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Research Paper

Exploring factors impacting patient decisions in hemorrhoid surgery: A questionnaire survey in Taiwan

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HIGHLIGHTS

- Significant gender disparity in awareness of minimally invasive surgery benefits
- Medical personnel show higher awareness of minimally invasive surgery advantages
- Personal networks and medical social media are primary information sources
- Surgeon evaluation and care quality are top considerations for patients

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ABSTRACT

Background: Minimally invasive hemorrhoid surgeries like Doppler-Guided Hemorrhoidal Artery Ligation (DGHAL) and Stapled Hemorrhoidopexy (PPH) offer benefits over traditional methods. This study investigated public perceptions and attitudes towards these surgeries, exploring awareness, preferences, and influencing factors.
Methods: A detailed questionnaire was disseminated to 2011 participants from various regions of Taiwan in December 2023, gathering data on demographics, understanding of minimally invasive surgery, and attitudes towards hemorrhoid surgery. Chi-square tests were used for analysis ($p < 0.05$).
Results: Hemorrhoid prevalence was similar across sexes and age groups. About 70 % preferred medical centers or district hospitals for surgery. Postoperative complications were a primary concern, with significant sex differences. Approximately 70 % preferred minimally invasive surgery if costs were below NT$50,000. Medical personnel showed higher awareness of minimally invasive surgery benefits. Most participants relied on personal networks and medical social media for information.
Conclusions: The study revealed generally positive perceptions of minimally invasive hemorrhoid surgery, with cost being a significant factor. Knowledge gaps exist, particularly among non-medical personnel. Future initiatives should aim to enhance public awareness of minimally invasive surgery benefits, and policy considerations should address financial aspects of healthcare decisions.

Background

As hemorrhoids have become an escalating health issue worldwide, their management offers a gamut of options, ranging from lifestyle alterations to medication and surgical interventions such as hemorrhoidectomy [1–3]. The choice to perform hemorrhoidectomy is based on a complex matrix of medical and individual factors [4]. However, a significant gap remains in comprehensive research regarding the primary factors that patients consider when selecting a healthcare provider or institution for this procedure [5].

Minimally invasive hemorrhoid surgery (MIS) has gained significant traction over the past few decades as an alternative to conventional

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hemorrhoidectomy, primarily due to its reduced postoperative pain, quicker recovery times, and fewer complications. Techniques such as Doppler-Guided Hemorrhoidal Artery Ligation (DGHAL), Stapled Hemorrhoidopexy (PPH), Laser Hemorrhoidoplasty (LHP), and Transanal Hemorrhoidal Dearterialization (THD) have been developed to address hemorrhoidal symptoms by reducing blood flow to the hemorrhoids and managing prolapsed tissue [6–8].

Previous studies have investigated patient perspectives on hemorrhoidectomy, focusing on aspects such as surgical outcomes, postoperative pain, and postoperative quality of life [9–11]. Recent research has begun to consider patient decision-making processes in the healthcare context, recognizing an increasing emphasis on patient autonomy and informed consent [12–14].

Although considerable progress has been made in studying the various factors that influence patient choices [15,16], a distinct research gap persists when examining the specifics of the decision-making processes for hemorrhoidectomy. This area includes understanding patients' awareness of minimally invasive surgical procedures, their principal information sources, and the surgical facets that evoke the most concern.

This study aimed to comprehensively examine patient decision-making processes for hemorrhoidectomy by investigating a broad range of influencing factors. We hypothesized that demographics (age, sex, occupation, and place of residence), awareness of MIS benefits, cost considerations, and information sources would significantly impact patients' choices. Specifically, we anticipated higher MIS awareness among medical personnel, cost as a major determinant across all demographics, and reliance on personal networks and online sources for information. Using an online questionnaire distributed to participants in Taiwan, we explored these factors along with specific concerns and preferences regarding surgery. Our goal was to provide insights that could help healthcare providers refine their communication and care strategies, aligning them more closely with patients' values and decision-making processes in the context of hemorrhoid surgery.

Methods

We distributed an online questionnaire to 2011 participants across various regions of Taiwan in December 2023. Participants were recruited through a combination of methods to ensure a diverse and representative sample:

1. Hospital outpatient clinics: We invited patients visiting general surgery and colorectal surgery outpatient clinics at multiple hospitals across Taiwan to participate in the survey.
2. Online health forums and social media: We posted invitations to participate in the survey on popular Taiwanese health forums and social media platforms, targeting individuals interested in health-related topics.
3. Snowball sampling: We encouraged initial participants to share the survey link with their networks, allowing us to reach a broader demographic.

Inclusion criteria were adults (age 18 and above) residing in Taiwan. We did not restrict participation based on whether individuals had personal experience with hemorrhoids or hemorrhoid surgery, as we were interested in public perceptions and decision-making factors. The opinions of the participants regarding their consideration of minimally invasive hemorrhoid surgery were obtained using a specially created questionnaire. The questions in the questionnaire included the following:

(1) Does the responder have hemorrhoids?

(2) Which medical facility would the responder prefer if they wanted to undergo hemorrhoid surgery?

(3) Which aspects of hemorrhoid surgery cause the greatest anxiety?

(4) Are you aware of the benefits of minimally invasive surgery for hemorrhoids?

(5) Which type of hemorrhoid surgery would the responder choose in the absence of other medical insurance?

(6) Is this the most reliable resource for information on hemorrhoid surgery?

(7) What is the most crucial factor to consider before hemorrhoid surgery?

Demographic information on the participants' sex, age, occupation, and place of residence was also gathered.

To ensure consistent understanding of minimally invasive surgery (MIS) among participants, we provided a brief definition and explanation at the beginning of the relevant survey section. The definition read as follows:

'Minimally invasive surgery for hemorrhoids refers to procedures that are less extensive than traditional hemorrhoidectomy. These techniques aim to reduce post-operative pain, shorten recovery time, and minimize complications. Examples include stapled hemorrhoidopexy, doppler-guided hemorrhoidal artery ligation, Laser Hemorrhoidoplasty (LHP), and Transanal Hemorrhoidal Dearterialization (THD). These procedures typically involve smaller incisions or no external incisions at all. Traditional hemorrhoidectomy often involves cutting and removing hemorrhoidal tissue, which can result in significant post-operative pain and a recovery period of several weeks. In contrast, minimally invasive techniques aim to reduce hemorrhoid blood supply or reposition the hemorrhoidal tissue, often resulting in less pain and faster recovery.

Taiwan exhibits significant socioeconomic and cultural disparities between its northern and southern regions. The north, centered around Taipei, is more urbanized and economically developed, while the south, despite having major cities like Kaohsiung, features more rural areas and a distinct cultural landscape. These regional variations potentially influence healthcare access, health-seeking behaviors, and attitudes towards medical procedures. By comparing responses from Southern Taiwan with other regions, we sought to identify any regional differences in perceptions and decision-making regarding hemorrhoid surgery.

The respondents were then divided into three age groups: 18–29 years old, 30–49 years old, and $>$ 50 years old. We compared the differences in the opinions on the topics between genders, medical and non-medical personnel, and between Southern Taiwanese and non-Southern Taiwanese in each age group using the chi-square test. Statistical significance was set at p-value <0.05. All statistical analyses were performed using SPSS (version 24.0; IBM Corp., 2016). IBM SPSS Statistics for Windows, version 24.0. Armonk, NY: IBM Corp.).

In this study, 'medical social media pages' refer to social media accounts managed by healthcare professionals, medical institutions, or health organizations that disseminate medical information and health-related content. These pages, prevalent on platforms such as Facebook and Instagram, represent an emerging, social media-based method of health information dissemination in Taiwan. Their inclusion as a potential information source reflects the growing importance of digital platforms in health communication.

The study was approved by the Institutional Review Board of the *E*-Da Hospital, Taiwan (Identifier: No2023019). All participants provided informed consent before completing the questionnaire.

Results

Among the 2011 participants, 516 (25.7 %) were males, 1494 (74.3 %) were females, and 1 (0.0 %) was others. The proportions of participants who were between the ages of 18 and 29, 30 and 39, 40 and 49, 50 and 59, and above 60 years were 37.8 %, 24.5 %, 14.7 %, 10.2 %, and 12.8 %, respectively (Table S1). Table 1 presents the sociodemographic characteristics of the study participants. Medical personnel comprised one-third of the participants (n = 735, 36.5 %). Additionally, the respondents were categorized according to their place of residence. A total of 53.4 % resided in Southern Taiwan, and 46.6 % resided in other regions.

Percentage of hemorrhoids

In the total sample population, hemorrhoids were present in approximately 47–48 % of men and women, with no significant differences in the proportions between men and women or among the various age groups. Additionally, there was no significant difference in the percentage of hemorrhoids between medical and non-medical personnel. However, in those aged between 18 and 29 years, there was a significant difference in the percentage of medical and non-medical personnel with hemorrhoids (42.8 % and 35.5 %, respectively). In terms of place of residence, there was no obvious difference in the proportion of hemorrhoids between Southern and non-Southern Taiwanese, but there was a significant difference between the two groups in those aged between 18 and 29 years (33.0 % and 43.6 %, respectively). (Fig. 1.)

Percentage of health care site selection

There was no significant difference in healthcare site selection between men and women, with almost 70 % of the respondents choosing to undergo hemorrhoid surgery at a medical center or district hospital. Among the various age groups, there were no significant differences in healthcare site selection between medical and non-medical personnel. Additionally, there was no significant difference between Southern and non-Southern Taiwanese participants. In general, approximately 70 % of the respondents wanted to undergo surgery at a medical center or district hospital, compared to 17.8 % who selected a nearby hospital, 8.1 % who preferred aesthetic medicine, and roughly 5 % who preferred to undergo surgery at a clinic. (Fig. 2.)

Percentage of worries about surgery

Regardless of the group, men and women differed significantly in their concerns regarding surgery. Postoperative complications were identified as a main concern in approximately 46 % of the female participants and 40 % of the male participants. Approximately 20 % of the male participants were more worried about when they could resume work, and 10 % were more worried about the costs of surgery, compared to roughly 10 % of the female participants who were more worried about when they could resume work, and 7 % were more worried about the costs of surgery. There was a significant difference between medical and non-medical personnel in those aged 30–49 years. Non-medical staff members were more worried about postoperative complications (46.0 %), postoperative pain (29.2 %), returning to work (16.8 %), and surgery costs (7.1 %), while medical personnel were more worried about postoperative complications (41.4 %), postoperative pain (42.2 %), returning to work (11.2 %), and surgery costs (4.4 %). In terms of place of residence, there was no obvious difference between Southern and non-Southern Taiwanese in their concerns regarding surgery, regardless of age. In general, >44 % of the participants worried about postoperative complications, 33 % worried about postoperative pain, 12.6 % worried about when they would be able to return to work, and 7.7 % worried about the costs of surgery (Table 2).

Table 1
Participant characteristics by age group.

	N (%)	18–29 years	30–49 years	50+ years	*p*-value
All participants	2011 (100.0)	760 (37.8 %)	788 (39.2 %)	463 (23.0 %)	
Gender					<0.001
Men	516 (25.7)	129 (17.0)	236 (29.9)	151 (32.7)	
Women	1494 (74.3)	631 (83.0)	552 (70.1)	311 (67.3)	
Occupation					<0.001
Medical personnel	735 (36.5)	425 (55.9)	251 (31.9)	59 (12.7)	
Non- medical personnel	1276 (63.5)	335 (44.1)	537 (68.1)	404 (87.3)	
Place of residence					<0.001
Southern Taiwan	1074 (53.4)	285 (37.5)	467 (59.3)	322 (69.5)	
Non-Southern Taiwan	937 (46.6)	475 (62.5)	321 (40.7)	141 (30.5)	

Percentage of aware of benefits of minimally invasive surgery (MIS)

Overall, there was a significant difference in the percentages of men and women who were aware of the benefits of MIS (30.0 % vs 36.5 %, respectively). However, there was no obvious difference in the 18–29 age group, and approximately 25 % of them were unaware of the benefits of MIS. There were also significant cognitive differences between the medical and non-medical personnel. >40 % of nonmedical personnel and <20 % of medical personnel, regardless of age group, were unaware of the benefits of MIS. However, there was no obvious difference in the percentages between Southern and non-Southern Taiwanese regarding this issue, and approximately 30 % of the participants were unaware of the benefits of the MIS. Additionally, approximately 25 % of the participants aged 18–29 years and approximately 40 % of those over 50 years were unaware of the benefits of MIS. (Fig. 3.)

Percentage of choice of types of hemorrhoid surgery

Fig. 4. shows that almost 70 % of the respondents were more likely to select minimally invasive hemorrhoid surgery on their own if the cost was less than NT $50,000 (MIS_50) or traditional surgery (17.7 %). When selecting traditional surgery or minimally invasive treatment at their own expense, there was a significant difference between men and women (p-value = 0.005). Only 16.0 % of female respondents favored traditional surgery compared to 22.3 % of male respondents. In contrast, 63.4 % of male and 71.1 % of female respondents favored MIS_50. However, no significant differences were observed between men and women across the various age groups. Additionally, there was a significant difference in the percentage of hemorrhoid surgeries between medical and non-medical personnel. In contrast to 20.4 % of non-medical personnel, only 12.9 % of medical personnel preferred traditional surgery. Significant differences were also found among those aged 18–29 years, but not among those aged 30–49 or older. In terms of place of residence, there was a significant difference between Southern and non-Southern Taiwanese people. MIS_50 was chosen by 72.5 % of non-Southern Taiwanese patients compared to 66.1 % of Southern Taiwanese patients, and traditional surgery was chosen by 16.2 % of non-Southern Taiwanese patients compared to 18.9 % of Southern Taiwanese patients.

Percentage of trusting information sources

More than half of the respondents relied on relatives, friends, or people who had undergone the procedure; medical social media pages (28.1 %); and online reviews (14.0 %) as their source of information (Fig. 5.) Overall, there was no significant difference between men and women in the selection of this subject, although they were in the 30–49 age group. Online reviews were used as information sources by 10.3 % of women and 17.4 % of men, compared to 60.1 % of women and 55.9 % of men who relied on relatives, friends, or people who had undergone hemorrhoid surgery. In both age groups under the age of 49, there were differences between the medical and non-medical personnel. In the 18–29 age group, 33.6 % of medical personnel preferred medical social media pages and 14.4 % preferred online reviews. Conversely, 27.5 % of non-medical personnel in this age group preferred medical social media pages and 22.1 % preferred online reviews. In the 30–49 age group, 30.3 % of medical personnel favored medical social media pages while 7.2 %

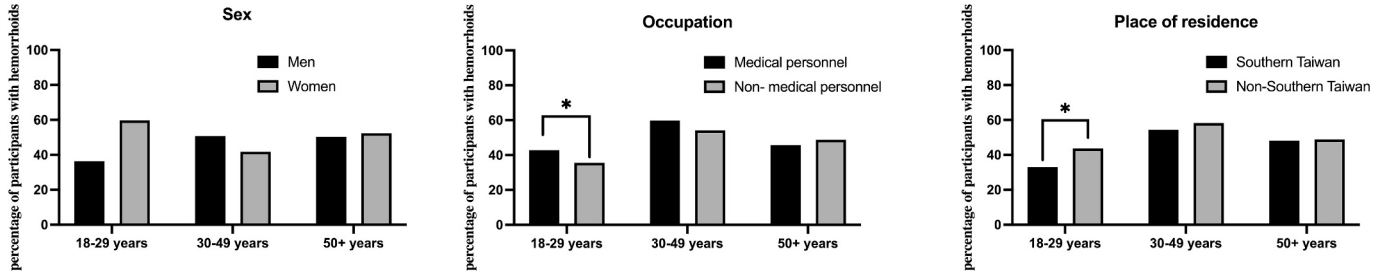

Fig. 1. Percentage of hemorrhoids by age group, sex, occupation, and area of residence. Bar chart displaying the prevalence of hemorrhoids across different demographic categories. The chart shows the percentage of participants with hemorrhoids in each age group (18–29, 30–49, 50+), sex (men, women), occupation (medical personnel, non-medical personnel), and area of residence (Southern Taiwan, Non-Southern Taiwan). Significant differences ($p < 0.05$) between categories are indicated by asterisks (*).

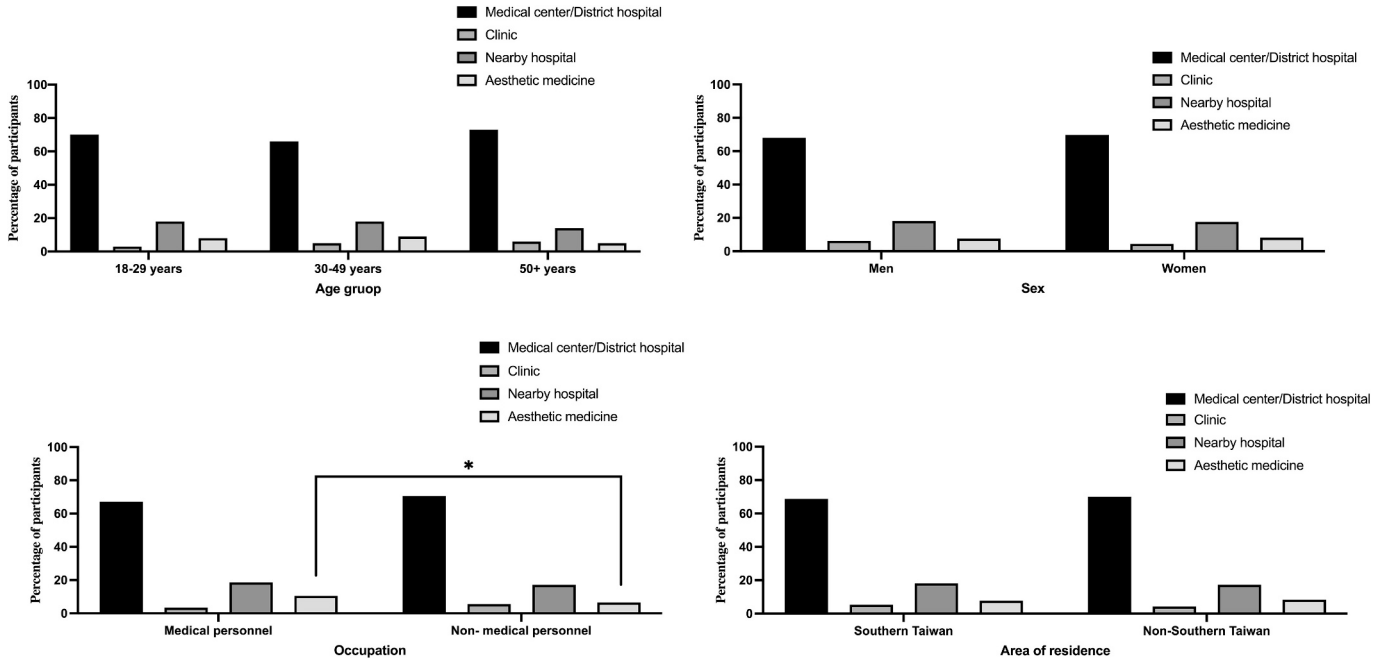

Fig. 2. Distribution of health care site selection by age group, sex, occupation, and area of residence. Bar chart illustrating the preferred health care sites for hemorrhoid surgery among participants. The chart presents the percentage of participants choosing medical centers/district hospitals, clinics, nearby hospitals, and aesthetic medicine centers, stratified by age group (18–29, 30–49, 50+), sex (men, women), occupation (medical personnel, non-medical personnel), and area of residence (Southern Taiwan, Non-Southern Taiwan). Significant differences ($p < 0.05$) between categories are denoted by asterisks (*).

favored online reviews. Conversely, 25.0 % of non-medical personnel in this age group favored medical social media pages and 14.9 % favored online reviews. In terms of place of residence, there was a significant difference between Southern and non-Southern Taiwanese individuals in the total sample population. However, there were no significant differences in any age group. Overall, 58.4 % of Southern Taiwanese rely on relatives, friends, or people who have undergone hemorrhoid surgery and medical social media pages (26.9 %), compared to 51.9 % and 29.5 % of non-Southern Taiwanese, respectively.

Percentage of the main consideration about surgery

As shown in Table 3, approximately 60 % of the respondents ranked the evaluation of surgeons as the most important consideration, followed by medical care quality (26.4 %), surgery costs (7.8 %), and geography (6.9 %). A significant difference between men and women was observed in the 30–49 age group, but not in the 18–29 or over 50 age groups. In the 30–49 age group, 51.7 % of male participants, 34.7 % of medical care quality, and 4.7 % of surgical costs selected the evaluation of surgeons, as opposed to 62.5 %, 20.8 %, and 9.6 %, respectively. There was a significant difference between the medical and non-medical personnel in the total sample population; however, there were no significant differences in any age group. Overall, 62.9 % of medical personnel ranked the surgeon's evaluation as the most crucial factor, 22.2 % of them ranked medical care quality as the second most important factor, 8.3 % of them ranked costs of surgery as the third, and 5.9 % of them ranked geography as the fourth, compared to 55.7 %, 28.8 %, 7.5 %, and 7.5 % of non-medical personnel, respectively. In terms of place of residence, there were no significant differences between the Southern and non-Southern Taiwanese in either age group.

Discussion

Our study explored the considerations and influences on patient decision-making for hemorrhoid surgery by collecting data from 2011 participants across various demographic sectors. The key findings suggest that the presence of hemorrhoids is relatively consistent across sexes, professions, and regions. Healthcare site selection primarily favored medical centers or district hospitals with concerns about postoperative complications and pain-taking precedence. There was a

Table 2
Distribution of **concerns** according to age, sex, occupation, and area of residence.

	concerns					
	Costs	Time to return to work	Postoperative pain	Postoperative complications	others	*p*-value
Total	154 (7.7 %)	254 (12.6 %)	674 (33.5 %)	902 (44.9 %)	27 (1.3 %)	
Sex						
All participants						<0.001*
Men	50 (9.7 %)	101 (19.6 %)	152 (29.5 %)	207 (40.1 %)	6 (1.2 %)	
Women	103 (6.9 %)	153 (10.2 %)	522 (34.9 %)	695 (46.5 %)	21 (1.4 %)	
18–29 years						0.044*
Men	19 (14.7 %)	19 (14.7 %)	38 (29.5 %)	52 (40.3 %)	1 (0.8 %)	
Women	54 (8.6 %)	59 (9.4 %)	243 (38.5 %)	268 (42.5 %)	7 (1.1 %)	
30–49 years						0.001*
Men	18 (7.6 %)	55 (23.3 %)	67 (28.4 %)	95 (40.3 %)	1 (0.4 %)	
Women	31 (5.6 %)	63 (11.4 %)	196 (35.5 %)	256 (46.4 %)	6 (1.1 %)	
50+ years						0.020*
Men	13 (8.6 %)	27 (17.9 %)	47 (31.1 %)	60 (39.7 %)	4 (2.6 %)	
Women	18 (5.8 %)	31 (10.0 %)	83 (26.7 %)	171 (55.0 %)	8 (2.6 %)	
Occupation						
All participants						0.001*
Medical personnel	55 (7.5 %)	71 (9.7 %)	283 (38.5 %)	317 (43.1 %)	9 (1.2 %)	
Non- medical personnel	99 (7.8 %)	183 (14.3 %)	391 (30.6 %)	585 (45.8 %)	18 (1.4 %)	
18–29 years						0.199
Medical personnel	38 (8.9 %)	38 (8.9 %)	156 (36.7 %)	186 (43.8 %)	7 (1.6 %)	
Non- medical personnel	35 (10.4 %)	40 (11.9 %)	125 (37.3 %)	134 (40.0 %)	1 (0.3 %)	
30–49 years						0.005*
Medical personnel	11 (4.4 %)	28 (11.2 %)	106 (42.2 %)	104 (41.4 %)	2 (0.8 %)	
Non- medical personnel	38 (7.1 %)	90 (16.8 %)	157 (29.2 %)	247 (46.0 %)	5 (0.9 %)	
50+ years						0.255
Medical personnel	6 (10.2 %)	5 (8.5 %)	21 (35.6 %)	27 (45.8 %)	0 (0.0 %)	
Non- medical personnel	26 (6.4 %)	53 (13.1 %)	109 (27.0 %)	204 (50.5 %)	12 (3.0 %)	
Place of residence						
All participants						0.480
Southern Taiwan	76 (7.1 %)	143 (13.3 %)	372 (34.6 %)	469 (43.7 %)	14 (1.3 %)	
Non-Southern Taiwan	78 (8.3 %)	111 (11.8 %)	302 (32.2 %)	433 (46.2 %)	13 (1.4 %)	
18–29 years						0.349
Southern Taiwan	24 (8.4 %)	29 (10.2 %)	118 (41.4 %)	112 (39.3 %)	2 (0.7 %)	
Non-Southern Taiwan	49 (10.3 %)	49 (10.3 %)	163 (34.3 %)	208 (43.8 %)	6 (1.3 %)	
30–49 years						0.709
Southern Taiwan	32 (6.9 %)	71 (15.2 %)	161 (34.5 %)	199 (42.6 %)	4 (0.9 %)	
Non-Southern Taiwan	17 (5.3 %)	47 (14.6 %)	102 (31.8 %)	152 (47.4 %)	3 (0.9 %)	
50+ years						0.781
Southern Taiwan	20 (6.2 %)	43 (13.4 %)	93 (28.9 %)	158 (49.1 %)	8 (2.5 %)	
Non-Southern Taiwan	12 (8.5 %)	15 (10.6 %)	37 (26.2 %)	73 (51.8 %)	4 (2.8 %)	

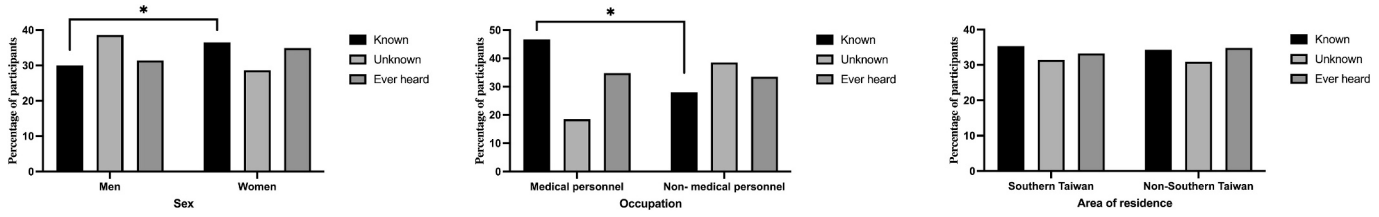

Fig. 3. Awareness of benefits of minimally invasive surgery (MIS) by sex, occupation, and area of residence. Bar chart depicting the level of awareness regarding the benefits of MIS among participants. The chart displays the percentage of participants who are aware of, unaware of, or have ever heard of the benefits of MIS, categorized by age group (18–29, 30–49, 50+), sex (men, women), occupation (medical personnel, non-medical personnel), and area of residence (Southern Taiwan, Non-Southern Taiwan). Significant differences ($p < 0.05$) between categories are indicated by asterisks (*).

significant gender disparity in awareness of MIS benefits, and MIS was the preferred choice for most respondents if the cost was less than NT $50,000. Information was primarily sourced from personal and medical social media pages. Finally, surgeon evaluation and quality of medical care were deemed the most crucial factors when considering surgery.

These findings offer a significant understanding of patients' choices concerning hemorrhoid surgery, aligning with the American Society of Colon and Rectal Surgeons (ASCRS)'s aim to deepen our understanding of patient viewpoints and therapies for hemorrhoids [17]. The relative consistency in the presence of hemorrhoids indicates a broad application of the study results. The predilection for medical centers or district hospitals, likely driven by the reputation for high-quality care, reaffirms the significance of healthcare institutions in patients' decision-making processes [18,19]. Our study uncovered a notable gender difference in the awareness of minimal invasive surgery (MIS) benefits, with women displaying a higher understanding (36 %) than men (30 %). This observation corresponds to McDermott et al.'s research on sex distinctions in comprehending and accepting robot-assisted surgery, which is a subset of MIS [20]. The study found that women were more concerned yet better informed about innovative surgical technologies, whereas men were less concerned. These findings indicate a stronger awareness of MIS among women, suggesting the necessity for enhanced educational efforts to improve men's comprehension of these surgical techniques. The preference for affordable minimally invasive surgery (MIS)

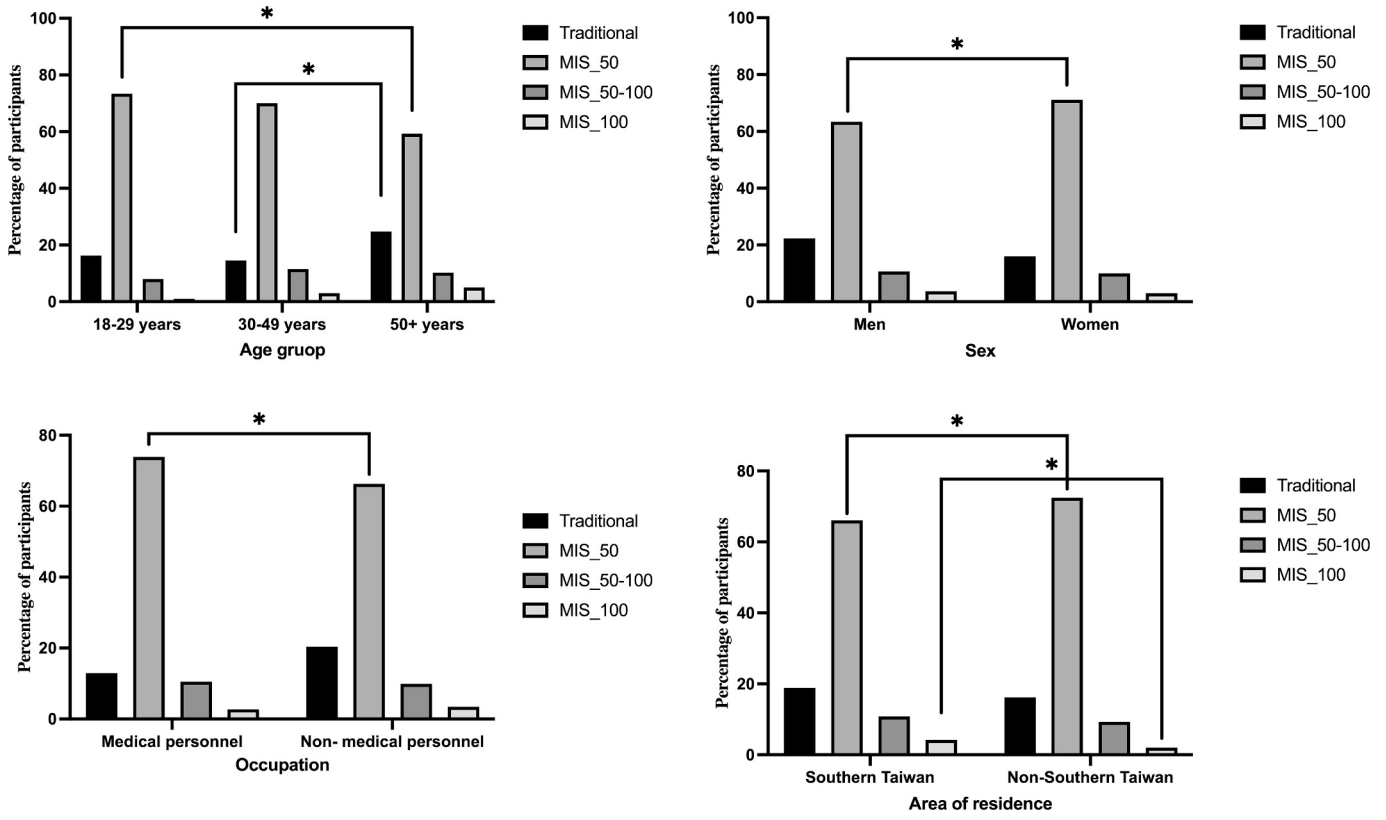

Fig. 4. Selection of types of hemorrhoid surgery by age group, sex, occupation, and area of residence. Grouped bar chart illustrating the preferred types of hemorrhoid surgery among participants. The chart shows the percentage of participants choosing traditional surgery, minimally invasive surgery within NT$ 50,000 (MIS_50), minimally invasive surgery between NT$ 50,000–100,000 (MIS_50–100), and minimally invasive surgery above NT$ 100,000 (MIS_100), stratified by age group (18–29, 30–49, 50+), sex (men, women), occupation (medical personnel, non-medical personnel), and area of residence (Southern Taiwan, Non-Southern Taiwan). Significant differences ($p < 0.05$) between categories are denoted by asterisks (*). MIS_100, minimally invasive surgery, at the expense of more than NT$ 100,000; MIS_50–100, minimally invasive surgery, at your own expense, NT$ 50,000–100,000; MIS_50, minimally invasive surgery, at your own expense, within NT $ 50,000.

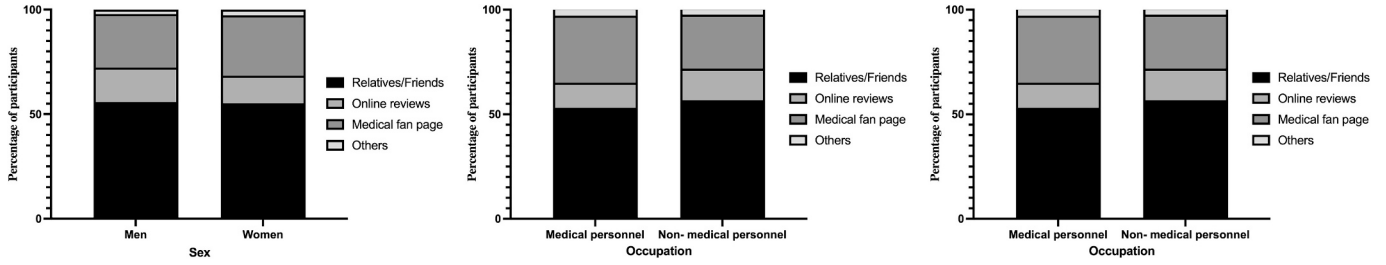

Fig. 5. Trusted information sources for hemorrhoid surgery by sex, occupation, and area of residence. Stacked bar chart displaying the trusted information sources for hemorrhoid surgery among participants. The chart presents the percentage of participants relying on relatives/friends, online reviews, medical fan pages, and other sources, categorized by age group (18–29, 30–49, 50+), sex (men, women), occupation (medical personnel, non-medical personnel), and area of residence (Southern Taiwan, Non-Southern Taiwan). Significant differences ($p < 0.05$) between categories are indicated by asterisks (*).

underlines the significance of costs in healthcare decisions. This reflects the findings of a comprehensive study on decision-making and healthcare costs from a patient perspective, where it was found that patients tended to opt for procedures such as MIS when they were financially feasible [21]. The Internet has become a commonly utilized resource in making healthcare decisions, with 65 % of Americans being aware that they can find online physicians [22]. A notable percentage of patients, ranging from 36 % to 51 %, turned to the internet to research specific hospitals or surgeons for surgical procedures [23,24]. Interestingly, while the Internet plays a significant role in information sourcing [25], primary dependence on personal networks reflects trust in first-hand experiences [26–28]. Finally, the importance given to the evaluation of surgeons and quality of care [29] underscores the patient's emphasis on professional expertise and procedural outcomes.

Our study expands on existing research by comprehensively examining patient decision-making processes for hemorrhoid surgery. This enhanced understanding can aid healthcare providers in optimizing their communication, education, and service provision and aligning these elements more closely with patient preferences [30–32]. Fostering awareness of the benefits of MIS, particularly among men, should be a focus area for healthcare providers. Moreover, by recognizing the importance of professional reputation and care quality, healthcare institutions can prioritize these aspects to better meet patient expectations [33]. Ultimately, this could result in increased patient satisfaction and trust, and potentially improved surgical outcomes [34].

Although our study provides valuable insights, it has some

Table 3
Distribution of **the main consideration** by Age Group, Sex, Occupation, and Area of Residence.

	Main consideration					
	Evaluation of surgeons	Quality of medical care	Geographical	costs	others	*p*-value
Total	1173 (58.3 %)	530 (26.4 %)	139 (6.9 %)	157 (7.8 %)	12 (0.6 %)	
Sex						
All participants						0.002*
Men	270 (52.3 %)	170 (32.9 %)	38 (7.4 %)	34 (6.6 %)	4 (0.8 %)	
Women	903 (60.4 %)	360 (24.1 %)	101 (6.8 %)	122 (8.2 %)	8 (0.5 %)	
18–29 years						0.774
Men	74 (57.4 %)	34 (26.4 %)	10 (7.8 %)	11 (8.5 %)	0 (0.0 %)	
Women	383 (60.7 %)	152 (24.1 %)	36 (5.7 %)	57 (9.0 %)	3 (0.5 %)	
30–49 years						0.001*
Men	122 (51.7 %)	82 (34.7 %)	18 (7.6 %)	11 (4.7 %)	3 (1.3 %)	
Women	345 (62.5 %)	115 (20.8 %)	35 (6.3 %)	53 (9.6 %)	4 (0.7 %)	
50+ years						0.149
Men	74 (49.0 %)	54 (35.8 %)	10 (6.6 %)	12 (7.9 %)	1 (0.7 %)	
Women	175 (56.3 %)	93 (29.9 %)	30 (9.6 %)	12 (3.9 %)	1 (0.3 %)	
Occupation						
All participants						0.005*
Medical personnel	462 (62.9 %)	163 (22.2 %)	43 (5.9 %)	61 (8.3 %)	6 (0.8 %)	
Non- medical personnel	711 (55.7 %)	367 (28.8 %)	96 (7.5 %)	96 (7.5 %)	6 (0.5 %)	
18–29 years						0.762
Medical personnel	262 (61.6 %)	102 (24.0 %)	22 (5.2 %)	37 (8.7 %)	2 (0.5 %)	
Non- medical personnel	195 (58.2 %)	84 (25.1 %)	24 (7.2 %)	31 (9.3 %)	1 (0.3 %)	
30–49 years						0.131
Medical personnel	161 (64.1 %)	51 (20.3 %)	15 (6.0 %)	20 (8.0 %)	4 (1.6 %)	
Non- medical personnel	306 (57.0 %)	146 (27.2 %)	38 (7.1 %)	44 (8.2 %)	3 (0.6 %)	
50+ years						0.109
Medical personnel	39 (66.1 %)	10 (16.9 %)	6 (10.2 %)	4 (6.8 %)	0 (0.0 %)	
Non- medical personnel	210 (52.0 %)	137 (33.9 %)	34 (8.4 %)	21 (5.2 %)	2 (0.5 %)	
Place of residence						
All participants						0.511
Southern Taiwan	610 (56.8 %)	295 (27.5 %)	78 (7.3 %)	83 (7.7 %)	8 (0.7 %)	
Non-Southern Taiwan	563 (60.1 %)	235 (25.1 %)	61 (6.5 %)	74 (7.9 %)	4 (0.4 %)	
18–29 years						0.698
Southern Taiwan	172 (60.4 %)	65 (22.8 %)	20 (7.0 %)	26 (9.1 %)	2 (0.7 %)	
Non-Southern Taiwan	285 (60.0 %)	121 (25.5 %)	26 (5.5 %)	42 (8.8 %)	1 (0.2 %)	
30–49 years						0.967
Southern Taiwan	274 (58.7 %)	119 (25.5 %)	31 (6.6 %)	38 (8.1 %)	5 (1.1 %)	
Non-Southern Taiwan	193 (60.1 %)	78 (24.3 %)	22 (6.9 %)	26 (8.1 %)	2 (0.6 %)	
50+ years						0.293
Southern Taiwan	164 (50.9 %)	111 (34.5 %)	27 (8.4 %)	19 (5.9 %)	1 (0.3 %)	
Non-Southern Taiwan	85 (60.3 %)	36 (25.5 %)	13 (9.2 %)	6 (4.3 %)	1 (0.7 %)	

limitations. The reliance on self-reported data may introduce bias, and the specific cultural context of Taiwan may limit the generalizability of our findings. Additionally, the cross-sectional nature of the study provides only a snapshot of patients' perceptions at a particular point in time. Therefore, future research should consider using a longitudinal design to track the changes in perceptions over time. Further investigation is needed into effective strategies for raising awareness of the benefits of MIS and increasing trust among healthcare providers. Overall, our study paves the way for more nuanced and patient-centered approaches to healthcare provision.

Conclusions

Our research utilized a comprehensive survey administered to 2011 participants to explore their perceptions and decision-making factors regarding minimally invasive hemorrhoid surgery. The key results showed marked variations in understanding, attitudes, and preferences related to such surgeries across diverse demographic and professional groups. This study confirmed the prevalence of hemorrhoids across all demographics, with a preference for minimally invasive surgery when the cost was less than NT$50,000. The influential information sources included personal connections and medical social media pages.

These findings provide a robust basis for further research and the development of minimally invasive hemorrhoid surgeries. It is important to delve deeper into the factors shaping public perception and to create effective education and communication strategies. Our research underscores the importance of recognizing and addressing knowledge and preference disparities among groups to improve policies and healthcare delivery.

For future research, it is necessary to explore strategies for enhancing public awareness of the benefits of MIS and ensure its accessibility to all individuals, irrespective of their socioeconomic or demographic status.

List of bbreiviations

MIS	Minimally invasive hemorrhoid surgery
MIS_50	Minimally invasive hemorrhoid surgery on their own if the cost was less than NT $50,000
ASCRS	American Society of Colon and Rectal Surgeons

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Ethics approval and consent to participate

The study was approved by the Institutional Review Board of the *E*-Da Hospital, Taiwan (Identifier: No2023019). All participants provided informed consent before completing the questionnaire.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

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Authors' contributions

Study conception and design, acquisition of data: Pin-Chun Chen and Chih-I Chen; Formal analysis and drafting manuscript: Pin-Chun Chen; Writing-review and editing: Chih-I Chen. All authors read and approved the final manuscript.

CRediT authorship contribution statement

Pin-Chun Chen: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Chih-I Chen:** Writing – review & editing, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no competing interests.

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