

Comparison of European regionwide and Japanese nationwide surveys on gynecologic robotic surgery

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Abstract

[Introduction]

Gynecologic robotic surgery is increasingly adopted worldwide. Robotic surgical education plays a key role in expanding its use among early-career surgeons. In Europe, structured educational systems have been established, and the Young European Advocates of Robotic Surgery (YEARS) conducted a survey to evaluate training and practice. The Japan Society of Gynecologic Robotic Surgery (JSGRS) conducted a similar nationwide survey. This study aimed to compare these surveys to identify similarities and differences and to explore opportunities for collaborative education.

[Methods]

The YEARS survey targeted early-career European gynecologists (< 4 years post-fellowship), whereas the JSGRS survey included Japanese obstetricians and gynecologists in 2023. To enable comparison, respondents with ≤ 12 years of experience were selected from the JSGRS cohort, and institutional activity, surgical experience, and educational perspectives were analyzed.

[Results]

A total of 298 respondents, 81 respondents from 21 European countries and 212 Japanese respondents were analyzed. The availability of robotic systems was comparable (77.8 vs 74.1% for Europe and Japan, respectively), and interest in robotic surgery was also high in both groups (81.0% vs 70.3%). However, hands-on experience differed markedly. 66.7% of Europeans operated weekly, whereas only 25.0% of Japanese did, especially among resident doctors (26.7% vs 0%). Online educational resources were widely used and perceived positively in both cohorts.

[Conclusions]

Japanese gynecologists demonstrate a strong interest in robotic surgery comparable to their European counterparts, but face limited opportunities for training and practice. Standardized multinational surveys across Asia are warranted to better define regional disparities and support the development of structured educational systems.

Introduction

Robotic surgery has become increasingly widespread in gynecology over the past two decades, driven by technological advancements and expanding clinical applications. Compared with conventional laparoscopy, robotic surgery offers several advantages, including improved ergonomics, enhanced visualization, and a potentially shorter learning curve. The global number of robotic surgical systems has rapidly increased, particularly in North America, Europe, and Asia, reflecting growing acceptance of this technology in clinical practice.

In Japan, the first robotic hysterectomy was performed in 2009. However, it took quite a long time for the robotic procedures to be covered by national healthcare insurance, especially in the gynecological field. The robotic-assisted hysterectomy for benign and endometrial cancer was finally covered by this national system from 2018; however, only sacrocolpopexy was additionally listed in the national healthcare system, and the other procedures, for instance, myomectomy or cystectomy, cannot be performed under the national healthcare system so far [1]. Historically, Europe, especially France, was famous for performing hysterectomy by vaginal and laparoscopic routes as a minimally invasive surgery, which was mainly laparotomy in the US previously. This trend drastically changed to a minimal invasive route after the appearance of the Da Vinci system in the US [2]. The US is the leading country for robotic surgery, although Europe is the second-largest area where robotic surgery is performed. This is also supported by the analysis of the number of academic manuscripts in the gynecologic robotic field [3, 4]. Even though the healthcare system differs in each European country, they attempted to gather evidence of robotic surgery from their countries' data [5-7].

Many articles have reported the comparative studies of robotic and laparoscopic surgery and claimed the merit of the robotic surgery [6-9]. There are several papers that also the gynecological robotic surgery has a better learning curve than conventional laparoscopic surgery [10-13]. Even though there is an advantage for robotic surgery, there is an obstacle for the younger generation to learn and start their robotic surgery in Japan. This is because the delayed insurance coverage has limited the robotic procedure to only experienced, consultant-level gynecologists. To facilitate the widespread of robotic surgery in gynecology, education system in robotic surgical field plays an important role. The Japan Society of Gynecologic Robotic Surgery (JSGRS), which is established in 2018, promotes the safe expansion of robotic surgery through a proctoring system in which certified proctors by the society provide surgical guidance during the introduction of robotic systems at institutions nationwide. And also, the Japan Society of Gynecologic and Obstetric Endoscopy and Minimally Invasive Therapy (JSGOE) established the certification system for gynecological robotic surgical [14]. Meanwhile, the Society of European Robotic Gynaecological Surgery (SERGS), which is established in 2009 has managed European multicentric collaborative tasks to strengthen the scientific weight of their publications in benign and oncological procedures. SERGS put emphasis on education with the policy that the scientific society has to provide a standardized robotic training with the era of increasing robotic platform. They outlined a Pilot Curriculum for standardized education of robotic use in gynecological surgery in 2015 and now they have well-organized education and fellowship programs with lots of webinars and video portals [15]. Young European Advocates of Robotic Surgery (YEARS), young members of SERGS, played an important role in the curriculum, for mentoring and support.

These YEARS and young members of JSGRS conducted independent surveys among each society member to assess the attitude toward gynecological robotic surgery in the close timing. As a collaborative work of these two scientific groups, we compared these survey results to identify similarities and differences with an aim to improve a collaborative education system.

Methods

Survey structure

The YEARS developed a 28-item questionnaire mainly regarding gynecologic surgical training and the surgical activity of both the respondent's department and the individual surgeon [16]. The survey was to target early-career gynecologic surgeons, which was defined as trainee/resident enrolled in a national obstetrics and gynecology training program, gynecology clinical fellow, and recent consultant (within the past 3 years) of a fellowship or subspecialty training program. The survey was hosted on SurveyMonkey and distributed through the social media accounts of YEARS and SERGS-inviting members from December 2022 to September 2023. While young members of JSGRS developed the 26-question survey asking about demographic information, current state of robotic surgery implementation, barriers to adoption and skill acquisition, and education in robotic surgery [17]. The survey was distributed to all members of the Japan Society of Obstetrics and Gynecology (JSOG) and collected through Google Forms from September to November 2023. The raw questionnaires can be found in Supplement table 1 (Table.S1).

Data curation

To compare two surveys with different questionnaires and populations, we selected and narrowed down the responders for the JSGRS survey to make it more similar to the population of the YEARS survey. In particular, we excluded responses from obstetricians and reproductive doctors, and we included only ≤ 12 years of experience for the JSGRS survey to be closer to ≤ 4 years post-fellowship for the YEARS survey. Also, the identical or similar questionnaires from both surveys were selected for comparison analysis, which can be found in Table.1.

Statistical analysis

Comparison analysis between two surveys, we conducted Fisher's exact test to identify the difference in distribution. Statistical significance was set at $p < 0.05$ (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$) and all data manipulations and analyses, figure construction were conducted using PRISM 10 software (Version 10.4.1 (532)).

Results

81 respondents from 55 centers around 21 countries in Europe were included in the YEARS survey, and the original data can be found in their article [16]. On the other hand, the original response for the JSGRS survey was 1,443 from both obstetricians and gynecologists [17]. After the curation for only ≤ 12 years of experienced doctors and excluding obstetricians and reproductive doctors, 212 respondents were finally included for comparison.

Overall descriptive results for these two surveys are shown in Table 2. The gender distribution was comparable between the two surveys, with females accounting for 44/81 (54.3%) in the YEARS survey and 119/212 (56.1%) in the JSGRS survey. Gynecologic oncology was the predominant subspecialty or

interest in both surveys, representing 57/81 (70.4%) in the YEARS survey and 116/212 (54.7%) in the JSGRS survey. Regarding institutional affiliation, respondents in the YEARS survey were predominantly based in tertiary university hospitals 47/63 (74.6%). In contrast, in the JSGRS survey, a substantial proportion were affiliated with tertiary non-university centers 110/212 (51.9%), exceeding those in university hospitals 91/212 (42.9%), which was statistically significant. In terms of experience, a higher proportion of respondents in the YEARS survey were early-career consultants 43/81 (53.1%), while in the JSGRS survey, the largest group consisted of fellows 101/212 (47.6%), which was significantly different. The availability of robotic surgical systems was similar between the two surveys, reported by 63/81 (77.8%) in the YEARS survey and 157/212 (74.1%) in the JSGRS survey. With respect to institutional robotic surgery activity, 32/81 (39.5%) in the YEARS survey reported performing robotic surgery more than once per week, whereas in the JSGRS survey, the most common category was 11–50 cases per year 72/212 (34.0%), and performing robotic surgery once per week or more which corresponds to an annual volume of ≥ 51 cases, was higher in the YEARS than JSGRS survey (65.4% vs 27.4%, $p < 0.001$). The proportion of the facility that never performed robotic surgery was similar between the two surveys (22.2% vs 28.3%), and these percentages were also consistent with that of robotic device availability at the facility (Figure 1A). For individual surgical experience, a marked difference was observed between the two surveys. In the YEARS survey, 66.7% of respondents reported operating as a main surgeon at least once per week, whereas in the JSGRS survey, 75.0% reported no experience as a primary robotic surgeon. Because of the difference in career between the two surveys, we also analyzed the surgical experience based on the stage of their career. In the YEARS cohort, 69.0% of consultants (29/42), 41.2% of fellows (7/17), and 26.7% of residents (4/15) reported performing robotic surgery. In contrast, in the JSGRS cohort, 53.1% of consultants (17/32) and 21.8% of fellows (22/101) had experience with ≥ 50 robotic cases, which was not significantly different from YEARS, whereas no residents (0/38) reached this level ($p = 0.0047$) (Figure 1B).

Despite these differences, interest in robotic surgery was high in both groups. In the YEARS survey, 81.0% expressed a desire to perform more robotic procedures as a main surgeon or to initiate such surgeries, while in the JSGRS survey, 70.3% either strongly or slightly agreed that they wished to be involved in robotic surgery. Regarding educational aspects, online learning resources were commonly utilized and positively perceived in both surveys. In the YEARS survey, webinars were accessed by 49.4% of respondents, while in the JSGRS survey, 79.7% of respondents considered online education to be effective for acquiring robotic surgery skills.

Discussion

In this comparative analysis of early-career gynecologic surgeons from Europe and Japan, several key findings emerged. While institutional access to robotic surgery was comparable between the two regions, higher institutional activity and earlier acquisition of robotic surgical experience were observed in the European cohort, suggesting potential differences in training structures and opportunities. Notably, these findings indicate that differences in structured training systems, rather than access to robotic platforms alone, may play a critical role in determining surgical experience among early-career surgeons.

Nevertheless, interest in robotic surgery and engagement with educational resources remained consistently high across both cohorts.

Early exposure to robotic surgery is increasingly recognized as essential for efficient skill acquisition and the safe implementation of robotic procedures. Structured training programs incorporating simulation, stepwise progression, and objective assessment have been shown to improve surgical performance and shorten the learning curve, particularly in minimally invasive surgery [18-20]. In Europe, the SERGS has pioneered the standardizing of robotic education. The SERGS curriculum emphasizes a stepwise, competency-based approach, moving from simulation and modular dry-lab training to supervised clinical practice [15, 21-23]. Such structured programs may facilitate earlier exposure to robotic surgery, which likely contributes to the higher level of surgical experience observed in the European cohort.

The rapid global proliferation of robotic surgical systems partly explains the overall expansion of robotic surgery. For instance, the number of da Vinci systems in the USA grew from 1,160 in 2010 to 4,129 in 2021. Significant growth was also observed in Europe (from 264 to 1,199) and Asia (from 84 to 1,050) during the same period [24-26]. Furthermore, numerous global and domestic companies have developed original robotic platforms. However, despite similar availability of robotic systems observed in this study, substantial differences in institutional activity and individual surgical experience remained between the two regions. This discrepancy suggests that system availability alone is insufficient to ensure adequate surgical exposure. Differences in institutional structure, including the distribution of university and non-university centers, may also contribute to variations in training opportunities and surgical exposure. These findings highlight the necessity of not only structured training frameworks but also clinical environments that actively provide these opportunities to trainees.

In contrast, robotic surgical training systems in Japan are still evolving. Although certification systems for robotic surgery have been introduced alongside established endoscopic skill certification frameworks, current reports suggest that comprehensive, society-based educational programs and standardized curricula remain limited [14]. Furthermore, limitations in case distribution and restricted indications under the national healthcare system may further reduce opportunities for early-career surgeons to gain hands-on experience. On a broader scale, the Asian Society of Gynecologic Robotic Surgery (ASGRS) has begun to address these gaps by establishing regional robotic education systems aimed at harmonizing training standards across Asia, reflecting an increasing recognition of the importance of formalized robotic training systems beyond Europe. [27]. Such a framework, integrating simulation, objective assessment, and regional collaboration, will be vital to nurturing the next generation of robotic surgeons and ensuring the continued evolution of gynecologic surgery.

Several limitations of this study should be acknowledged. First, the analysis was based on a comparison of two independently conducted surveys with different designs, target populations, and question formats. Although we selected comparable items and curated the data to align the study populations, the comparison remains indirect and may not fully capture the nuanced differences between regions. Second, the variables assessed in each survey were not completely identical, particularly regarding the

measurement of surgical experience and institutional activity, which may have influenced the interpretation of the results. Future studies are warranted to enable more direct regional comparisons. We are currently planning further collaborative surveys across Asia, which will adopt a standardized and unified questionnaire. Such efforts will allow for a more accurate evaluation of regional differences and contribute to the development of optimized training systems in robotic gynecologic surgery, ultimately bridging the gap between surgical interest and practical experience while ensuring equitable access to robotic surgical training across regions.

Conclusion

In conclusion, this comparative analysis demonstrated that early-career gynecologic surgeons in Japan share a similarly high level of interest in robotic surgery as their European counterparts. However, despite comparable access to robotic platforms, Japanese surgeons experience fewer opportunities for hands-on training and surgical practice. These findings highlight the importance of structured educational systems in bridging the gap between interest and experience. Further multinational surveys, particularly including a broader range of Asian countries, are warranted to better understand regional disparities and identify underlying challenges. Such efforts will be essential for developing standardized and effective training frameworks, ultimately promoting the wider dissemination of robotic surgery in gynecology.

Declarations

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Author Contributions

All authors contributed to the study conception and design. T.T., S.F.G., and M.H did Material preparation, conceptualization, data collection and analysis. M.D., T.Y., A.T., H.Kom., C.U., C.C., D.E.H., D.G., M.M.K., E.K., A.M.S., A.A. were all involved in data collection and analysis. H.Kob supervised the research. The first draft of the manuscript was written by T.T. All authors checked previous versions of the manuscript and approved the final manuscript.

Ethics approval

The original two surveys were IRB-exempted cross-sectional studies and therefore IRB approval was not required for this study.

References

1. Suzuki Y, Sato H, Nakazawa N (2023) Current status of robotic surgery in Japan gynecologic field. *Intell Surg* 6:25–30. 10.1016/j.isurg.2023.03.001
2. Lavoue V, Collinet P, Fernandez H (2020) Robotic surgery in gynecology: Has France lost its leadership in minimally invasive surgery? *J Gynecol Obstet Hum Reprod* 49(4):101708. 10.1016/j.jogoh.2020.101708
3. Levin G, Siedhoff M, Wright KN, Truong MD, Hamilton K, Brezinov Y et al (2023) Robotic surgery in obstetrics and gynecology: a bibliometric study. *J Robot Surg* 17(5):2387–2397. 10.1007/s11701-023-01672-1
4. Levin G, Gotlieb WH, Zand B, Zaid T, Meyer R, Yates E et al (2024) Robotic Surgery in Gynecologic Oncology-A Bibliometric Study. *J Minim Invasive Gynecol* 31(10):882–889. 10.1016/j.jmig.2024.07.002
5. El-Hamamsy D, Geary RS, Gurol-Urganci I, van der Meulen J, Tincello D (2022) Uptake and outcomes of robotic gynaecological surgery in England (2006–2018): an account of Hospital Episodes Statistics (HES). *J Robot Surg* 16(1):81–88. 10.1007/s11701-021-01197-5
6. McCarthy A, Samarakoon D, Gray J, McMeekin P, McCarthy S, Newton C et al (2023) Robotic and laparoscopic gynaecological surgery: a prospective multicentre observational cohort study and economic evaluation in England. *BMJ Open* 13(9):e073990. 10.1136/bmjopen-2023-073990
7. Brunes M, Forsgren C, Warnqvist A, Ek M, Johannesson U (2021) Assessment of surgeon and hospital volume for robot-assisted and laparoscopic benign hysterectomy in Sweden. *Acta Obstet Gynecol Scand* 100(9):1730–1739. 10.1111/aogs.14166
8. Sarlos D, Kots L, Stevanovic N, von Felten S, Schar G (2012) Robotic compared with conventional laparoscopic hysterectomy: a randomized controlled trial. *Obstet Gynecol* 120(3):604–611. 10.1097/AOG.0b013e318265b61a
9. Paraiso MF, Ridgeway B, Park AJ, Jelovsek JE, Barber MD, Falcone T et al (2013) A randomized trial comparing conventional and robotically assisted total laparoscopic hysterectomy. *Am J Obstet Gynecol* 208(5):368e1–368e7. 10.1016/j.ajog.2013.02.008
10. Woelk JL, Casiano ER, Weaver AL, Gostout BS, Trabuco EC, Gebhart JB (2013) The learning curve of robotic hysterectomy. *Obstet Gynecol* 121(1):87–95. <http://10.1097/AOG.0b013e31827a029e>
11. 1097/aog 0b013e31827a029e
12. Lin JF, Frey M, Huang JQ (2014) Learning curve analysis of the first 100 robotic-assisted laparoscopic hysterectomies performed by a single surgeon. *Int J Gynaecol Obstet* 124(1):88–91. 10.1016/j.ijgo.2013.06.036

13. Sandadi S, Gadzinski JA, Lee S, Chi DS, Sonoda Y, Jewell EL et al (2014) Fellowship learning curve associated with completing a robotic assisted total laparoscopic hysterectomy. *Gynecol Oncol* 132(1):102–106. 10.1016/j.ygyno.2013.11.017
14. Tang FH, Tsai EM (2017) Learning Curve Analysis of Different Stages of Robotic-Assisted Laparoscopic Hysterectomy. *Biomed Res Int* 2017:1827913. 10.1155/2017/1827913
15. Komatsu H, Hiraike O, Fukuhara R, Yokoyama Y, Takahashi N, Nishi H et al (2023) Is there a need for a technical certification system for gynecological robotic surgery? Questionnaire survey of members of the Japan Society of Gynecologic and Obstetric Endoscopy and Minimally Invasive Therapy. *J Robot Surg* 17(3):1125–1131. 10.1007/s11701-022-01520-8
16. Rusch P, Kimmig R, Lecuru F, Persson J, Ponce J, Degueldre M et al (2018) The Society of European Robotic Gynaecological Surgery (SERGS) Pilot Curriculum for robot assisted gynecological surgery. *Arch Gynecol Obstet* 297(2):415–420. 10.1007/s00404-017-4612-5
17. Fernandez-Gonzalez S, El-Hamamsy D, Karatrasoglou E, Amirthanayagam A, Solano AM, Collet C et al (2026) Evaluation of robotic exposure among gynecological surgeons: results of survey from the young European advocates of robotic surgery (YEARS). *J Robot Surg* 20(1):241. 10.1007/s11701-026-03153-7
18. Hayasaka M, Dofutsu M, Yoshimura T, Taima A, Komatsu H, Kobayashi H (2025) Current status and prospects of robotic surgery adoption in obstetrics and gynecology: insights from a nationwide survey. *J Robot Surg* 19(1):67. 10.1007/s11701-024-02197-x
19. Lawrie TA, Liu H, Lu D, Dowswell T, Song H, Wang L et al (2019) Robot-assisted surgery in gynaecology. *Cochrane Database Syst Rev* 4:CD011422. 10.1002/14651858.CD011422.pub2
20. Keelan S, Guirgis M, Julien B, Hewett PJ, Talbot M (2025) Surgeon Training in the Era of Computer-Enhanced Simulation Robotics and Emerging Technologies: A Narrative Review. *Surg Techniques Dev* 14(3). 10.3390/std14030021
21. Liakos N, Moritz R, Janssen M, Wagner C, Editorial (2025) Current trends and topics in robotic surgical education in urology. *Front Surg* 12:1744652. 10.3389/fsurg.2025.1744652
22. Rusch P, Ind T, Kimmig R, Maggioni A, Ponce J, Zanagnolo V et al (2019) Recommendations for a standardised educational program in robot assisted gynaecological surgery: Consensus from the Society of European Robotic Gynaecological Surgery (SERGS). *Facts Views Vis Obgyn* 11(1):29–41
23. Ind T (2023) Providing a standardised educational programme in robot-assisted gynaecological surgery. *Best Pract Res Clin Obstet Gynaecol* 91:102399. 10.1016/j.bpobgyn.2023.102399
24. Klapczynski C, Sallee C, Tardieu A, Peschot C, Boutot M, Mohand N et al (2021) Training for next generation surgeons: a pilot study of robot-assisted hysterectomy managed by resident using dual console. *Arch Gynecol Obstet* 303(4):981–986. 10.1007/s00404-020-05870-2
25. Vaessen C (2011) Location of robotic surgical systems worldwide and in France. *J Visc Surg* 148(5 Suppl):e9–11. 10.1016/j.jviscsurg.2011.04.004
26. Lee W-J (2016) Ten-year Experience of the da Vinci Robotic Surgery At Severance Yonsei University Hospital in Korea. *Hanyang Med Reviews* 36(4). 10.7599/hmr.2016.36.4.215

27. Park J, Bak S, Song JY, Chung YJ, Yuki G, Lee SJ et al (2023) Robotic surgery in Gynecology: the present and the future. *Obstet Gynecol Sci* 66(6):518–528. 10.5468/ogs.23132

28. Kim T-J (2024) Asian Society for Gynecologic Robotic Surgery: Taking it to the next level. *Gynecologic Robotic Surg* 5(1):3–4. 10.36637/grs.2024.00017

Tables

Table 1. Similar questionnaires between the YEARS and JSGRS surveys [16, 17]

Topic	YEARS	JSGRS
Gender	What is your gender?	What is your gender?
Area of Interest / Subspecialty	What is your Gynecological subspecialty or area of interest?	What is your subspecialty?
Facility	Where do you work?	Which type of facility do you work?
Level of experience	What is your level of experience within your current role?	How many years after graduated?
Availability of Robotic Devices	Is there a surgical robotic device at your workplace?	Installation status of robotic surgical systems at the facility
Departmental Robotic Surgery Activity	How often does your department perform robotic surgery?	Annual number of robotic surgeries at the facility
Experience as a Robotic Surgeon	Do you operate as a main surgeon by robotic approach?	Robotic experience as a primary surgeon
Willingness to Perform Robotic Surgery	Would you like to operate more often by a robotic approach?	Do you personally want to be involved in gynecologic robotic surgery?
Learning Opportunities	What learning tools do you access most frequently about robotics (more than one allowed)?	Do you think online education is effective for acquiring robotic surgery skills?

Table 2. Characteristics of respondents and their comparison [16, 17]

YEARS (n=81)	n	(%)	JSGRS (n=212)	n	(%)	p-value
What is your gender?			What is your gender?			
Female	44	54.3%	Female	119	56.1%	n.s
Male	37	45.7%	Male	90	42.5%	
			Prefer not to say	3	1.4%	
What is your Gynecological subspecialty or area of interest?			What is your subspecialty?			
Gynecology Oncology	57	70.4%	Gynecology Oncology	116	54.7%	n.s
Benign gynecology	18	22.2%	General gynecology	62	29.2%	
Urogynecology	6	7.4%	Women's Healthcare	27	12.7%	
			Other	7	3.3%	
Where do you work? (Among 63 responders from where robotic device available)			Which type of facility do you work?			
Tertiary University Hospital	47	74.6%	Tertiary University Hospital	91	42.9%	***
Tertiary No-University Center	9	14.2%	Tertiary No-University Center	110	51.9%	
Private Hospital	7	11.1%	Private Hospital	7	3.3%	
			Others	4	1.9%	
What is your level of experience within your current role?			How many years after graduated? (<12Y)			
Currently, doing training program in gyn/obs	16	19.8%	Residency (-5Y)	38	17.9%	***
Currently, 1/2 half of fellowship	12	14.8%	Fellowship (5Y- without subspecialty)	101	47.6%	
Currently, 2/2 half of fellowship	5	6.2%	Consultant (5Y- with certification of subspecialty)	32	15.1%	
Working as a consultant < 4 years	43	53.1%	Other (5Y-, doing general)	41	19.3%	
Others	5	6.2%				
Is there a surgical robotic device at your workplace?			Installation status of robotic surgical systems at the facility			
Yes	63	77.8%	Yes	157	74.1%	n.s

No	18	22.2%	No	55	25.9%	
How often does your department perform robotic surgery?			Annual number of robotic surgeries at the facility (Case/ Year)			
> 1 day per week	32	39.5%	151-	5	2.4%	***
1 day per week	21	25.9%	101-150	12	5.7%	
< 1 day per week	10	12.3%	51-100	41	19.3%	
Never	18	22.2%	11-50	72	34.0%	
			1-10	12	5.7%	
			Never	60	28.3%	
			Not well known	10	4.7%	
Do you operate as a main surgeon by robotic approach?			Robotic experience as a primary surgeon (Case so far)			
< 1 day per week	39	48.1%	101-150	2	0.9%	NA
1 day per week	15	18.5%	51-100	6	2.8%	
> 1 day per week	8	9.9%	11-50	28	13.2%	
No device	18	22.2%	1-10	17	8.0%	
NA	1	1.2%	Never	159	75.0%	
Would you like to operate more often by a robotic approach? (Among 63 responders)			Do you personally want to be involved in gynecologic robotic surgery?			
No, I am happy with my frequency	11	17.5%	strongly agree	67	31.6%	NA
I would like to operate more often as a main surgeon	35	55.6%	slightly agree	82	38.7%	
I would like to initiate surgeries as a main surgeon	16	25.4%	not sure	6	2.8%	
NA	1	1.5%	slightly disagree	38	17.9%	
			strongly disagree	19	9.0%	
What learning tools do you access most frequently about robotics (more than one allowed)?			Do you think online education is effective for acquiring robotic surgery skills?			
On-site courses	34	42.0%	strongly agree	53	25.0%	NA
Webinars	40	49.4%	slightly agree	116	54.7%	

Society websites	27	33.3%	not sure	13	6.1%
Social media	12	14.8%	slightly disagree	27	12.7%
			strongly disagree	3	1.4%

Figures

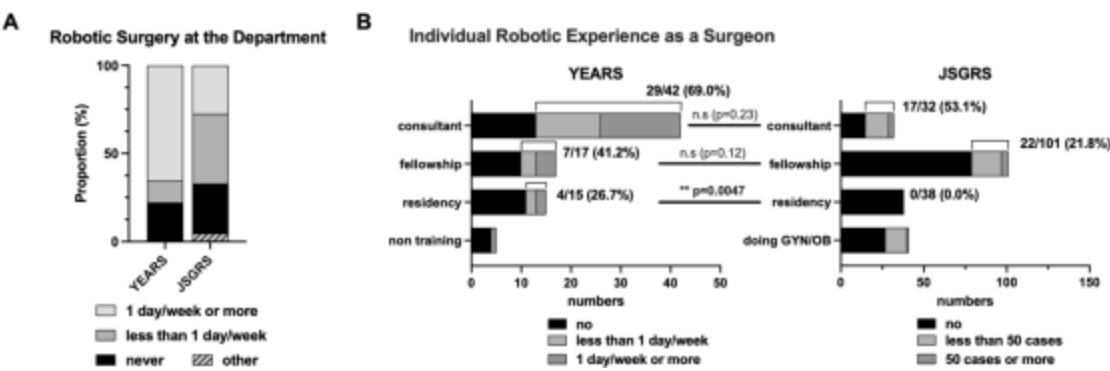


Figure 1

Comparison of robotic surgical volume in European and Japanese surveys

A: Comparison of institutional robotic surgery activity between the YEARS and JSGRS surveys. Robotic system availability was similar between the two cohorts. However, higher institutional activity was observed in the YEARS survey, with more centers performing robotic surgery at least once per week, while the proportion of institutions not performing robotic surgery was comparable. **B: Comparison of individual robotic surgical experience stratified by career stage in the YEARS and JSGRS surveys.** The proportion of robotic surgical experience is similar in consultants, fellows level, while the difference was most pronounced at the resident level (p=0.0047).

Supplementary Files

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