understanding about vasectomy were limited, with concerns expressed about physical and social side effects. Healthcare providers had limited experience and knowledge about vasectomy, and about male sexual and reproductive health more generally. However, our findings also indicate a small but existing demand for vasectomy services that could be grown and better met through health systems strengthening initiatives. Insights from our research have informed programmatic decision-making in Timor-Leste and can be further used to inform national health policy and practice.

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Introduction

Vasectomy is a safe, effective and affordable method of permanent contraception (WHO 2022a). It is also one of the few contraceptive methods for men, along with male condoms and some natural family planning methods. Compared to tubectomy

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(a permanent contraceptive method for women), vasectomy has higher efficacy, lower rates of complications, and is more cost-effective (WHO 2022a). Despite this, tubectomy remains the world's most commonly used method of contraception (24% of the global contraceptive method mix), while vasectomy is one of the least used methods (2% of the global contraceptive method mix) (United Nations Department of Economic and Social Affairs 2019).

While vasectomy uptake varies widely between contexts (United Nations Department of Economic and Social Affairs 2019), a common trend is that countries with higher vasectomy prevalence also rank higher in gender equality, and vice versa (Jacobstein et al. 2023). Indeed, vasectomy prevalence exceeds tubectomy prevalence for the majority of countries in the top ten UN ranking for gender equality (Jacobstein et al. 2023). Moreover, global disparities in the uptake of tubectomy to vasectomy have widened over time, from 5:1 in 2001 to 13:1 in 2019 (Jacobstein et al. 2023). This increasing disparity indicates that women continue to bear a disproportionate burden of contraceptive care responsibilities, while men's sexual and reproductive health (SRH) is neglected. However, the relationship between gender equality and contraceptive uptake is complex. Contraceptive choice should always be made available to people, based on individual needs and medical eligibility (Bertrand et al. 2014; WHO 2022a).

The importance of choice is vital when understanding the history of sexual and reproductive health and rights (SRHR) globally, and how contraceptive methods have been used as tools of violence and control against people and populations. For example, forced sterilisation has occurred in a range of settings, with Indigenous people and socially marginalised populations disproportionately targeted (Jacobstein et al. 2023; Rowlands and Amy 2018). Understanding how these experiences may influence social norms and health practice is essential to improving contraceptive care in any context.

Study context

There is limited evidence about access to vasectomy in locations where uptake is reported to be negligible, such as The Democratic Republic of Timor-Leste (Timor-Leste). Timor-Leste is a young island nation in South-East Asia. It gained independence in 2002 after a long and complex history of colonisation and occupation, including by Portugal and Indonesia (Government of the Democratic Republic of Timor Leste 2021; Stockings 2022; WHO 2022b). Timor-Leste has a population of 1.2 million people, who are mostly young (median age is 20.8 years), identify as Catholic (97.6%) and live in rural and remote locations (70.6%) (General Directorate of Statistics et al. 2018).

Contraceptive use is low in Timor-Leste. Only 24% of married women (15–49 years) are using a modern method of family planning (General Directorate of Statistics et al. 2018). The total fertility rate has reduced from 5.7 children per woman in 2010 to 4.2 children in 2016, although is still higher than what the Timorese population report as their average desired family size of 3.7 children (General Directorate of Statistics et al. 2018). One in four women have an unmet need for family planning, and 29% of married woman and 26% of married men do not want any more children (General Directorate of Statistics et al. 2018).

Most of the people using contraceptive services in Timor-Leste, like the rest of the world, are women, and often in the context of maternity care (Henderson et al. 2023; United Nations Department of Economic and Social Affairs 2019). Just 0.3% of men in Timor-Leste reported ever use of vasectomy in 2010 (most recent national data available), while global data reports vasectomy prevalence in Timor-Leste as zero or 'negligible' (National Statistics Directorate, Ministry of Finance and ICF Macro 2010, United Nations Department of Economic and Social Affairs 2019). Tubectomy uptake is likewise low, but increasing, from 0.8% of married women in 2010 to 1.4% in 2016 (General Directorate of Statistics et al. 2018).

Accounts of sexual and reproductive violence against Timorese women during the Indonesian occupation (1975–1999) have been documented, including the coerced and forced use of contraception and female sterlisation (Vásquez 2022). However, there is limited evidence about the history of SRHR for men in Timor-Leste. We are mindful and respectful of Timor-Leste's historical and current context, and the impacts this may have on beliefs and understanding about vasectomy, and contraception more generally.

In this study, we used participatory and operational methods of qualitative inquiry to explore access to and uptake of vasectomy services in Timor-Leste. Our research aims to understand the current context of vasectomy services in Timor-Leste and how access to these services could be improved.

Terminology

We acknowledge the terms family planning and contraception have different meanings (Rodríguez, Say and Temmerman 2014), however, consistent with the terminology most often used in Timor-Leste and across global SRHR organisations, we use the terms interchangeably. We use the terms tubectomy and vasectomy to describe the two types of permanent contraceptive methods that people may consider and use. We use the term sterilisation in reference to the forced or coerced use of these methods. We purposefully differentiate these language choices for clarity in discussion, and to avoid inadvertent stigma when discussing vasectomy and tubectomy as genuine contraceptive options (Jacobstein et al. 2023). Participant quotes are shared verbatim.

Materials and methods

This research is part of a larger study about access to male contraceptive methods in Timor-Leste. The study was designed and implemented by a multi-lingual field research team of five (HH, AS, SM, MS, HSX), who at the time of research implementation, all worked at Marie Stopes Timor-Leste (MSTL). MSTL specialises in SRHR and works in partnership with the Timor-Leste Ministry of Health. Through our work, we had heard stories about Timorese men travelling to Indonesia to access vasectomy services through the Indonesian health care system. These stories sparked an interest to explore the context of vasectomy access and uptake in Timor-Leste. An author reflexivity statement reflecting on the dynamics of our majority Timorese research team and collaboration process is available in online supplemental appendix 1.

We conducted participatory group discussions (PGDs) with community members and in-depth interviews (IDIs) with healthcare providers. All study tools were piloted before use. We report on our study using the Consolidated Criteria for Reporting Qualitative Research checklist (see online supplemental appendix 2) as a guide (Tong, Sainsbury and Craig 2007).

Participatory group discussions

PGD participants were purposively sampled and organised into groups based on age, gender and location. Before the commencement of data collection, we coordinated with community leaders (*Xefe Suco*/Village Chief) to help ensure our research intentions were transparent and our presence acceptable. On arrival in a community, the field research team introduced themselves and explained the research activities to interested community members. We invited anyone interested to participate to then join us in the gender-specific groups and complete the informed consent process.

The PGD sessions involved: 1) body mapping activities about SRH; 2) vignettes about a fictional Timorese couple; and 3) facilitated group discussion about contraceptive methods. In the third activity, the research team presented a Ministry of Health poster describing different contraceptive methods, including vasectomy, before facilitating group discussion on the methods. PGD sessions lasted between two to four hours each, were audio-recorded, and facilitated by MS and HSX (men's group), and HH and AM or HH and SM (women's group). Thirteen different languages were spoken by participants across the PGDs (Tetun, Portuguese, Indonesian, English, Tetun Terik, Baikenu, Bunak, Fataluku, Kairui, Kemak, Lakalei, Makasai and Mambai). Audio-recordings were translated and transcribed into English using a multi-lingual panel translation process described in detail elsewhere (Henderson et al. 2022a). After the research activities, participants were invited to join an SRHR education session, led by the field research team.

In-depth interviews with healthcare providers

IDI participants were purposively sampled based on location and role as a client-facing healthcare provider. Before the start of data collection, we coordinated with health directors from each study municipality, to help facilitate communication with facility-level health directors and healthcare providers. IDIs consisted of semi-structured open-ended questions followed by body mapping activities (Henderson et al. 2022b). IDIs lasted from 30-120 min (median duration: 65 min), and were facilitated by HH, AS and MS. IDIs were audio-recorded and transcribed verbatim in the language of data collection (Tetun, English, Indonesian, Portuguese and Spanish). Transcripts were translated to English by a professional translator.

Data analysis

Data from the PGD and IDI activities were collaboratively analysed by the field research team using reflexive thematic analysis (Braun et al. 2019). Practically, this involved reviewing, discussing, and reflecting on the data as a group. Our experience

and perspectives shaped how we engaged with the data as individuals and as a team, and how we collaboratively generated codes and research themes. NVivo software was used to support data management and storage (QSR International Pty Ltd 2018).

Ethical considerations

Ethics approvals were provided by the National Health Institute of Timor-Leste (1168MS-INS/DE/DEP/V112019), The University of Melbourne (1954731.1), and MSI Reproductive Choices in the United Kingdom (020-19). Participants were provided a plain language information statement. Written and verbal consent was provided by all participants. Research data were de-identified.

Results

We held 14 PGDs with 175 community participants (84 men, 91 women; aged 18-72) across seven municipalities (Ainaro, Baucau, Bobonaro, Dili, Lautem, Manufahi and Oecusse), between August and December 2019 (Table 1). Twenty-four healthcare providers (16 women, 8 men; aged 25–56 years) participated in the IDIs (Table 2).

We present our findings under five themes: 1) Limited community awareness and understanding about vasectomy; 2) Limited experience with male SRH amongst health-care providers; 3) Gendered roles around contraceptive use and fertility; 4) Complex beliefs about trust, love and respect within a relationship; and 5) Uncertainty about where vasectomy sits within the health system.

Limited community awareness and understanding about vasectomy

Only a small number of community participants, mostly men, had prior awareness of vasectomy. Amongst these participants, understandings about vasectomy were diverse. Some described vasectomy as regulating sperm production or movement, while others described it as castration, circumcision, or removing the testicles.

> A man's scrotum is split and one teste is taken out. I have heard about this, yeah. Just one testicle is taken out, so if he sleeps with a woman, he won't get children (Men's PGD participant, 24 years, rural location)

Most participants with prior awareness about vasectomy described the procedure as resulting in a man's inability to have sexual relations, due to physical inability to have or maintain an erection. Other perceived side-effects of having a vasectomy included infection, weakness, fatigue, and death.

> The penis will no longer function. Even if a woman is naked in front of you, and she wants to have sex, a man will do nothing because it doesn't function, the power is gone. There is no more sperm (Men's PGD participant, 45 years, rural location)

> If you use this method [vasectomy] you can get an infection and die. For example, before in the Indonesian time [1975 – 1999], one of the Indonesian men living and working here did this and died. It's because he did this method, they pulled out the vein. Maybe

Table 1. Socio-demographic summary of community members taking part in the participatory group discussions.

	Younger women's group (*n* = 43)	Younger men's group (*n* = 43)	Older women's group (*n* = 48)	Older men's group (*n* = 41)	Participants (*n* = 175)
Municipality					
Ainaro	5	9	7	8	29
Baucau	5	4	5	5	19
Bobonaro	7	6	10	8	31
Dili	6	4	6	3	19
Lautem	9	6	7	5	27
Manufahi	3	6	7	6	22
Oecusse	8	8	6	6	28
Location – *n*(%)					
Rural	13 (30%)	19 (44%)	29 (60%)	23 (56%)	84 (48%)
Urban	30 (70%)	24 (56%)	19 (40%)	18 (44%)	91 (52%)
Age – median (range)	19 (18-26)	23 (18-33)	33 (19-72)	31 (19-59)	25 (18-72)
Education – *n*(%)					
No formal education	1 (2%)	1(2%)	0 (0%)	3 (7%)	5 (3%)
Primary school	0 (0%)	0 (0%)	9 (19%)	6 (15%)	15 (9%)
Secondary school	35 (81%)	31 (72%)	37 (77%)	23 (56%)	126 (72%)
Vocational	3 (7%)	0 (0%)	0 (0%)	1 (2%)	4 (2%)
University	4 (9%)	11 (26%)	2 (4%)	8 (20%)	25 (14%)
Marital status – *n*(%)					
Married	2 (5%)	6 (14)	36 (75%)	34 (83%)	78 (45%)
Single	39 (90%)	37 (86)	2 (4%)	7 (17%)	85 (48%)
Divorced	1 (2.5%)	0 (0)	2 (4%)	0 (0%)	3 (2%)
Living with partner	1 (2.5%)	0 (0)	8 (17%)	0 (0%)	9 (5%)
Employment – *n*(%)					
Student	23 (53%)	12 (28%)	0 (0%)	2 (5%)	37 (21%)
Unpaid household	4 (9%)	0 (0%)	29 (65%)	0 (0%)	33 (19%)
Volunteer	14 (33%)	18 (42%)	11 (23%)	12 (29%)	55 (31%)
Agriculture	0 (0%)	5 (12%)	0 (0%)	19 (46%)	24 (14%)
Private sector	0 (0%)	0 (0%)	1 (2%)	4 (10%)	5 (3%)
Government sector	2 (5%)	3 (7%)	7 (10%)	4 (10%)	16 (9%)
Unemployed	0 (0%)	5 (12%)	0 (0%)	0 (0%)	5 (3%)
Number of living children –median (range)	0 (0-1)	0 (0-4)	3 (0-8)	2 (0-9)	1 (0-9)
Self-identified kinship system – *n*(%)					
Matrilineal	10 (23%)	7 (16%)	17 (35%)	10 (24%)	27 (25%)
Patrilineal	33 (77%)	36 (84%)	30 (63%)	31 (76%)	63 (74%)
Other	0 (0%)	0 (0%)	1 (2%)	0 (0%)	1 (<1%)

> sometimes it will be good for us but sometimes we will die. This Indonesian guy, he died because of this (Men's PGD participant, 56 years, rural location)

A few PGD participants described vasectomy as a service that some men wanted and actively sought out. These participants described Timorese men who had travelled to Indonesia to access the service.

> A guy in this village, he went to Indonesia. He had his testicles cut out like a pig and now he can't make a woman pregnant. He had four or five children first and then after cutting out his testicles, he can't have any more children. He can have sex with a woman but can't make her pregnant…it's because he wanted to. (Men's PGD participant, 23 years, rural location)

While others spoke about the service as something that men were forced or coerced to use during the Indonesian occupation of Timor-Leste (1975–1999).

Table 2. Sociodemographic summary of healthcare providers participating in in-depth interviews.

	Total (*n* = 24)
Gender	
Women	16
Men	8
Median age (age range)	36.5 (25-56)
Location	
Rural	9
Urban	11
Mobile (visiting rural and urban sites)	4
Municipality	
Ainaro	3
Baucau	3
Bobonaro	3
Dili	7
Lautem	2
Manufahi	3
Oecusse	3
Profession	
Midwife	15
Nurse	3
Doctor	4
Counsellor	2
Professional experience as a healthcare provider (years)	
<1	1
1–5	5
6–10	8
11–15	3
16+	7
Health facility level	
Hospital	3
Community health centre	6
Health post	4
Mobile outreach at public and private health facilities	9
Counselling site	2
Marital status	
Married	20
Single	1
Divorced	1
Living with partner	2
Number of living children – median (range)	2 (0-6)
Self-identified kinship system	
Matrilineal	7
Patrilineal	16
Other	1

> During Indonesian times men were taken to Indonesia for [vasectomy]. They weren't told what was happening, that their sacred part would be cut. I heard these stories, I don't know if this is real. (Men's PGD participant, 45 years, rural location)

> I have heard some men went to Indonesia to take out the vein [vasectomy]. They were paid to do this… before they were here and OK… now they can no longer function as men, no erection. (Men's PGD participant, 56 years, rural location)

First impressions about vasectomy use

Community participants had a diverse range of responses when introduced to vasectomy during the third PGD research activity – facilitated group discussion about contraceptive methods. Participants expressed surprise, happiness, excitement, fear, anger, confusion, and disbelief.

> I didn't know this was possible. I never heard about this for men. Nobody talks about this… men don't have KB [*keluarga berencana* - family planning]. Can men really use KB? (Women's PGD participant, 45 years, urban location)

Many PGD participants did not believe that vasectomy and tubectomy services could be permanent. Instead, these participants believed fertility could be returned by eating certain foods or asking a healthcare provider for support.

> KB is to give spacing, not to stop having children. There is no way to stop totally. (Men's PGD participant, 32 years, rural location)

Some PGD participants acknowledged that permanent methods of contraception existed but understood the methods to be in conflict with religion or the Catholic Church. Some PGD participants described all modern contraceptive use as being in conflict with religion and the church. However, due to the permanent change to an individual's reproductive system, vasectomy and tubectomy were overwhelmingly described as being the least accepted or 'allowed' methods of contraception.

> Maybe it's good for health, maybe good for the woman… I don't know… but for religion it's not allowed. You shouldn't destroy God's things. (Men's PGD participant, 41 years, rural location)

Common concerns and questions raised by PGD participants after first hearing about vasectomy included if the service would make a man *fraku* (weak), unable to work, uninterested or unable to engage in sexual relations. Although initial responses to vasectomy were diverse, almost all PGD participants expressed interest to learn more about the service and contraceptive care more generally.

> I'm interested to hear about this [vasectomy]. Hopefully one day it will be available here, so men can also take responsibility. (Men's PGD participant, 27 years, urban location)

Limited experience with male SRH amongst healthcare providers

Overall, knowledge and understanding about male physiology and male contraception was limited amongst healthcare providers participating in the IDIs. For example, several healthcare providers were unable to identify the site of spermatogenesis or describe how vasectomy prevented pregnancy. Most healthcare providers shared they had not learned about male SRH during their clinical training or while working in SRH service provision. This was especially true for midwife participants.

> In midwifery we study the woman's body not the man's… I don't know about the man's body. I'm a midwife. (IDI participant, midwife, rural location)

> The function of the testicles? No, I don't know the function of the testicles… we don't really study about the man's body. We attend women (IDI participant, midwife, urban location)

Almost all healthcare providers participating in the IDIs identified vasectomy as a contraceptive option for men. However, most also reported knowledge gaps about the service. Knowledge gaps included understanding medical eligibility for the service; possible side-effects; post-service follow-up needs; and method failure rates. Only two

male healthcare providers (one doctor, one nurse) were able to accurately describe the process of vasectomy.

Only one healthcare provider (a male doctor) had experience providing vasectomy services, while completing medical training overseas. This healthcare provider had also provided post-service support to an individual accessing vasectomy in Timor-Leste.

> I haven't done this operation here [Timor-Leste] before. I have helped somebody after having the operation with another doctor here… I helped facilitate them do a sperm analysis at the hospital. Their percentage was low enough, the probability of finding more sperm in their semen was low (Male IDI participant, doctor, urban location)

Two midwives participating in the IDIs had indirect service provision experience in Timor-Leste, through the female partner of a man using vasectomy. In both examples, the female partner had visited the midwife to stop using contraception, after the male partner had received a vasectomy. Most IDI participants identified the need for healthcare provider training and support as a first step to increasing access to vasectomy in Timor-Leste.

> The individual can choose what method they want, but it will be influenced by the skill of the provider. How the provider talks about the benefits and disadvantages and if they are confident in their knowledge and present all the options or not. So, I think first, all the healthcare providers need to be trained. (Female IDI participant, midwife, rural location)

Gendered roles in relation to contraceptive use and fertility

Most PGD and IDI participants described the important role of men in a couple's decision to use contraception. However, contraceptive use was overwhelmingly identified and described as something women are responsible for, not men.

> Women are responsible for using KB. If the man supports it, it's the woman that uses this. Women use KB. It's the woman's role. (Men's PGD participant, 27 years old, rural location)

When discussing male use of contraception, many PGD participants (with and without prior awareness of vasectomy) described men who used vasectomy as *fahi* (pigs), *feto* or *inan* (women or mothers) or derogatory slurs for men who have sex with men. Many participants believed that vasectomy impacted a man's masculinity, and therefore reduced the respect, worth or power a man had within a relationship and within a community. More specifically, almost all participants described male identity as being linked to a man's ability to have heterosexual relations, and to produce biological children.

> One of my friends said now he is like a woman because he can't get an erection. Because he did this thing. (Men's PGD participant, 56 years, rural location)

> If we go and get it cut, what about your life? I think men will regret using this option. They will no longer feel like a man. (Men's PGD participant, 26 years, rural location)

Several healthcare providers described the need to address harmful beliefs about masculinity and vasectomy use, to increase uptake of the service.

> I think there are some people who think that vasectomy is taking away a man's identity, especially men themselves… People need to know that when a man has a vasectomy, he still has his identity as a man, that hasn't changed. (Male IDI participant, doctor, urban location)

However, other healthcare providers described men who did not desire children or more children as being unwell, or that there was something wrong or 'not normal' with them.

> In my opinion, if he doesn't want to have more children… maybe he has a disease. Something is broken in how he thinks… normal men will always want more children. (Female IDI participant, midwife, urban location)

The idea of lost fertility, and therefore masculinity, as a result of a vasectomy, also played into fears and concerns about the inability for a man to have future relationships. This was most often described in the case of a man being widowed or separated from a current partner.

> There is an expectation that men must always have more children in the future, even when they are very old. People always think like this because men are different, they can keep producing. So maybe if his wife dies and he takes a new wife, he is expected to have children with the new wife. (Male IDI participant, counsellor, urban location)

Furthermore, many IDI and PGD participants described men as being less likely to visit a health facility than women, for any type of health service. This was described as due to the need for men to be *forte* (strong) and *brani* (brave), and that exhibiting health seeking behaviour may diminish or impact their perceived masculinity.

In contrast, some participant-identified concepts of masculinity were also identified as potentially enabling vasectomy uptake. For example, a 'real man' was often described as being strong, brave and protectors of their wife and family. Several PGD participants used these identifiers as reasons why a man should access vasectomy services.

> I think it [vasectomy] is good, the wife will be happy… It's better if a man uses KB [keluarga berencana - family planning], because men are stronger. (Men's PGD participant, 27 years, rural location)

However, if a man or couple decided to use vasectomy, most PGD and some IDI participants believed the service would not be made available to them in Timor-Leste for ethical or social reasons. For example, tubectomy was described by most IDI and PGD participants as being offered to women only when their life was at risk from pregnancy or birth, rather than it being a genuine contraceptive option. As men do not face the same individual risks from pregnancy and birth that women do, some participants believed it was therefore never appropriate for a man to use a permanent method.

> There are times when sterilisation is needed to save the mother, when the womb is too thin and weak, but this will never be the case for a man. God created man to always keep producing. Men should not do this [vasectomy]. (Male IDI participant, counsellor, urban location)

Complex beliefs about trust, love and respect within a relationship

IDI and PGD participants expressed complex beliefs about how vasectomy use might be understood, discussed, and experienced within a relationship. Many participants described vasectomy use as indication that a man loved his wife and family. In these instances, the use of vasectomy was described as a commitment or sacrifice to the relationship and wider family.

> A man can show his love by doing this [vasectomy]. He must really love his wife and family to do this. It's a good thing. (Women's PGD participant, 29 years, urban location)

Vasectomy was also described by some participants as a way for men to care for their partners.

> This [vasectomy] is good. He can use this and help his wife, help his family. Some women die because their womb becomes thin from having many children. Better a man do this. (Men's PGD participant, 43 years, rural location)

At odds with the common belief that vasectomy causes sexual dysfunction, many PGD and IDI participants also described vasectomy as an enabler and motivator for infidelity. This was reasoned as being due to a man's ability to have sexual relations with more than one woman 'without consequence' (pregnancy).

> I've heard about vasectomy, yeah. It's for when a man wants to use this KB [keluarga berencana – family planning], he can be with many women, have many wives and other women because it's a permanent method. He can live freely with this one. (Female IDI participant, midwife, rural location)

In contrast, several PGD participants described vasectomy use as a way to prevent male infidelity within a primary relationship due to increased trust and love between a couple, and less stress within a relationship or family.

Vasectomy was also described as a motivator for female infidelity. However, rather than seeking sexual relations with other men for pleasure or desire, women were described as being unfaithful in order to become pregnant and have more children.

In general, discussions about infidelity and the use of vasectomy were complex and often described alongside notions of trust and respect. For example, while many participants believed that a man cheating on a primary partner was disrespectful, such behaviour was also described as common practice. In these instances, participants described vasectomy use as a sign of respect to his primary partner, by ensuring no children were born outside of the primary relationship (usually described as marriage).

Concerns were also raised by participants about what could happen if a female partner of a man who had a vasectomy became pregnant. Many participants, including some healthcare providers, believed this would be proof the female partner had had sexual relations with another man. A woman in this potential situation was described as facing shame, stigma, violence, and abandonment, and that the male partner would experience shame, anger and sadness.

Uncertainty about where vasectomy is positioned within the health system

Only a few PGD participants believed vasectomy was available in Timor-Leste but were uncertain about where and how a man could access the service. Most IDI participants were also unsure if vasectomy services were available in Timor-Leste. Several healthcare providers believed a person would need to travel internationally to access vasectomy. Furthermore, most IDI participants were unsure about what type of healthcare provider can provide a vasectomy service, or at what level of healthcare facility.

> I don't know if it [vasectomy] exists here. Does a surgeon do this? I don't think anyone is trained in Timor. I have never met anyone who is trained to do this… no, I don't think it's an option here. Nobody talks about it. (Female IDI participant, midwife, rural location)

Some IDI participants described vasectomy as a highly specialised service that could only be provided by trained surgeons, in a hospital. Others described it as a more simple and accessible service, that could be made available in any primary healthcare setting, by a doctor.

> It [vasectomy] is a simple service. Low risk, easy to do. It's an outpatient procedure, in and out. A doctor needs training and the facility needs to be clean. Easy. (Male IDI participant, doctor, urban location)

The three IDI participants based at hospital settings described their healthcare facilities as having the equipment, stock, and trained healthcare providers to offer vasectomy services. However, these participants described a lack of health promotion and not having effective referral systems from primary health care facilities as significant barriers to vasectomy access, especially for men living in rural and remote locations.

Discussion

Building on the global body of evidence, our study shows that beliefs and understanding about vasectomy in Timor-Leste are shaped by a wide range of social concepts relating to men's bodies, fertility and virility, fidelity, lifecourse narratives, and concepts of masculinity and religion (Nicholas et al. 2021). It is also evident that beliefs and stories of forced or coerced male sterilisation during the Indonesian occupation of Timor-Leste are also present within some Timorese communities and hold power in how conversations about vasectomy are framed. Previous studies have discussed the complex environment for family planning programming in Indonesia in the early 1990s, including investigations conducted about allegations of coerced sterilisation (Hull 1991, 2007). It is essential to respectfully plan for, acknowledge and address these possible concerns during contraceptive care programming (Starrs et al. 2018).

In general, however, we found overall low awareness and knowledge about vasectomy across Timor-Leste. This provides a unique opportunity to design and plan vasectomy programming in ways that do not introduce or propel misinformation or harmful gender norms, and instead present it as a genuine contraceptive option (Terry and Braun 2011a). It is also important that any health promotion messaging that praises or promotes men's contraceptive or SRH care uptake should be implemented in conjunction with other initiatives that promote gender equality and more equitable changes in social norms. This is to minimise the risk of any existing and harmful discourses around masculinities being perpetuated by the notion that men are doing something extraordinary or heroic by having a vasectomy (Terry and Braun 2011b).

As other studies have described, increasing vasectomy prevalence as a standalone target will not automatically result in improved gender equity in SRHR (Hill and Kindon 2021). To improve contraceptive care, initiatives are needed to promote more gender-equitable attitudes and social norms at the individual, family, community, health

service and societal level (World Health Organization 2007). This includes addressing harmful beliefs about masculinity that may limit a man's ability to seek out, access and use any healthcare services, including vasectomy (Nicholas et al. 2021). At the same time, strengthening the health system to better provide male SRH services is also vital. Similar to other contexts, we found that healthcare providers in Timor-Leste are not routinely offering vasectomy as a contraceptive option (Shih, Dubé and Dehlendorf 2013). Indeed, most of the healthcare providers participating in our study did not consider male contraceptive services as part of their scope of work and had not received sufficient training or support to provide any male SRH services.

Our study also identified the need for ongoing engagement between the health sector and religious leaders and organisations in Timor-Leste, due to their important influence on SRHR (Richards 2015; Williams, Haire and Nathan 2017; Henderson et al. 2023). Indeed, when engagement is done well, religious leaders have been shown to have a positive impact on the uptake of vasectomy services in other countries (Perry et al. 2016).

Our study also suggested there may be more people in Timor-Leste using vasectomy than current data suggest. Given the social stigma and misunderstandings identified in our study, it is unsurprising that satisfied vasectomy users are not more vocal about their experiences. Including men in national surveys about contraceptive use would provide a more accurate picture of vasectomy prevalence in Timor-Leste, along with other methods of male contraception (Ross and Hardee 2016).

Many successful vasectomy programmes conducted in other contexts can provide valuable guidance and lessons for adaptation in Timor-Leste and respond to some of the access challenges identified in this study (Jacobstein et al. 2023; Shattuck et al. 2016). These include ensuring that interventions focusing on the demand and supply aspects of vasectomy services are conducted in unison (Jacobstein et al. 2023), to ensure trained healthcare providers do not forget or lose their skills due to lack of clients, and that clients wanting vasectomy are able to access the service. Programmes have also demonstrated the successful use of mobile family planning clinics to increase access to vasectomy in rural and remote locations (Padmadas et al. 2014). It is important to acknowledge, however, that strengthened programming alone will not result in immediate vasectomy uptake, as investments in the demand and supply of vasectomy services will take time to have effect (along with an enabling environment). Instead, strategic investment now will lead to increased future vasectomy uptake (Jacobstein et al. 2023).

Our study also supports existing evidence that ongoing and increased investments are required to better meet women's contraceptive care needs (General Directorate of Statistics et al. 2018; Wallace et al. 2018). It is important that vasectomy programming should not take funding away from existing programming that targets women, but instead additional funding should be allocated. Furthermore, programming that acts to improve men's SRH needs must continue to actively respect and advocate for women's bodily autonomy.

Strengths and limitations

Binary conceptions of sex and gender (male/female, men/women) are limiting and inaccurate, and do not describe the true diversity of people and communities in

Timor-Leste. We acknowledge the limitations of using this binary language in our research, although do so because it is currently the most used and understood language amongst communities in Timor-Leste. More than half of the healthcare providers interviewed were midwives. Although contraceptive care is predominantly provided by midwives in Timor-Leste, we acknowledge that they may not be the ideal target audience for future vasectomy programming (Henderson et al. 2023). We also acknowledge possible power imbalances between researchers and participants, through our associations with a health NGO and an Australian university. Throughout the research process we used the ethics of reflexivity to help track and explore our own beliefs, positionality and knowledge as individuals and as a research team.

Research application

Our study has provided important evidence to inform discussions about how vasectomy services can be made more available and accessible in Timor-Leste. We used insights from the research to inform our work at MSTL, with the Ministry of Health (including national health sector strengthening initiatives), and to inform the adaptation of a social and behaviour change initiative to prevent violence and improve SRHR in Timor-Leste (Holmes 2022). Research insights informed the development of health promotion materials for MSTL, including education initiatives and social media messaging. We gathered and shared client-testimonials about vasectomy use from other countries with healthcare providers.

Conclusion

Our study has generated new and valuable evidence about access to vasectomy in Timor-Leste and about men's SRH more generally. While long-term investments are required for vasectomy to become a genuine contraceptive option in Timor-Leste, the benefits of doing so are significant for men, women and families.

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The five field research team members (HH, AS, MS, HSX and SM) all worked for Marie Stopes Timor-Leste at the time of data collection.

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Data availability

The data/transcripts are not publicly available due to the need to protect participant confidentiality but may be made available on reasonable request to the corresponding author.

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