



# Evaluation of Muslim women's perspectives on natural orifice specimen extraction (NOSE) surgery

Ersin Gundogan<sup>1^</sup>, Cuneyt Kayaalp<sup>2</sup>

<sup>1</sup>Department of General Surgery, Health Science University, Kayseri, Turkey; <sup>2</sup>Department of Gastrointestinal Surgery, Inonu University, Malatya, Turkey

**Contributions:** (I) Conception and design: Both authors; (II) Administrative support: Both authors; (III) Provision of study material or patients: Both authors; (IV) Collection and assembly of data: Both authors; (V) Data analysis and interpretation: Both authors; (VI) Manuscript writing: Both authors; (VII) Final approval of manuscript: Both authors.

**Correspondence to:** Ersin Gundogan, MD. Associate Professor, Department of General Surgery, Health Science University, 38080 Kocasinan, Kayseri, Turkey. Email: ersingundogan@hotmail.com.

**Background:** Patient perception of natural orifice transluminal endoscopic surgery, which is a minimally invasive surgical technique, is not clear. The purpose of the present study was to evaluate the perspectives of Asian women on this method.

**Methods:** There were two groups in the study; medical personnel with 100 female participants and the general population. After a brief briefing on the method, a questionnaire with 25 questions was applied by the teams who were impartial and had knowledge about the method.

**Results:** The mean age of the participants was 31.6±10.9 years, the mean height was 163±5.7 cm, and the mean weight was 63.5±12.3 kg. When the survey results were examined, it was found that 131 (68.9%) of the participants had a problem with the surgery scar and 191 (96.9%) wanted to have surgery without this scar. When asked why, aesthetic anxiety (85.5%), pain (73.9%) and hernia risk (73.4%) answers were given respectively. Although only 56 (28%) of the participants had heard of the natural orifice specimen extraction (NOSE) method, it was found that 92 (46%) of them were worried that this method would affect their sexual life, and 49 (24.5%) were not sure about this. It was also found that the participants preferred the transvaginal (52.1%) method the most, followed by the transoral (34.2%), and transanal (13.7%) method, respectively. The order of preference of cholecystectomy methods was laparoscopic (53.7%), NOSE (41.2%), and conventional (5.1%).

**Conclusions:** Although the rate of awareness of natural orifice surgery is lower in Asian country than in other countries, it seems that this rate will increase with adequate information. Education level, socio-cultural structure and insufficient public opinion seem to be the main reasons that decrease this rate.

**Keywords:** Minimally invasive surgery; natural orifice surgery; laparoscopy; transanal; transvaginal

Received: 27 October 2023; Accepted: 06 March 2024; Published online: 10 April 2024.

doi: 10.21037/ales-23-52

View this article at: <https://dx.doi.org/10.21037/ales-23-52>

## Introduction

Natural orifice transluminal endoscopic surgery (NOTES) is a hybrid procedure in which natural orifices are used to perform the intra-abdominal surgical procedure. It is aimed to emphasize patient comfort with this technique by

reducing the complications related to abdominal incision. However, the requirement for special endoscopic equipment and experience limits the use of this technique. To minimize these disadvantages, methods that could create a step for NOTES were started to be used. One of them, natural

<sup>^</sup> ORCID: 0000-0002-3046-9040.

orifice specimen extraction (NOSE), which is a combined method with laparoscopy, in which natural orifices are used as the stage of extraction and trocar entry area. Although the applicability of natural orifice surgery was first proven in 2004 (1), it could not be put into daily use until 2007. It has been used more frequently since this date with the increase of technological infrastructure and surgical experience. Although the advantages of these innovative procedures in minimally invasive methods cannot be underestimated, the point of view of the population is the most important criterion that changes the amount of application. Also, the perspective of healthcare staff, who have an active role in the application of this treatment method, is another important factor affecting the applicability of the method.

Another important issue that affects the acceptability of this treatment protocol is the effect it has on the individual's belief, as in other treatment modalities. Belief plays important roles in the acceptance of treatment and lifestyle after the treatment. Although there are many survey studies examining the factors that affect the acceptability of this method, there is no study showing the perspective of a Asian population. The purpose of the present study was to examine the point of view of the population formed by the Asian community and the healthcare staff to natural orifice surgery and the factors that affect it. We present this article in accordance with the SURGE reporting checklist (available at <https://ales.amegroups.com/article/view/10.21037/ales-23-52/rc>).

### Highlight box

#### Key findings

- In this study, awareness of the natural orifice specimen extraction (NOSE) technique, patient acceptability and the change in patient perspective after information were investigated.

#### What is known and what is new?

- Our study is the first to investigate the awareness of the NOSE method on the population of this region.
- It has been observed that the awareness of the study is low and the perspective on the method in this aspect is weak.

#### What is the implication, and what should change now?

- It has been observed that Asian and Muslim communities are prejudiced against the NOSE method and its awareness is low. It was observed that the rate of preference increased when information about the method was given. It is thought that by adequately informing the public and increasing the awareness of the method, the existing prejudice can be broken and the preference rates will increase.

## Methods

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The present study was approved by Inonu University Ethical Committee (No. 2016/199) and was registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (No. NCT03311893). Participants were included in the study by obtaining consent form after verbal and written information about the study. A total of 200 participants were included in the study in two groups, each with 100 patients, as healthcare staff and the normal population. In the power analysis, when  $\alpha$ : 0.05,  $1-\beta$ (power): 0.80, it was determined that at least 100 questionnaires were required for the population to change the awareness of natural orifice piece extraction surgery to 29%, and the number of questionnaires was adjusted accordingly. In line with their consent, the people were asked to fill in a 15-question questionnaire, and when requested, information was given by the pollsters (Appendix 1). Between questions 6 and 7, the interviewers gave information to the participants about NOSE surgery and then the survey continued with other questions—(What kind of method is it? What diseases is it used for? What advantages does it have over laparoscopic surgery?). Those who were not educated were assisted by independent pollsters with knowledge of the method. The participants were informed that there was no obligation to answer all of the questions. The survey was conducted within our hospital and only 10 surveys were made outside the hospital. The survey results were entered into the SPSS version 16.0 and Microsoft Excel 2013 data system by an independent healthcare professional. Unanswered questions were considered incomplete and each parameter was evaluated among those answered. By entering the height and weight values of the persons, body mass index (BMI) was calculated with the  $\text{weight}/\text{height}^2$  formula and recorded as a separate parameter. The data of the groups were evaluated in comparison with each other and separately.

### Statistical analysis

Descriptive statistics were made for all data and reported as mean values and percentages. The continuous variables were analyzed with the unpaired *t*-test. The categorical variables were analyzed with the Chi-square test and Fisher-exact test. Statistical significance was taken as  $P < 0.05$ . The data were analyzed by using the SPSS version 16.0 and Microsoft Excel 2013.

## Results

The survey was conducted on 100 female participants, in two separate groups as healthcare staff and normal population. The mean age of the participants was found to be  $31.6 \pm 10.9$ , the mean height was  $163 \pm 5.7$  cm, and the mean weight was  $63.5 \pm 12.3$  kg. Also, 103 (34.8%) of the group were married, 119 (59.5%) were college graduates, and only 9 (4.5%) were uneducated. Considering their clinical histories, 95 (47.7%) patients had a surgery history. When the survey results were examined, it was found that 131 (68.9%) of the participants had a problem with the surgery scar and 191 (96.9%) wanted to have surgery without such a scar. When asked why, aesthetic anxiety (85.5%), pain (73.9%) and hernia risk (73.4%) answers were given respectively.

After the first evaluation, people were informed about what they were worried about regarding the surgical wound and about NOSE, a surgical technique that could be beneficial in this respect. After this information, it was seen that 65% preferred NOSE, 26% were undecided and 9% did not prefer this method. When these rates were compared with the rates of requesting the natural surgery in the first questions of the questionnaire, a significant difference was found in the acceptance rate ( $P=0.0001$ ). When the reasons for those who did not prefer the NOSE method were investigated, the age ( $35.1 \pm 14.7$  vs.  $31.7 \pm 10.8$  years,  $P=0.24$ ), BMI ( $24.1 \pm 4.8$  vs.  $23.8 \pm 4.5$  kg/m<sup>2</sup>,  $P=0.80$ ), high educational status (47% vs. 56%,  $P=0.6$ ), surgeon gender (47% vs. 41%,  $P=0.80$ ), and profession (41% vs. 46%,  $P=0.8$ ) did not differ in this regard. However, fear of sexual dysfunction was significantly higher in those who did not accept NOSE (86% vs. 45%,  $P=0.004$ ).

Although only 56 (28%) of the participants had heard of the NOSE method, it was found that 92 (46%) of them were worried that this method would affect their sexual life, and 49 (24.5%) were not sure about this. When the emotional change of transvaginal piece removal was questioned in patients, although 112 (56%) were undecided on this, 56 (28%) stated that they were positive, and 32 (16%) stated that they were negative. When their desire to have surgery with this technique was questioned, although 92 (46%) were undecided, 65 (32.5%) answered “yes”, and 43 (21.5%) answered “no”. Also, when the relationship between the desire to have surgery with this technique and the level of education was examined, no significant differences were found in any group. When the application requests of this technique in gynecological operations were

examined, although 79 people (39.5%) said “yes”, 46 (23%) said “no”, and 75 (37.5%) were undecided. When asked “Does the gender of the surgeon affect the acceptability of this method?” 108 (54%) said “no”, 85 (42.5%) “yes”, and 7 (3.5%) were undecided. The opinions of the participants about NOSE were found to be positive in 107 (53.7%) questionnaires, negative in 13 (6.6%) questionnaires, and undecided in 79 (39.7%) questionnaires. It was also found that the participants preferred the transvaginal (99–52.1%) method the most, followed by the transoral (65–34.2%) and transanal (26–13.7%) route, respectively. It was also seen that 88 (44.2%) of the participants would recommend this method to their relatives, 28 (14.1%) would not, and 83 (41.7%) were undecided. The order of preference for cholecystectomy methods was laparoscopic (107–53.7%), NOSE (82–41.2%), and conventional (10–5.1%). To the question in which case the NOSE method would be selected, 102 participants (51.6%) answered “always”, 77 participants (38.8%) “sometimes”, and 19 participants (9.6%) “never”. Also, the perspectives of two groups as healthcare staff and the population were also examined. The demographic data and the results are given comparatively in *Tables 1-3*.

## Discussion

Many studies were conducted in the last decade on natural orifice surgery. This revolutionary process, which started with NOTES, did not receive the expected attention because of the need for technological equipment and experience. These difficulties were tried to be overcome to some extent with pioneering methods used in the transition phase such as NOSE. Many survey studies have been published since the end of the 2000s to investigate the impression created by this method in society (1-10). The studies are mostly of USA origin, but there are also studies specific to European and Asian populations. Despite this, there is no study showing the viewpoint of the Asian people on this method. One of the important components of a good treatment plan is to consider the effects of this treatment plan on the individual's belief. Belief plays important roles in acceptance of treatment and lifestyle after treatment (11,12). One of the important factors that affect the point of view regarding this method is the opinions of the healthcare staff, with whom the patients are closely contacted and severely affected during the treatment, about this method. Considering these important and missing points, this comparative survey study was conducted, stating

**Table 1** Demographic data of the groups

Demographic data	General population	Healthcare staff	P
Age, years	33.5±13.1	29.8±7.9	0.01
Height, cm	162.4±5.5	163.6±5.8	0.13
Weight, kg	65.5±14.4	61.5±9.4	0.02
Marital status			
Separated	3 [3]	1 [1]	0.62
Single	39 [39]	50 [50]	0.15
Married	56 [56]	47 [47]	0.25
Empty	2 [2]	2 [2]	
Educational status			
None	9 [9]	0 [0]	0.003
Primary school	23 [23]	0 [0]	0.0001
Secondary school	14 [14]	0 [0]	0.0001
High school	24 [24]	11 [11]	0.02
College	30 [30]	89 [89]	0.0001
Operation history			
Yes	49 [49]	46 [46]	0.77
No	51 [51]	53 [53]	
Empty	0 [0]	1 [1]	

Data are presented as mean ± standard deviation or n [%].

the opinions of the Middle East-Anatolia population and healthcare staff.

The primary purpose of natural orifice surgery is to minimize the amount of incision and to reduce the associated complications. In the present study, it was found that 96.9% of the participants wanted surgery without incision, and this was mainly because of aesthetic concerns (85.5%). It was also found that there was no difference in this preference between healthcare staff and the population. When the literature was reviewed, pain and incisional hernia anxiety were found to be more prominent in an Italy-based study (2), and in a Germany-based study, pain and aesthetic anxiety were found to be more prominent (3). Also, in an American-based survey study, it was reported that aesthetic anxiety, especially pain, was included in this preference (4). In a study that was conducted in the Czech Republic in which physicians and patients were compared, the highest anxiety rate was observed to be the risk of hernia (80%) in the physician group, and pain in the patient group (66%) (13). In the present study, it was found that the

leading cause was aesthetic anxiety in the healthcare staff group and the population group (92.6–80%). Interestingly, it was also found that the rate of negative thinking about this method was significantly higher in the group of healthcare staff ( $P=0.01$ ). This result was associated with the fact that the geographical area in which the study was conducted was a society that adopted the structure of paternalism and that it believed in the correctness of the proposed method without questioning.

In the present study, the rate of being aware of natural orifice surgery was found to be 28% and the rate of requesting the application of this method was 32.5%. Although the rate of healthcare staff being aware of this method was significantly higher, the rate of wanting to use this method was found to be lower, although not significant. When the literature was reviewed, in an Italy-based study, the rate of being aware of this method was found to be 12.9% (2). Considering that this study was conducted on bariatric patients and this rate was 14% in the population group in our study, this difference was not

Table 2 Survey answers 1

Survey answers	Group (before the information)		P
	General population, n [%]	Healthcare staff, n [%]	
Do you care about the surgery scar?			0.87
Yes	67 [68]	64 [69]	
No	31 [32]	28 [30]	
Do you want to undergo surgery without a scar?			0.11
Yes	99 [99]	92 [95]	
No	1 [1]	5 [5]	
Why do you want to undergo surgery without a scar?			
A	12 [12]	18 [19]	0.23
A + B	3 [3]	1 [1]	0.62
A + C	3 [3]	2 [2]	>0.99
B	7 [7]	0 [0]	0.01
B + C	3 [3]	1 [1]	0.62
C	3 [3]	2 [2]	>0.99
D	68 [69]	70 [74]	0.52
Other	0 [0]	1 [1]	0.48
Have you ever heard about NOSE?			0.0001
Yes	14 [14]	42 [42]	
No	86 [86]	58 [58]	
How do you feel if the diseased organ is excised from the vagina after the surgery?			
Positive	32 [32]	24 [24]	0.27
Negative	16 [16]	16 [16]	>0.99
Not sure	52 [52]	60 [60]	0.31
Are you concerned about your sexual life?			
Yes	51 [51]	41 [41]	0.2
No	32 [32]	27 [27]	0.53
Not sure	17 [17]	32 [32]	0.02

A: Aesthetic reasons, B: Being less painful, C: Reduced possibility of hernia in the surgery site, D: All. NOSE, natural orifice specimen extraction.

found to be significant. This high rate in our study was associated with the high level of awareness of healthcare staff. Also, when the educational status of the patients in our study and the rate of requesting this method were compared, no difference was found. In a study conducted in the Czech Republic, it was seen that people with a higher education level preferred this method significantly (13). When a question at the end of the survey was re-examined,

it was found that the rate of preference for this method increased from 32.5% to 65%. This shows that even in-survey information significantly increased the rate of patient preference ( $P=0.0001$ ), and it was thought that the primary reason for the prejudice against this method was the lack of information. Also, in the present study, it was concluded that the gender of the surgeon significantly changed the choice of this technique ( $P=0.009$ ). When the literature

Table 3 Survey answers 2

Survey answers	Group (after the information)		P
	General population, n [%]	Healthcare staff, n [%]	
Do you want to undergo through a natural way?			
Yes	38 [38]	27 [27]	0.13
No	21 [21]	22 [22]	>0.99
Not sure	41 [41]	51 [51]	0.2
Do you want a gynecological surgery with this method?			
Yes	41 [41]	38 [38]	0.77
No	24 [24]	22 [22]	0.86
Not sure	35 [35]	40 [40]	0.55
Does the surgeon gender affect your choice?			
Yes	52 [52]	33 [33]	0.009
No	47 [47]	61 [61]	0.06
Not sure	1 [1]	6 [6]	0.11
What are your thoughts about this method?			
Positive	50 [50]	57 [57]	0.32
Negative	11 [11]	40 [40]	0.01
Not sure	39 [39]	2 [2]	0.88
Which route do you prefer if you undergo surgery with this method?			
Transvaginal	49 [49]	50 [55]	0.47
Transoral	37 [37]	28 [33]	0.36
Transanal	13 [13]	13 [14]	0.83
Do you recommend this method to your relative?			
Yes	46 [46]	42 [42]	0.67
No	18 [18]	10 [10]	0.15
Not sure	36 [36]	47 [47]	0.11
Which method do you prefer if you undergo cholecystectomy surgery?			
Conventional	7 [7]	3 [3]	0.33
Laparoscopy	51 [51]	56 [57]	0.47
NOSE	42 [42]	40 [40]	0.88
In which circumstances do you prefer NOSE cholecystectomy surgery?			
Always	53 [53]	49 [50]	0.77
Sometimes	37 [37]	40 [41]	0.66
Never	10 [10]	9 [9]	>0.99
If you know that laparoscopic surgeries have the risk of hernia albeit at a low level, would you prefer the natural way?			
Yes	70 [70]	60 [60]	0.18
No	10 [10]	7 [7]	0.61
Not sure	20 [20]	33 [33]	0.05

NOSE, natural orifice specimen extraction.



was reviewed, Muslim women seeking reproductive health generally preferred female physicians in a USA-centered study conducted in the field of obstetrics-gynecology (14). It was thought that not only the current beliefs but also the sociocultural environment were effective in the preferences of patients.

In the present study, it was seen that more than half of the participants chose the transvaginal route and it was followed by the transoral route. It was seen that being a healthcare staff did not make a difference in this preference. It is already known that transvaginal procedures are used more frequently in the USA, and transoral endoscopic procedures are used more frequently in Europe and South America. However, when the natural orifice survey studies were examined, it was seen in a USA-based study that 85% of the participants preferred the transoral route (4). Although the actual reason why the participants preferred the oral route more is not known, it was emphasized that this difference may be caused by the fear of sexual life and the absence of a history of transanal intervention. Similarly, in a study based in Italy, it was seen that the transoral option was preferred more than other routes (2). Also, it was seen in a UK-based study that 27.8% preferred the transoral route, followed by transrectal (19.4%), and transvaginal (16.1%) routes, respectively (9). The reason for this difference in our study was that, as a socio-cultural structure, it was thought that the first birth age of the participants was small and the fact that the transvaginal route was stated as the birth route in the questionnaire information increased the acceptability.

In the current study, there was a fear that the use of the transvaginal route would negatively affect sexual life in 46% of the participants, and there was no difference between the two groups in this regard. Also, it was observed in the analysis based on age groups that the anxiety about sexual life was significantly higher in young women ( $P=0.01$ ). In a study that was conducted in Austria, it was found that this concern was 42% and was significantly higher in young women (6). Also, the fear of sexual life was significantly higher in the nulliparous and under 45 years old group than in the other groups in a USA-based study (7). In a multicenter study conducted on gynecologists in Germany, Switzerland and Australia, it was found that the reason for this fear was the possibility of infection, infertility and adhesions, respectively (8). The reason why this concern in the current study was higher than other studies was thought that the Muslim population, which constitutes a significant part of our patient population, might have prejudice regarding this treatment method. In a study that was

conducted in the USA and examining the relationship of the Muslim people with the health system, it was observed that cultural and religious norms in some Muslim sections create prejudice against some treatment methods (15).

In the present study, although 41% of the participants wanted to have a natural cholecystectomy surgery, it was seen that this rate was not different in the healthcare staff and population groups. When the literature was reviewed, although the rate of requesting a natural cholecystectomy surgery was 56% in a USA-based study (16), it was found to be 78% in another USA-based study (4). Also, when the participants in the study were asked about their emotional state after NOSE surgery, it was seen that one-fourth of them would be happy with this situation. When the literature was reviewed, it was seen that there were similar results with an Austria-based study (6).

When the participants were informed that there is a hernia risk in laparoscopic operations, the rate of requesting the natural surgery increased at significant levels in both groups ( $P=0.0001$ ). This difference showed us that the rate of requesting a natural surgery will increase significantly when adequate information is provided. When the literature was reviewed, it was seen that the rate of choosing the NOSE method increased because of the knowledge of the hernia risk (5).

Considering the rate of the participants recommending this method to their relatives (44.2%), it was found that the rate of their own acceptance was higher. This was evaluated as an indication that they were aware of the benefits of the method but could not accept it sufficiently. When the literature was reviewed, it was found that our results were similar to the results of a USA-based study (45–50%) (7), but were lower than the rates in an Italy-based study (61.3%) (2). Additionally, in the study conducted by Bulian *et al.* on patients who underwent cholecystectomy, it was observed that the group that underwent transvaginal cholecystectomy recommended it to friends and family significantly more than the group that underwent conventional cholecystectomy (17).

## Conclusions

Although natural orifice surgery came to the forefront as a method to reduce the complications of surgical principles, it did not receive enough attention. The survey study showed us that, compared to other studies, the rate of awareness of this method is lower in the Middle East people than in other regions. However, this rate increases even with the

information in the questionnaire. Education level, socio-cultural structure and insufficient public opinion seem to be the main reasons that decrease this rate. Although there is no significant difference between the healthcare staff and the general population in terms of perspective, negative results were obtained contrary to expectations in terms of the acceptance of this method by the healthcare staff. For this reason, informing healthcare staff must be prioritized.

## Acknowledgments

We would like to thank the 2nd-year students of the Faculty of Medicine, Inonu University, who supported us in the survey in this study.

*Funding:* None.

## Footnote

*Provenance and Peer Review:* This article was commissioned by the editorial office, *Annals of Laparoscopic and Endoscopic Surgery* for the series “Natural Orifice Specimen Extraction in Colorectal Surgery”. The article has undergone external peer review.

*Reporting Checklist:* The authors have completed the SURGE reporting checklist. Available at <https://ales.amegroups.com/article/view/10.21037/ales-23-52/rc>

*Data Sharing Statement:* Available at <https://ales.amegroups.com/article/view/10.21037/ales-23-52/dss>

*Peer Review File:* Available at <https://ales.amegroups.com/article/view/10.21037/ales-23-52/prf>

*Conflicts of Interest:* Both authors have completed the ICMJE uniform disclosure form (available at <https://ales.amegroups.com/article/view/10.21037/ales-23-52/coif>). The series “Natural Orifice Specimen Extraction in Colorectal Surgery” was commissioned by the editorial office without any funding or sponsorship. C.K. served as the unpaid Guest Editor of the series and serves as an unpaid editorial board member of *Annals of Laparoscopic and Endoscopic Surgery* from August 2023 to July 2025. The authors have no other conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are

appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The present study was approved by Inonu University Ethical Committee (No. 2016/199) and was registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (No. NCT03311893). Participants were included in the study by obtaining consent form after verbal and written information about the study.

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doi: 10.21037/ales-23-52

**Cite this article as:** Gundogan E, Kayaalp C. Evaluation of Muslim women's perspectives on natural orifice specimen extraction (NOSE) surgery. *Ann Laparosc Endosc Surg* 2024;9:12.

### Appendix 1 Survey on Diseased Organ Removal through Natural Orifice

Laparoscopic surgery is performed through small holes without large abdominal wound. Pain is less after laparoscopic surgeries. The patient returns to daily life faster. Inflammation and hernia are less in the surgical sites. Although the surgery is laparoscopic, the abdomen must be cut a little to remove the diseased organ. These wound reduces these benefits of laparoscopic surgery. It has been recently discovered to use the stomach, large intestine, and vaginal tract to remove the diseased organ without large wound. This method is not very well-known by surgeons and patients in our country.

The purpose of this survey is to find out your thoughts on natural removal of the diseased organ.

Age \_\_\_\_\_ Gender \_\_\_\_\_ Occupation \_\_\_\_\_

Marital status (married, single, separated) \_\_\_\_\_

Educational status (primary school, middle school, high school, college) \_\_\_\_\_

Height \_\_\_\_\_ Weight \_\_\_\_\_

Reason for coming to the hospital \_\_\_\_\_

Have you ever had a surgery?    Yes    No

1) Do you care about the surgery scar?

Yes        No

2) Do you want to undergo surgery without a scar?

Yes        No

3) Why do you want to undergo surgery without a scar?

a) Aesthetic reasons    c) Reducing the possibility of hernia at the surgery site    b) Less painful    d) All

e) Other .....

4) Have you heard of the natural surgical technique? If yes, from where?

a) Yes (Where did you hear it? ..... )        b) No

5) How would you feel if you had a surgery in the abdomen and the diseased organ was removed from the vaginal tract rather than by large wound?

a) Positive    b) Not sure    c) Negative

6) Are you concerned about your sexual life?

a) Yes    b) No    c) I am not sure.

-----Information about natural orifice surgery (NOSE)-----

(What kind of method is it? What diseases is it used for? What advantages does it have over laparoscopic surgery? )

7) Do you want to undergo through a natural way?

a) Yes    b) No    c) Not sure

8) Do you want a gynecological surgery with this method?

a) Yes    b) No    c) Not sure

9) Does surgeon gender affect your choice?

a) Yes b) No c) I am not sure

10) What are your thoughts about this method?

a) Positive b) Negative c) I'm not sure

11) Which route do you prefer if you undergo surgery with this method?

a) Stomach b) Large intestine c) Vaginal tract

12) Do you recommend this method to your relative?

a) Yes b) No c) Not sure

13) Which method do you prefer if you undergo cholecystectomy surgery?

a) Conventional surgery b) Laparoscopic surgery c) Natural surgery

14) In which circumstances do you prefer NOSE cholecystectomy surgery?

a) I never prefer b) Maybe in some surgeries c) Maybe for any suitable surgery

15) If you know that laparoscopic surgeries have the risk of hernia albeit at a low level, would you prefer the natural way?

a) Yes b) No c) Not sure