RESEARCH ARTICLE

Characteristics of no-scalpel vasectomy patients in Jakarta, Indonesia [version 1; referees: 1 approved]

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Abstract

Background: This study aims to learn the demographic and surgical characteristics of patients who underwent no-scalpel vasectomy in Indonesia and to compare patient's demographic characteristics before and after legal pronouncement/*fatwa* issued by Indonesia Ulema Council in July 2012.

Methods: This is a retrospective study that collected data from the vasectomy medical records of patients who underwent no-scalpel vasectomy between January 2010 and May 2017. A total of 1497 patients were included in this study.

Results: The study found that patients' age of 40-49 years old (42.8%), wives' age of ≥ 35 years old (65.0%), having three children (34.3%), being Moslem (85.8%), high school graduated for patients (32.3%) and junior high school graduated for patients' wives (25.7%), casual laborer (40.7%), and guided by family planning program officer (40.6%) were the most frequent characteristics found in patients undergoing no-scalpel vasectomy. There was a significant difference in certain characteristics before and after *fatwa* issuance, namely wives' age, number of children, religion, patients' and wives' educational background and the person who guided patients to undergo vasectomy procedure. All no-scalpel vasectomy procedures were done using "Dr. Li's three finger technique" with local infiltration anesthesia; the median length of procedure was 10 (7 – 90) minutes. This study also found that surgeon felt that more than 95% patients were easy to perform no-scalpel vasectomy procedure and this procedure had low complication rate.

Conclusions: Even though there were significant proportional difference in some characteristics, this study considers that the *fatwa* was not the only factor that affected patients' choice of no-scalpel vasectomy.

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Introduction

Even though maternal mortality ratio has decreased since 1990, maternal death due to pregnancy- and childbirth-related complications remains a major problem, especially in developing regions[1]. Through Sustainable Development Goals, a continuation of Millennium Development Goals, the United Nations attempted to develop a framework to fight global problems; one of them is maternal mortality[2].

Family planning programs, which were first intended to reduce the growth of the population, could reduce maternity death through contraceptive services to prevent unintended and high risk pregnancy, such as being too young or old, having too many pregnancies, or having too short an interval between pregnancies. There are several contraception methods that may involve men or women separately. In Indonesia, women still have the major role as contraception users; data from the Indonesian Health Profile 2014 showed that 49.67% of female users used hormonal injection as their contraception method[3].

Vasectomy, one contraception method, is considered the safest and most inexpensive option for male sterilization, and no-scalpel vasectomy is preferred due to its shorter operative time and lower complication rate compared to traditional surgery[4–6]. However, only 0.21% prefer vasectomy to their contraception method in Indonesia[3]. Indonesia, the largest Moslem country, is very influenced by Islam culture, and there are still controversies regarding the use of vasectomy as a contraception method among Moslems. In July 2012, Indonesia Ulema Council (Majelis Ulama Indonesia; MUI), an institution that accommodates *ulema* or Moslem scholars to guide and nurture Moslems in Indonesia, issued a legal pronouncement/*fatwa* regarding vasectomy from *haram*/forbidden into *halal*/permissible, partly due to success of recanalization/vasectomy reversal[7]. Even though the *fatwa* still receives many controversies from other Moslem institutions in Indonesia, it might gradually change an individual's perception regarding vasectomy.

Currently, there is no data regarding demographic characteristics of patients that have undergone no-scalpel vasectomy in Indonesia. Such data could be helpful for the government to plan and evaluate family planning programs, specifically for vasectomy services. Therefore, this study aims to learn the demographic and surgical characteristics of patients who underwent no-scalpel vasectomy in Indonesia. This study also intends to investigate patient demographic characteristics before and after the *fatwa* issuance.

Methods

This study protocol received ethical approval from the Faculty of Medicine, Universitas Indonesia Ethical Committee (290/UN2.F1/ETIK/2017). The data are owned by The Indonesian Association for Secure Contraception (*Perkumpulan Kontrasepsi Mantap Indonesia*; PKMI) and were approved for use in this study by PKMI.

Data collection

This is a retrospective observational study. The data was collected from Profamilia Clinic run by PKMI, which is based in Central Jakarta City, DKI Jakarta Province, Indonesia. PKMI is a private professional association focusing on secure contraception. Data are owned by PKMI and collected from patients under the knowledge that the data may be used for future research.

Variables studied in this study were as follows: Patients' and their wives' age; number of children; youngest child's age; religion; patients' and their wives' educational background; patients' occupation; person who guided patients to undergo vasectomy; patient's payment method and patients' surgical characteristics. All variables were collected from the vasectomy medical records of patients who underwent vasectomy between January 2010 and May 2017. The medical record was designed by PKMI. Patients' age was classified according to Indonesia Demographic and Health Survey 2012: Male module (*Survei Demografi dan Kesehatan 2012 Modul Pria*)[8]. On the other hand, patients' wife age was classified according to high risk maternal age[9]. Indonesia vasectomy guidelines[10] state that participants must have at least two living children or if patients have only two living children, both children must be older than two years old to undergo vasectomy. Therefore, this study also presented the number of patients who had two children with one of them still under two years of age. All other variables were classified based on vasectomy medical record[10].

Data analysis

The data were presented in a descriptive, analytical method. Categorical data were presented by absolute value and its frequency (percentage). Numerical data were presented the mean and standard deviation if the data had normal distribution, and the median and range if the data did not have normal distribution. Any missing data was accounted for and presented in this study. Analytical statistics was used to compare patients' demographic characteristics before and after the *fatwa* issuance; Chi-squared or Fisher's test was also utilized to compare qualitative variables. Data merging was done if the data did not meet Chi-squared requirements. *P-value* less than 0.05 was considered statistically significant. All of analysis were done using SPSS v. 23.

Results

There were a total of 1,497 no scalpel vasectomy procedures conducted between January 2010 and May 2017. Demographic characteristics of patients could be seen in Table 1. Most of the patients (97.4%) were paid through the governmental program.

From 368 patients who had two children, only 25 patients had a child younger than 2 years old. Among the 1,497 patients undergoing no scalpel vasectomy, there were only 989 (66.1%) procedure reports found. All patients had infiltration with 2% lidocaine as an anesthesia technique, without any premedication, and had "Dr. Li's three finger technique" as a surgical technique to perform

Table 1. Demographic characteristics of patients undergoing no-scalpel vasectomy in Jakarta, between January 2010 and May 2017. July 2012 is when the *fatwa* was issued.

Characteristic	Total	Before July 2012	After July 2012	*P**
N	1497	742	755	
Patient's origin				
Central Jakarta	517 (34.5)	213 (28.7)	304 (40.3)	
North Jakarta	285 (19)	244 (32.9)	41 (5.4)	
East Jakarta	365 (24.4)	151 (20.4)	214 (28.3)	
South Jakarta	96 (6.4)	48 (6.5)	48 (6.4)	< 0.001
West Jakarta	206 (13.8)	68 (9.2)	138 (18.3)	
Kepulauan Seribu	2 (0.1)	2 (0.3)	0 (0)	
Outside Jakarta	24 (1.6)	14 (1.9)	10 (1.3)	
Unknown	1 (0.1)	1 (0.1)	0 (0)	
Patients' age, years, n (%)				
<20*[1]	1 (0.1)	14 (1.9)	18 (2.4)	
20 – 29*[1]	31 (2.1)			
30 – 39	382 (25.5)	181 (24.4)	201 (26.6)	0.461
40 – 49	641 (42.8)	327 (44.1)	314 (41.6)	
50 – 59	367 (24.5)	176 (23.7)	191 (25.3)	
> 60	72 (4.8)	42 (5.7%)	30 (4.0)	
Unknown	3 (0.2)	2 (0.3)	1 (0.1)	
Wife's age, years, n (%)				
<20	4 (0.3)	2 (0.3)	2 (0.3)	
20 – 34	317 (21.2)	163 (22.0)	154 (20.4)	0.032
≥35	973 (65.0)	496 (66.8)	477 (63.2)	
Unknown	203 (13.6)	81 (10.9)	122 (16.2)	
Number of children, n (%)				
1	24 (1.6)	12 (1.6)	12 (1.6)	
2	368 (24.6)	144 (19.4)	224 (29.7)	
3	513 (34.3)	245 (33.0)	268 (35.5)	
4	294 (19.6)	155 (20.9)	139 (18.4)	< 0.001
5	164 (11.0)	97 (13.1)	67 (8.9)	
≥6	126 (8.4)	86 (11.6)	40 (5.3)	
Unknown	8 (0.5)	3 (0.4)	5 (0.7)	
Youngest child's age, years, median (minimum – maximum)	5 (0 – 36)			
Religion, n (%)				
Islam	1284 (85.8)	648 (87.3)	636 (84.2)	
Christian	62 (4.1)	15 (2.0)	47 (6.2)	
Catholic	40 (2.7)	17 (2.3)	23 (3.0)	< 0.001
Hindu	3 (0.2)	2 (0.3)	1 (0.1)	
Buddha	20 (1.3)	7 (0.9)	13 (1.7)	
Unknown	88 (5.9)	53 (7.1)	35 (4.6)	
Patient's education background, n (%)				
No formal education	67 (4.5%)	37 (5%)	30 (4.0%)	
Elementary school	341 (22.8%)	188 (25.3%)	153 (20.3%)	
Junior high school	336 (22.4%)	155 (20.9%)	181 (24.0%)	*0.009*
High school	484 (32.3%)	246 (33.2%)	238 (31.5%)	
College	121 (8.1%)	44 (5.9%)	77 (12%)	
Unknown	148 (9.9%)	72 (9.7%)	76 (10.1%)	

Characteristic	Total	Before July 2012	After July 2012	P*
Wife's education background, n (%)				
No formal education	78 (5.2%)	42 (5.7%)	36 (4.8%)	
Elementary school	373 (24.9%)	214 (28.8%)	159 (21.1%)	
Junior high school	384 (25.7%)	179 (24.1%)	205 (27.2%)	0.001
High school	368 (24.6%)	186 (25.1%)	182 (24.1%)	
College	86 (5.7%)	31 (4.2%)	55 (7.3%)	
Unknown	208 (13.9%)	90 (12.1%)	118 (15.6%)	
Patients' occupation, n (%)				
Government employees	46 (3.1)	26 (3.5)	20 (2.6)	
Private sector employee	518 (34.6)	248 (33.4)	270 (35.8)	
Casual laborer	609 (40.7)	302 (40.7)	307 (40.7)	0.082
Army or Police	14 (0.9)	6 (0.8)	8 (1.1)	
Retired	4 (0.3)	3 (0.4)	1 (0.1)	
Businessmen	97 (6.5)	42 (5.7)	55 (7.3)	
Farmer*2	7 (0.5)	1 (0.1)	7 (0.9)	
Fishermen*2	1 (0.1)			
Unemployment	85 (5.7)	52 (7.0)	33 (4.4)	
Unknown	116 (7.7)	62 (8.4)	54 (7.2)	
Source of information/guidance, n (%)				
Friends or family	97 (6.5)	45 (6.1)	52 (6.9)	
Other family planning program participants	74 (4.9)	48 (6.5)	26 (3.4)	
Health workers	15 (1.0)	7 (0.9)	8 (1.1)	
Family planning program officers	608 (40.6)	423 (57.0)	185 (24.5)	< 0.001
Shaman	3 (0.2)	0 (0)	3 (0.4)	
Himself	31 (2.1)	20 (2.7)	11 (1.5)	
Other	11 (0.7)	8 (1.1)	3 (0.4)	
Unknown	658 (44.0)	191 (25.7)	467 (61.9)	

*Chi-square test
*1Merging data of < 20 years old and 20–29 years old due to unmet Chi-squared requirement.
*2Merging data of farmer and fishermen due to unmet Chi-squared requirement.

no-scalpel vasectomy. All procedures used simple ligation and excision of a vas segment without using electro-cauterization. Other details of procedure report from patients included in this study are shown in Table 2.

There were a few complications reported by patients following no-scalpel vasectomy, which are presented in Table 2. This study found that no semen analysis was done within 1–3 months after the no-scalpel vasectomy procedure.

Dataset 1. Demographic and surgical characteristics of no-scalpel vasectomy patients

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Discussion

No-scalpel vasectomy is a vasectomy procedure that is widely used today, due to its advantages over scalpel vasectomy; it is considered the safest and most inexpensive method for male sterilization[4–6]. However, it only contributes to a small percentage of the contraceptive methods used in Indonesia. This might be because the majority of Indonesian men (70.4%) have never heard about men sterilization, and among men who were aware of male sterilization methods, 77.4% never considered to undergo sterilization[8]. There were many factors found to affect the selection of vasectomy as a contraception method, such as lack of knowledge and negative attitudes toward vasectomy among patients and providers, education level, age, occupation, number of children, spousal support and social norms[11,12].

Indonesia is a country with the largest Moslem population in the world. There are still controversies regarding vasectomy procedures among Moslems in Indonesia. However, in July 2012, MUI declared a *fatwa* changing vasectomy from *haram* to *halal* in condition due to success recanalization/vasectomy reversal[7]. This study compared the demographic characteristics of patients who underwent no-scalpel vasectomy before and after MUI's *fatwa* issuance. This study found no significant difference in patients' age and patients' occupation before and after *fatwa* issuance. However, there was a significant difference regarding spouses' age, number of

Table 2. No-scalpel vasectomy procedure reports for patients in Jakarta, between January 2010 and May 2017.

Procedure	
N	989
Length of procedure time, minutes, median (minimum – maximum)	10 (7 – 90)
Grasping Vas Deferens, n (%)	
Easy	938 (94.8)
Difficult	35 (3.5)
Unknown	16 (1.7)
Scrotal skin puncture, n (%)	
Easy	955 (96.6)
Difficult	18 (1.8)
Unknown	16 (1.6)
Spreading tissue, n (%)	
Easy	967 (97.8%)
Difficult	6 (0.6%)
Unknown	16 (1.6%)
Vas Extraction, n (%)	
Easy	945 (95.6)
Difficult	28 (2.8)
Unknown	16 (1.6)
Type of suture material, n (%)	
Silk	981 (99.2)
Cat gut	2 (0.2)
Unknown	6 (0.6)
Fascia interposition, n (%)	
Yes	930 (94.0)
No	6 (0.6)
Unknown	53 (5.4)
Complication	
Edema	
Yes	9 (0.6)
No	1423 (95.1)
Unknown	65 (4.4)
Pain	
Yes	14 (0.9)
No	1418 (94.7)
Unknown	65 (4.4)
Ecchymosis	
Yes	1 (0.1)
No	1431 (95.6)
Unknown	65 (4.4)
Infection	
Yes	2 (0.1)
No	1433 (95.7)
Unknown	65 (4.4)

children, preligion, patients' and spouses' educational background, and the person who guided patients to undergo vasectomy procedure before and after *fatwa* issuance.

This study found that no-scalpel vasectomy procedure was most common in the age group of 40–49 years old (42.8%), followed by age group of 30–39 years old (25.5%) and 50–59 years old (24.5%). This finding is similar to other studies, which found that most vasectomy users underwent the procedure when they were over 30 years of age, but the largest proportion was at the age of 30–39 years old[11,13–16]. Moreover, based on Indonesian Demographic and Health Survey 2012 (*Survei Demografi dan Kesehatan* 2012), among patients considering vasectomy, the largest proportion was found at the age of 30–39 years old, followed by 40–49 years old[9]. Regarding the wife's age, over 35 years old was the most common age of wife of patients undergoing no-scalpel vasectomy procedures. This is explained, since pregnancies over 35 years has a high risk for women. Other studies found the wife's age of over 30 as the age for husbands to undergo vasectomy, while the mid- to late 30s was considered "typical" for Asian couples[11,13,15,17]. There was significant difference in wife's age before and after *fatwa* issuance. However, this is most likely due to larger missing data after *fatwa* issuance, which could be due to poor data collection.

Among no-scalpel vasectomy patients, most of them had three children (34.3%) when they underwent no-scalpel vasectomy procedure. There were variations regarding the number of children among the patients across geographical regions. Although in general, the vasectomy was performed when the number of children was four or more in some places, in other places two or more children were enough to encourage patients to undergo vasectomy, such in the USA or Iran[11–13,15]. There were significant differences regarding the number of children before and after *fatwa* issuance. After July 2012, there were higher proportion of patients having two children and lower proportion of patients having three or more children compared to before July 2012. This could be a sign of the success of the family planning program. However, further study is needed to support this hypothesis.

Islam is the most stated religion among patients undergoing no-scalpel vasectomy in Jakarta. This is because Islam is the majority religion in Indonesia. This study found a signficant difference in patients undergoing no-scalpel vasectomy in terms of religion before and after *fatwa* issuance. Interestingly, however, there were no increased participation of Moslems to undergo no-scalpel vasectomy. There was a higher proportion of Christian and Buddhist patients who underwent no-scalpel vasectomy after *fatwa* issuance compared to before *fatwa* issuance. However, an increase in the proportions of both religions could not be explained.

This study also found a high proportion of no-scalpel vasectomy patients and their spouses graduated from high school, junior high

school, and elementary school (patients: 32.3%, 22.4% and 22.8%; wives: 24.6%, 25.7% and 24.9%, respectively). Therefore, this study found that the majority of patients who underwent vasectomy had less than 12 years of education. Other studies showed varied education levels across regions with the majority of patients and their spouses illiterate or had low education levels in developing countries. However, in developed countries, vasectomy was more prevalent in men with high education level[16–18]. There were significant differences in education level for both patients and their spouses before and after July 2012. This might be due to the increased of education participation of Indonesian people, especially at junior high school and college level. This is supported by the presence of the same trend in both patient and wife education background data, which show an increase in the proportion of junior high school and college graduated. However, the government-level data regarding Indonesia's education participation rate are currently unavailable.

Most of the patients (40.6%) undergoing no-scalpel vasectomy were suggested by family planning program officers to choose no-scalpel vasectomy as their contraception method. Family planning program officers and their cadres have an important role in helping patients to decide on vasectomy[19]. Data from Ghana showed that most patients gained information regarding vasectomy through media and healthcare workers, whereas only small amounts of patients gained the information from family and friends[15]. There was a significant difference before and after July 2012 regarding source of information/guidance who encourages patients to undergo no-scalpel vasectomy. However, this was probably due to a high proportion of missing data.

All no-scalpel vasectomy procedures were performed using "Dr. Li's three finger technique". This technique was developed by Dr. Li Shunqiang and was performed using ringed clamp and dissecting forcep[10,20]. From the procedure report, this study found that doing no-scalpel vasectomy only took a relatively short amount of time (median 10 minutes; range 7–90 minutes). Other studies found a similar short operative time for no-scalpel vasectomy[6,21,22]. The wide range of operating times in this study might be influenced by operator's experience. One study found that high learning curve for no-scalpel vasectomy procedure required 10–15 operations before being able to perform the procedure perfectly[23]. All the procedures performed on the patients in this study were performed using infiltration as the anesthesia technique. There are several anesthetic techniques beside infiltration, such as combination of infiltration and spermatic cord block and no needle jet anesthesia. One study found that combination of infiltration and spermatic cord block was the best and the most effective method for reducing pain during vasectomy[4].

This study also found that "Dr. Li's three finger technique" was an easy procedure to conduct. Most operators felt easy in performing the steps of "Dr. Li's three finger technique" in no-scalpel vasectomy procedure. All procedures used ligation and excision (LE) without cautery. Cautery was associated with more rapid progression to severe oligospermia and fewer early vasectomy failure[24,25]. However, cautery has not been adapted yet into standard practice in Indonesia. Silk was the suture material mostly used for vas ligation in this study. There were various suture materials used, such as cotton and cat gut. One study showed that the usage of vicryl increased vasectomy failure three times compared to chromic cat gut. However, until today, there was no study comparing effectiveness of silk, cotton and cat gut[20,26]. Most of procedures used fascial interposition (FI) as an additional step when performing no-scalpel vasectomy in this study. FI can reduce the risk of occlusive failure when performing LE and was associated with decreased time to azoospermia, decreased time to severe oligospermia and reduced failure based on semen analysis[22,27]. The use of combination between LE and FI varied from one country to another. There were several reasons why FI was not performed in South Asian countries, such as technical difficulties, time consuming as it adds 2–4 minutes, and national standard practice didn't include FI as a mandatory step[22].

This study found only a few complications that occurred during the no-scalpel vasectomy procedures. Another study also found few complications after no-scalpel vasectomy procedures, with an overall rate of 0.32%, consisting of hematoma, bleeding, foreign body granuloma, scrotal pain, epididymitis and sinus formation[28]. However, there was also a probability that patients didn't report their complication or came to another facility, due to long distance, in this study. This study also found that no semen analysis was done after the vasectomy procedures. Based on the standard practice guideline, semen analysis should be done in the first month until the third month after vasectomy has been performed[10]. However, low compliance might be caused by long distance and cost. Other studies reported compliance under 30%, except for one center, in Nepal for semen analysis[29].

This is the first study that which describes the characteristics of patients undergoing no-scalpel vasectomy in Indonesia. Data in this study could be useful to encourage further studies, to plan and to evaluate programs related to contraception, specifically male sterilization. However, there are also limitations in this study regarding missing data. Some variables had high missing data, such as the data regarding wife's age and sources of information/guidance. This should encourage health care providers to pay more attention to completeness of data. Such data could be useful for a variety of goals, such as program evaluation.

Conclusion

Despite its limitations, this study provides a depiction of the characteristics of patients undergoing no-scalpel vasectomy in Jakarta. Even though there were significant proportional difference in some characteristics, this study considers that the *fatwa* was not the only factor that affects a patient's choice of no-scalpel vasectomy. This study also found that no-scalpel vasectomy was considered an easy procedure to perform and caused minimal complications.

Data availability

Dataset 1. Demographic and surgical characteristics of no-scalpel vasectomy patients. doi, 10.5256/f1000research.12748.d185669[30]

Competing interests

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This is an interesting manuscript which captures some of the barriers in Indonesia preventing widespread adoption of vasectomy. The science is sound and the commentary interesting; however, in its current state, the article requires grammatical review and correction prior to publication. There are errors throughout the text beginning in the abstract. The other clinical comment is that the author's report a guideline suggesting semen analysis be performed 1 month following the procedure, this is not the case for all guidelines (AUA suggests 8-16 weeks).

Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.