



Colonoscopic polypectomy preferences among gastrointestinal endoscopists in the Philippines: Results of an online survey-based cross-sectional study[^]

Abstract*

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Significance: To date, no study has investigated colonoscopic polypectomy preferences among endoscopists in the Philippines. This study aimed to assess current knowledge and practices of endoscopists on polypectomy and to determine the factors associated with adherence to recent polypectomy guidelines, particularly on cold snare polypectomy for small polyps. These results may streamline training programs to improve the utility of colonoscopy in preventing colorectal cancer (CRC). **Methods:** Endoscopists and trainees were recruited by convenience sampling to an online survey determining preferences in polypectomy techniques for different scenarios of polyps. Descriptive statistics, univariate analysis and logistic regression were used for statistical analysis. **Results:** 105 responses were included in the final analysis. For sessile polyps, cold forceps polypectomy was preferred for 1-3 mm polyps (74%). Cold snare polypectomy (CSP) was preferred for lesions 4-5 mm (39%). CSP and hot snare polypectomy (HSP) were equally favored for lesions 6-9 mm (34%). Endoscopic mucosal resection (EMR) was preferred for benign lesions >10 mm (38%), but most preferred to refer to an expert endoscopist for suspicious malignant lesions (53%). HSP was preferred for pedunculated polyps (75-80%). On univariate analysis and logistic regression, attendance to workshops on image-enhanced endoscopy (IEE) ($p = 0.025$), location of practice ($p < 0.001$), endoscopist's confidence in using IEE ($p = 0.013$) and adhering to guidelines ($p = 0.007$), and number of colonoscopies performed in a year ($p = 0.033$) were associated with using CSP on sessile polyps <10mm. **Conclusion:** Holding more workshops on polypectomy and IEE-targeted especially to endoscopists in areas other than the National Capital Region (NCR) and those who perform fewer colonoscopies may improve adherence to the most recent polypectomy guidelines.

Keywords: colon, rectum, polyp, colonoscopy, polypectomy, survey

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* *Laymanized Abstract:* No study yet has investigated the preferences of endoscopists in the Philippines in terms of preferred polyp removal practices in the colon and/or rectum. This study aimed to address such gap in knowledge by developing an online survey designed for endoscopists, and to determine factors that may lead the endoscopist to choose a recommended polypectomy method depending on the kind of polyp encountered. Through the survey, the preferred methods for each kind of polyp were successfully tallied, and it was found that adherence to the guidelines for polyp removal was poor. Several factors were significantly associated with the choice of proper polyp removal methods, specifically for small polyps. Holding more workshops on the most recent guidelines on removing polyps, especially in areas outside NCR and for endoscopists who perform fewer colonoscopies per year, may improve adherence to the most recent recommendations.

In the Philippines, colorectal cancer (CRC) is the most common site of all gastrointestinal malignancies and ranks third among the leading sites of malignancy overall, behind only lung and breast cancer. According to the Globocan studies, its incidence in the Philippines has increased from 9,625 (8.8%) in 2015 to 17,364 (11.3%) in 2020. CRC has also been found to be the fourth leading cause of cancer-related mortality, accounting for 9,091 (9.8%) deaths.^{1,2}

More importantly, CRC is a preventable disease, made possible through effective screening strategies with the goal of identifying and resecting pre-neoplastic and early neoplastic lesions. Colonoscopy is the gold standard for CRC screening in average and high-risk populations, as it allows complete examination of the colon and rapid detection of lesions with subsequent resection or tissue sampling for histologic examination. Polypectomy of adenomas in the colon has been shown to result in lower incidence of CRC-related death.^{3,4}

However, the practice and techniques of polypectomy during colonoscopy have been shown to be widely varied among endoscopists. This variation in preferences has naturally been brought about by the wide array of techniques available for use by the endoscopist, such as cold forceps (CFP) or hot forceps (HFP) polypectomy; cold snare (CSP) or hot snare polypectomy (HSP); endoscopic mucosal resection (EMR); endoscopic piecemeal resection (EPMR); or endoscopic submucosal dissection (ESD).⁵

Review of records from 1,061 screening colonoscopies in an institution in Romania revealed that CFP was the most commonly used method to remove small polyps, while HSP was most commonly used to remove larger polyps.⁶

A survey-based study among 100 Israeli gastroenterologists found significant differences in the preferred polypectomy method for polyps less than 10 mm, with most preferring CFP for polyps 1-3 mm, HSP for 7-9 mm polyps, and either HFP or HSP for 4-6 mm polyps. The study also noted that the practice of prophylactic clip deployment on larger pedunculated polyps was noted to be more common in those practicing in public hospitals, and that chromoendoscopy and image-enhanced endoscopy were associated with endoscopists who perform a higher number of colonoscopies per year.⁷

A nationally conducted online survey among medical practitioners in Australia who perform colonoscopy

found that CSP was preferred for smaller, diminutive polyps, while EMR was preferred for larger lesions. Variations in practice were also noted regarding double-passing high-risk areas and rectal retroflexion.⁸

Notable differences were noted among gastrointestinal endoscopists regarding self-reported colonoscopic polypectomy preference versus actual polypectomy practices in a single center survey-based study in Florida, USA. In the study, survey-based results found 89.5% preference for the use of CSP for small polyps, while retrospective analysis of consecutive colonoscopies in the same population revealed that only 26.6% of small polyps were resected by CSP, and that 90% of diminutive lesions less than 3 mm were removed by CFP.⁹

Lastly, in a 2021 online survey-based study by Yang et al. among endoscopists in Asian countries including Indonesia, South Korea, Malaysia, Mongolia, Myanmar, Thailand, and Vietnam, CFP was the most preferred resection method for polyps less than 5 mm; CSP being the second, except in Mongolia. For polyps 6-9 mm, preferences varied among countries, with CSP and EMR being preferred in Malaysia and Korea, respectively; while HSP was preferred in five other countries. This study also noted that the preference for performing CSP for small non-pedunculated polyps was statistically associated with trainee endoscopists, endoscopists in tertiary referral centers, and endoscopists in countries where the incidence of CRC was in the top three among all malignancies.¹⁰

Variations in the practice of polyp removal has been demonstrated as a factor in the effectiveness and safety of colonoscopy. CSP was found to be associated with a reduced incidence of incomplete resection without increasing procedure time compared to CFP.⁵ A 2018 systematic review and meta-analysis comparing cold polypectomy techniques found that CSP using dedicated cold snares was superior compared to traditional CSP and CFP in achieving complete histological eradication of small polyps. Citing these studies, the US Multi-Society Task Force (USMSTF) on colorectal cancer strongly recommends the use of CSP for diminutive and small lesions (less than 10 mm in size) in its most recently published guidelines on the endoscopic removal of colorectal lesions in 2020.¹¹ As much as 88% of polyps encountered during colonoscopy are less than 10 mm, and advanced adenomas were found in a significant 20%-

37% of all resected polyps within this size range.^{12,13} These findings underline the importance of effective and safe resection of small and diminutive lesions by CSP.

To date, no local studies have yet explored the current colonoscopic polypectomy preferences of gastrointestinal endoscopists in the Philippines. This study aims to serve as a pilot investigation to address this gap in knowledge locally, to assess how well current practices adhere with the most recent evidence-based guidelines on polypectomy during colonoscopy, and to provide recommendations on how adherence to such guidelines can be improved. Specifically for the second objective, this study aims to identify demographic factors that are associated with the use of CSP for diminutive and small lesions, since it has been the technique seen with robust supporting evidence associating it with better outcomes in terms of effectiveness and safety over other techniques, signified by its Grade 1A recommendation from the USMSTF for CRC.

Methodology

Study Design

The study design was cross-sectional based on an online survey. The online survey was conducted using a web-based survey platform, Google Forms (Google, Mountain View, CA, USA). The structure and the questions of the survey were designed and formulated by the Polypectomy Preference Study Group, a team of Filipino expert gastroenterologists and gastroenterologists-in-training to fill in the knowledge gap in this topic of interest.

Parts of the Online Survey

The first part of the survey included a portion on voluntary participation and an online waiver of informed consent. After signifying consent to participate in the study, data regarding the participants' demographics were obtained.

The second part of the survey contained multiple choice questions regarding preferred action when presented with different theoretical scenarios of sizes and appearances of polyps, as well as questions regarding adjunctive actions related to polypectomy, such as the performance of a biopsy on a lesion before definitive resection, or preferences on the use of instruments for prophylactic hemostasis. The structure of the questions was generally based on the 2020

recommendations set by the USMSTF for the endoscopic removal of colorectal lesions, as this portion would test the participants' theoretical knowledge on the proper polypectomy practices based on the latest evidence-based recommendations.

The third portion of the survey also contained multiple choice questions involving actual endoscopic images representing different sizes and appearances of polyps. This portion similarly asked the preferred polypectomy method for each polyp presented. This portion aimed to test the accuracy of the participant in making a visual diagnosis of a polyp which determines subsequent actions.

The survey took approximately ten minutes of the participant's time. A copy of the online survey is available as supplementary material with this manuscript.

Study Population, Sampling, Recruitment

All gastrointestinal endoscopists (adult and pediatric) in the Philippines were eligible to participate in the survey. Being a nationwide study, the research was not limited to the Philippine General Hospital alone, the investigators' affiliate institution. Invitations to participate via a link to the online survey were distributed to all GI endoscopists, disseminated via email and through social media communities and specialty society chat groups. The link to the survey were distributed by the corresponding society secretariat (Philippine Society of Digestive Endoscopy, Philippine Society of Gastroenterology), but it was clear in the waiver of informed consent portion of the survey that this was a personal-driven research study from the primary investigators and not as a society-based research study. Participation was purely voluntary and had no implication on the participant's affiliation to these societies. Only the specialty societies had access to the complete list of email addresses/contacts of the target population, as these were only available to the society secretariat. The principal investigators did not have access to the complete list of contact information of the members during recruitment.

Endoscopists of other specialty fields such as otorhinolaryngology and gynecology were excluded. GI endoscopists who practice in other countries were also not part of this study. Being an online-based study, limitations in participation and sampling were foreseen in supposedly eligible participants who were unable to access the Internet.

Sample size was computed using an online statistical calculator, OpenEpi¹³, with an estimated total population size of 400 active practicing GI endoscopists, and a previously determined prevalence of utilization of CSP for small polyps at 15% seen in Thailand⁹, which was a country deemed to have a similar setting as our target population. Computation for a study power of 90% yielded a sample size of 103 participants.

Data Collection, Statistical Analysis

Responses from the survey were compiled electronically within the google forms platform. The compiled responses were received by the principal investigator in a spreadsheet file generated by google forms. Privacy and confidentiality were of utmost importance and were upheld via several measures described in more detail later in this manuscript under “Ethical Considerations”.

The demographics of the sample population and responses obtained from the survey pertaining to preferred polypectomy practices were presented using descriptive statistics.

Chi-square and Fisher exact tests were used to determine the variables associated with the use of CSP over other techniques for diminutive and small polyps. Factors demonstrated to have a value of $p < 0.2$ were included in the logistic regression to identify the factors independently associated with choosing CSP, for which a p -value of <0.05 was significant.

Ethical Considerations, Data Storage and Processing

Reporting of survey results and analysis was population-based, and survey responses were ensured of anonymity. The survey responses were treated with utmost confidentiality in compliance with the provisions of RA 10173 or the Data Privacy Act of 2012. Sensitive information, specifically email addresses obtained (which were required by the survey platform for participation) were safely kept confidential, the list being available only to the principal investigator in a password-protected hard drive to be kept for five years, after which these will be deleted. Email addresses were required to participate in the online survey platform to ensure that there would be no duplicate responses from the same individual participant. After screening and excluding duplicate or invalid entries, the responses were anonymized and were assigned corresponding

participant numbers. Email addresses were then excluded in the spreadsheet used for data analysis. The study protocol was submitted to the University of the Philippines Manila Research Ethics Board (UPMREB) and was approved for protocol review exemption.

Participation in the survey was purely voluntary. This study entailed minimal risk to the study participants, such as risk to privacy. In cases of breach of privacy, matters would be forwarded to the Philippine General Hospital (PGH) Data Privacy Officer for corresponding subsequent action. No financial nor academic incentives were provided for participants. Withdrawal from the study was permitted anytime by declining to participate during the informed consent portion of the survey, or simply by not finishing the online survey. Their participation, however, was of indirect benefit to them and to the general population by filling in the gap in scientific knowledge that this study aimed to address.

Images of polyps included within the survey were obtained from personal image libraries of the gastroenterologists who were part of the team who developed the survey. Strictly no patient identifiers were included in the images within the survey.

Results

Demographics of the survey respondents

A total of 132 responses for the survey were initially received. Twenty-seven (27) were excluded for incompleteness of responses. A total of 105 (79.5%) responses were included in the final analysis.

The baseline characteristics of the study population is shown in **Table 1**. The mean age of the study population was 44.9, ranging from 30 to 72 years. Sixty percent of the population was male. About half of the respondents were in practice for more than ten years and were able to perform about 100-250 colonoscopies in a year. Eighty percent of the respondents were gastroenterology consultants, and only 3% were surgeons who performed GI endoscopy. In terms of the location of practice, most of the respondents practiced in private institutions and training hospitals within the National Capital Region (NCR).

Table 1 also contains demographics of the study population pertaining to the respondents' colonoscopy practices. Notably, 90% of the respondents had access to scopes with image-enhancement capability, and among these, most have had prior training to image-enhanced

endoscopy (IEE) and used it routinely to characterize a colonic lesion encountered. On the other hand, dye-based chromoendoscopy was a much less popular method for lesion characterization, as only 39% had

access to it, and among those who did have access, only 7% performed it routinely as a substitute or in addition to IEE. Five percent of the study population performed endoscopic submucosal dissection.

Table 1. Demographics of the Study Population (N = 105)

Basic Demographics	
Age in years	44.9 (30-72)
Gender: n (%)	
Male	63 (60)
Female	42 (40)
Years in practice: n (%)	
<1 year	15 (14)
1-3 years	13 (12)
4-10 years	22 (21)
>10 years	55 (52)
Number of colonoscopies performed per year: n (%)	
<99	33 (31)
100-250	48 (46)
251-500	14 (13)
>501	10 (10)
Designation: n (%)	
Colorectal Surgery consultant	2 (2)
GI consultant	84 (80)
GI Fellow-in-training	18 (17)
Minimally invasive / endoscopic surgeon	1 (1)
Location of practice in PH: n (%)	
NCR	64 (61)
Luzon	25 (24)
Visayas	11 (10)
Mindanao	5 (5)
Type of medical institution affiliation: n (%)	
Primary care center / secondary referral center	11 (10)
Tertiary referral center	34 (32)
Training hospital	60 (57)
Government vs. private institution affiliation: n (%)	
Government	16 (15)
Private	89 (85)
Government vs. private institution affiliation: n (%)	
Government	16 (15)
Private	89 (85)
Brand of scope most frequently used: n (%)	
Fuji	19 (18)
Olympus	74 (79)
Pentax	10 (9)
Storz	3 (3)
Able to perform ESD: n(%)	
Yes	5 (5)
No	100 (95)
Scope with image enhancement capability: n (%)	
Yes	95 (90)
No	10 (10)
Routinely perform IEE upon detecting a colonic lesion? n (%)	
Yes	78 (82)
No	17 (18)
With previous training / seminar on IEE: n (%)	
Yes	83 (87)
No	12 (13)
Confidence in labeling colonic lesions using IEE and NICE classification (score of 1-10; mean, SD)	7.1 (1.6)
Availability of dye-based chromoendoscopy: n (%)	
Yes	41 (39)
No	58 (55)
Not sure	6 (6)
Routinely perform chromoendoscopy in lieu or aside from IEE: n (%)	
Yes	3 (7)
No	38 (93)

Scenario-Based Questions: Sessile/Flat Polyps

Tables 2 and 3 summarize the results of the scenario-based questions regarding polypectomy methods and adjunctive practices for sessile/flat and pedunculated polyps, respectively. Most of the respondents still preferred CFP (74.3%) to resect 1-3 mm sessile polyps, but snare polypectomy was more commonly preferred with increasing polyp size. For 4-5 mm sessile polyps, CSP (39.0%) was most preferred, followed closely by CFP

(35.2%). For 6-9 mm sessile polyps, CSP (34.3%) and HSP (34.3%) were equally favored by most.

For sessile polyps 10 mm or larger which were not suspected to have deep submucosal invasion, EMR was the most preferred method of resection (39%), followed by HSP (34.3%). For polyps 20 mm or larger, EMR was still the most preferred (38.1%), but a significant portion of the participants (33.3%) preferred to refer either to another expert GI endoscopist for EMR or ESD, or to a surgeon for resection. Nearly half (45.7%) of those who

would refer to another specialist would biopsy the lesion first prior to referral.

For sessile polyps 10 mm or larger suspected to have deep submucosal invasion, majority (53.3%) preferred to

refer to an expert GI for EMR or ESD; only 9.5% would refer to a surgeon for resection. Similarly, nearly half (45.7%) of those who would refer to another specialist would biopsy the lesion before referring.

Table 2. Preferred polypectomy methods for sessile / flat polyps (N = 105).

For 1-3 mm polyps: n (%)		Submucosal injection prior to polypectomy	
CFP	78 (74.3)	Yes	74 (87.1)
CSP	15 (14.3)	No	11 (12.9)
HSP	4 (3.8)	Biopsy first before proceeding to polypectomy	
EMR	3 (2.9)	Yes	6 (7.1)
None; observation	4 (3.5)	No	79 (92.9)
Refer to an expert GI for EMR or ESD	1 (1.0)	For polyps >20 mm, (-) submucosal invasion: n(%)	
Biopsy prior to referral: n (%)		CSP	2 (1.9)
Yes	0 (0.0)	HFP	1 (1.0)
No	1 (100)	HSP	19 (18.1)
For 4-5 mm polyps: n(%)		EMR	40 (36.1)
CFP	37 (35.2)	ESD	8 (7.6)
CSP	41 (39.0)	Refer to an expert GI endoscopist for EMR or ESD	33 (31.4)
HFP	6 (5.7)	Refer to Surgery for resection	2 (1.9)
HSP	11 (10.5)	Biopsy first before referring to GI / surgeon	
EMR	8 (7.6)	Yes	16 (45.7)
ESD	1 (1.0)	No	19 (54.3)
None; observation	1 (1.0)	Submucosal injection prior to polypectomy	
For 6-9 mm polyps: n(%)		Yes	62 (89.9)
CFP	10 (9.5)	No	7 (10.1)
CSP	36 (34.3)	Biopsy first before proceeding to polypectomy	
HFP	4 (3.8)	Yes	10 (14.5)
HSP	36 (34.3)	No	59 (85.5)
EMR	13 (12.4)	For polyps ≥10 mm, (+) submucosal invasion: n(%)	
ESD	2 (1.9)	CFP	1 (1.0)
Refer to an expert GI endoscopist for EMR or ESD	4 (3.8)	HFP	7 (6.7)
Perform biopsy prior to referral		EMR	12 (11.4)
Yes	2 (50.0)	ESD	15 (14.3)
No	2 (50.0)	Refer to an expert GI endoscopist for EMR or ESD	56 (53.3)
For 10-19 mm polyps, (-) submucosal invasion: n(%)		Refer to Surgery for resection	10 (9.5)
CFP	3 (2.9)	Others	4 (3.8)
CSP	3 (2.9)	Biopsy first before referring to GI / surgeon	
HFP	4 (3.8)	Yes	32 (45.7)
HSP	36 (34.3)	No	36 (54.3)
EMR	41 (39.0)	Submucosal injection prior to polypectomy	
ESD	5 (4.5)	Yes	31 (89.9)
Refer to an expert GI endoscopist for EMR or ESD	11 (10.5)	No	3 (10.1)
Refer to surgeon for resection	2 (1.9)	Biopsy first before proceeding to polypectomy	
Biopsy first before referring to GI / surgeon		Yes	11 (14.5)
Yes	5 (39.5)	No	23 (85.5)
No	8 (61.5)		

CFP - cold forceps polypectomy; CSP - cold snare polypectomy; HFP - hot forceps polypectomy; HSP - hot snare polypectomy; EMB - endoscopic mucosal resection; ESD - endoscopic submucosal dissection.

Table 3. Preferred polypectomy methods for pedunculated polyps (N = 105)

Polyp head <20 mm and stalk width of <5mm: n (%)		Polyp head size ≥20 mm, or with stalk width of ≥5 mm: n (%)	
CFP	4 (3.8)	CSP	2 (1.9)
HFP	4 (3.8)	HSP	79 (75.2)
HSP	85 (81.0)	EMR	9 (8.6)
EMR	6 (5.7)	ESD	1 (1.0)
ESD	2 (1.9)	Refer to expert GI endoscopist for EMR or ESD	14 (13.3)
Refer to an expert endoscopist for EMR or ESD	4 (3.8)	Biopsy first before referring to GI / surgeon	
Biopsy first before referring to GI / surgeon: n (%)		Yes	6 (42.9)
Yes	3 (75.0)	No	8 (57.1)
No	1 (25.0)	Submucosal injection prior to polypectomy	
Submucosal injection prior to polypectomy		Yes	56 (61.5)
Yes	52 (53.6)	No	35 (38.5)
No	45 (46.4)	Prophylactic stalk ligation before polypectomy	
Prophylactic stalk ligation before polypectomy		Yes	58 (63.7)
Yes	30 (31.9)	No	0 (36.3)
No	67 (68.1)	Preferred method of ligation	
Preferred method of ligation		Detachable loop (Endoloop)	38 (65.5)
Detachable loop (Endoloop)	15 (50.0)	Hemoclip	20 (34.5)
Hemoclip	15 (50.0)	Biopsy first before polypectomy	
Biopsy before polypectomy		Yes	9 (9.9)
Yes	5 (5.2)	No	82 (90.1)
No	92 (94.8)		

CFP - cold forceps polypectomy; CSP - cold snare polypectomy; HFP - hot forceps polypectomy; HSP - hot snare polypectomy; EMR - endoscopic mucosal resection; ESD - endoscopic submucosal dissection.

Confidence in Adherence to Guidelines, Polypectomy for Patients on Blood Thinners

Table 4 reports on additional questions related to the practice of polypectomy during colonoscopy. Eighty-one percent (81%) of the participants felt confident that their preferences on polypectomy technique in the scenario-based questions were in line with most recent practice guidelines and recommendations. For the 19% who were not confident about their choices, the reasons most often cited for this were the lack of technical skill

necessary to perform the recommended technique (70%), unavailability of accessories/instruments to perform the recommended resection technique (65%), and the unavailability of technology such as those for IEE or chromoendoscopy (50%).

For a patient who needed polypectomy but whose aspirin was not put on hold, 63.8% responded that they would not proceed with polypectomy. In a similar setting where the patient was on dual antiplatelet therapy not put on hold, a much higher 91.4% of the respondents would not proceed with polypectomy.

Table 4. Additional questions related to the practice of polypectomy (N = 105).

Do you feel that your choices above are in line with the most recent guidelines on polypectomy during colonoscopy? n (%)		Unsure of the most recent guideline recommendations	3 (15.0)
Yes	85 (81.0)	Personal preference to limit practice to diagnostic endoscopy	1 (5.0)
No	20 (19.0)	Others (surgeons need biopsy result prior to planning surgery)	1 (5.0)
Reasons cited for practice limitation (more than one answer allowed)		Perform polypectomy if aspirin is not put on hold?	
Unavailable accessories / instruments	13 (65.0)	Yes	38 (36.2)
Lack of technical skill to perform the recommended techniques	14 (70.0)	No	67 (63.8)
Unavailable technology (e.g., IEE, chromoendoscopy)	10 (50.0)	Perform polypectomy if patient is maintained on dual antiplatelet therapy?	
Inability to address possible complications	1 (5.0)	Yes	9 (8.6)
		No	96 (91.4)

Image-Based Questions

Lastly, **Table 5** summarizes the results of the image-based questions from the survey. For diminutive sessile polyps, CSP was the preferred method of resection (41.9%), followed by CFP (32.4%). For 6-9 mm sessile polyps, HSP (31.4%) was the preferred method, while CSP was second most preferred (28.4%). For larger sessile lesions >10 mm, four images were presented. Two images were presented as they appeared on white light imaging, while the other two images were presented using IEE, particularly using narrow-band imaging or NBI (Olympus Medical). The two corresponding images differed in the presence or absence of endoscopic features suggesting deep submucosal invasion.

For the large sessile lesions without features of deep SM invasion on WLI, the most preferred options were either to proceed with EMR, or to refer to another expert GI endoscopist for EMR or ESD (39%). When features of deep submucosal invasion were present on WLI, referral

for EMR or ESD was preferred by the majority (47.6%). Only 8.6% referred to a surgeon for outright resection.

On the other hand, on IEE, for both images with and without features of submucosal invasion, participants mostly preferred to refer to an expert GI endoscopist for EMR or ESD (36.2% if with features, 54.3% if without). Notably, a larger proportion of the participants opted to refer to a surgeon outright for surgical resection for the polyp with these features (29.5% if with features, 4.8% if without).

Presented with an image of a pedunculated polyp on WLI, HSP was widely preferred as the method of resection (91.5%).

A similar question was asked on the image-based portion of the questionnaire regarding the participant's adherence to the most recent guidelines, for which 82.9% felt they were adherent. For those who felt their choices were not adherent to the guidelines, similar reasons were cited (**Table 4**).

Table 5. Preferred polypectomy methods based on image-based questions (N = 105).

Diminutive (<5 mm) sessile / flat polyp on WLI: n (%)	
CFP	34 (32.4)
CSP	44 (41.9)
HFP	5 (4.8)
HSP	16 (15.2)
EMR	4 (3.8)
Refer to an expert GI endoscopist for EMR or ESD	2 (1.9)
Small (6-9 mm) sessile / flat polyp on WLI: n (%)	
CFP	7 (6.7)
CSP	30 (28.6)
EMR	22 (21.0)
ESD	1 (1.0)
HFP	1 (1.0)
HSP	33 (31.4)
None; refer to Surgery for surgical resection	1 (1.0)
Refer to an expert GI endoscopist for EMR or ESD	10 (9.5)
Large (>10 mm), sessile / flat polyp without features suspicious for submucosal invasion on WLI: n (%)	
CFP	2 (1.9)
CSP	2 (1.9)
HFP	1 (1.0)
HSP	3 (2.9)
EMR	41 (39.0)
ESD	13 (12.4)
Refer to an expert GI endoscopist for EMR or ESD	41 (39.0)
Others	2 (1.9)
IEE first	1 (1.0)
Biopsy first	1 (1.0)
Large, sessile / flat polyp with features suspicious for submucosal invasion on WLI: n (%)	
CFP	2 (1.9)
HFP	96 (91.4)
HSP	3 (2.9)
EMR	18 (17.1)
ESD	20 (19.0)

None; refer to Surgery for surgical resection	9 (8.6)
Refer to an expert GI endoscopist for EMR or ESD	50 (47.6)
Others	2 (1.9)
Biopsy first	1 (1.0)
Refer for EUS	1 (1.0)
Pedunculated polyp on WLI	
CSP	3 (2.9)
HSP	96 (91.5)
EMR	5 (4.5)
Refer to an expert GI endoscopist for EMR or ESD	1 (1.0)
Large, sessile / flat polyp suspicious for deep submucosal invasion on IEE: n (%)	
CFP	2 (1.9)
HSP	2 (1.9)
EMR	15 (14.3)
ESD	12 (11.4)
None; refer to Surgery for surgical resection	31 (29.5)
Refer to an expert GI endoscopist for EMR or ESD	38 (36.2)
Others ("Biopsy first")	5 (4.8)
Do you feel that your choices in the image-based questions are in line with the most recent guidelines on polypectomy during colonoscopy? n (%)	
Yes	87 (82.9)
No	18 (17.1)
If not, what do you think is the reason for your practice limitation? [More than one answer was allowed]: n (%)	
Unavailable accessories / instruments	11 (61.1)
Lack of technical skill to perform the recommended techniques	12 (66.7)
Inability to address possible complications	4 (22.2)
Unsure of the most recent guideline recommendations	7 (38.9)
Personal preference to limit practice to diagnostic endoscopy	2 (11.1)
Others: "Surgeons need biopsy result prior to planning surgery"	1 (5.6)

CFP - cold forceps polypectomy; CSP - cold snare polypectomy; HFP - hot forceps polypectomy; HSP - hot snare polypectomy; EMR - endoscopic mucosal resection; ESD - endoscopic submucosal dissection.

Factors Associated with Cold Snare Polypectomy for Diminutive/Small Polyps (less than 10 mm)

Factors associated with the choice of cold snare polypectomy for diminutive or small sessile polyps (less than 10 mm) were identified using Fisher's exact test and logistic regression analysis as applicable (Table 6). Previous attendance to seminars/workshops on IEE ($p = 0.016$), level of confidence in labelling colonic lesions

using the NICE classification ($p = 0.013$), level of confidence of the individual participant's adherence to the most recent polypectomy guidelines ($p = 0.007$), location of practice in NCR ($p = <0.001$), number of colonoscopies performed in a year to be more than 100 ($p = 0.033$), and use of the Olympus brand of scope ($p = <0.001$) were all identified to be significantly associated with choosing CSP.

Table 6. Factors identified to be significantly associated with choice of CSP for a diminutive or small colorectal lesions

Factor	p-value
Previous attendance to seminar/workshop on IEE	0.016
Location of practice	<0.001
No. of colonoscopies in a year	0.033
Brand of scope used	<0.001
Confidence in adherence to recent polypectomy guidelines (Y/N)	0.007
Level of confidence in the use of IEE for NICE classification (on a scale of 1-10) <i>[Analyzed using logistic regression analysis]</i>	Coeff. = 0.070 Standard Error = 0.028 p-value = 0.013

Discussion

For diminutive polyps measuring 1-3 mm, adherence to the recommendation of CSP as the preferred polypectomy method was poor (14.3%), with CFP still being preferred by 74.3% of the participants. For 4-5 mm sessile polyps, adherence to CSP was still poor at 39.0%; CFP followed closely as the second most preferred method at 35.2%. Based on previous studies as discussed earlier, CSP has been demonstrated to be superior to CFP for diminutive and small polyps in terms of rates of complete polyp resection and procedure time, especially for lesions 4 mm or larger.^{14,15} For 1-3 mm polyps, while results may be comparable between CSP and CFP in terms of complete resection, the RCT supporting this was only powered to detect a difference of at least 15% between the two groups. An RCT by Huh on 190 patients with 196 resected polyps comparing the use of jumbo biopsy forceps, which are larger-sized biopsy forceps for polypectomy (JFP) to CSP for diminutive polyps 5 mm or less, demonstrated JFP to be non-inferior to CSP in terms of complete resection of diminutive adenomatous polyps.¹⁶ However, as commented by Rao in 2019¹⁷, the Huh RCT documented incomplete polyp resection by two biopsy specimens taken from the polypectomy site, which might be a less optimal method of documenting complete resection rates. He compared this to a study by Kim et al. in which more complete sampling of the polypectomy site through an EMR was performed. Moreover, as it is not uncommon to encounter polyps with sizes of both 1-3 mm and more than 4 mm, costs related to using multiple instruments for polypectomy of differently sized polyps, rather than a single cold snare for polypectomy of diminutive and small lesions altogether, may also increase procedure cost, which is disadvantageous.¹⁷

On the other hand, for small sessile polyps measuring 6-9 mm, adherence to the CSP was only 34.3%. Moreover, the dilemma of whether electrocautery was to be used for these polyps was also apparent, with CSP and HSP equally being favored by 34.3% of the participants. As cited in the 2020 USMSTF guidelines, several prospective randomized studies have already demonstrated why CSP should be preferred over HSP for small lesions, with CSP being associated with a lower incidence of delayed post-polypectomy bleeding, perforation, and post-polypectomy coagulation

syndrome, while maintaining excellent rates of complete histologic resection.¹¹

It was interesting to find out that the choice of preferred polypectomy method was associated with previous training and the level of confidence of the participant in the use of IEE in detecting and diagnosing colorectal lesions. Somewhat related to these factors is the level of confidence of the participant in adhering to the most recent polypectomy guidelines. Workshops on GI endoscopy often include such topics as utilizing IEE, as well as recent guidelines on polypectomy during colonoscopy. Holding workshops, which has been made more convenient now through virtual setups, remains to be an effective method of educating local endoscopists on proper polypectomy practices.

In relation to location of practice, the National Capital Region (NCR) was also associated with the choice of CSP for diminutive and small polyps. Being the country's capital, practice in the region offers access and availability to necessary instruments and expertise for proper polypectomy, compared to regions outside of this area. This explains the the two most cited reasons of the participants for being unable to adhere to the guidelines (**Tables 4 and 5**), which are the lack of technical expertise to perform basic and/or advanced procedures for polypectomy, as well as the lack of access to instruments and equipment necessary to perform these procedures properly.

NCR also houses a higher concentration of academic training institutions compared to the other regions, and while it was hypothesized that endoscopists are more equipped with knowledge on the most updated guidelines in these institutions with regular conferences and workshops as part of the training programs, this was not reflected in the statistical analysis in this study.

Performance of a higher number of colonoscopies in a year was seen to be associated with choosing CSP for small or diminutive polyps as well. It is reassuring that those endoscopists who perform more colonoscopies appear to be able to continue to educate themselves on the most recent guidelines and adhere to them.

As workshops have been suggested to remain an effective method of educating endoscopists, these might be more beneficial if targeted for endoscopists outside NCR as well as GI endoscopists who perform only a few colonoscopies in a year.

Lastly, the use of an Olympus scope was seen to be associated with using CSP for small or diminutive polyps,

compared to other brands. This brand was used by a significantly high proportion of participants in the study (70%). The investigators found it difficult to derive definitive conclusions considering this skewness in the demographics. Nonetheless, Olympus scopes are quite popular for its narrow band imaging (NBI), Olympus's brand of IEE, from which the NICE classification of polyps used for lesion diagnosis was originally derived.¹⁸ This may loosely correlate to the previously discussed factors related to IEE – previous training with IEE and self-perceived proficiency in IEE, for which Olympus's NBI is popularly used.

This study has several strengths. To date, this was the first study in the Philippines to measure colonoscopy polypectomy preferences among gastrointestinal endoscopists in the country, as well as the first study able to determine factors that may affect the choice for proper polypectomy techniques during colonoscopy. Information gathered by this study serves as a baseline local prevalence study which may be cited by future studies. Aside from describing the prevalence of practice for different polyp scenarios and analyzing demographic factors that affect their choices, this study was able to explore the reasons as to why they feel they are not able to adhere to the most recent guidelines on polypectomy. A study conducted by Yang in 2020¹⁰ on polypectomy preferences among Asian endoscopists had similar findings as this survey regarding the two most cited reasons for deviation of practice from the recommendations, which are the unavailability of specific devices or lack of technical skill for polypectomy. Several other polypectomy-related practices such as biopsies prior to polypectomy or referral, injection, and mechanical hemostasis, were also explored and described, which might serve as take-off points for further polypectomy-related research.

This study has a number of limitations. First, as a pilot study, sampling was done via convenience sampling, and the sample size reached was just enough to allow valid statistical analysis. Truly, a higher number of participants can give a more accurate picture of the true prevalence of polypectomy practices in the local setting. Second, as an inherent limitation of a survey, these choices may not necessarily reflect true polypectomy practices, and are still confined to the theoretical choices of the participants. Third, as was mentioned in the methodology, practicing endoscopists who have no access to the internet and/or who are not proficient with

its use, are unable to participate in this online survey. Lastly, this study, being cross-sectional in nature, only captures the point prevalence of polypectomy practices during this study period only, and this can certainly change in the future. In line with this, the same survey, possibly with minor modifications as deemed necessary, may be distributed again in the future to monitor trends in polypectomy practices, as well as to measure the impact of interventions that may be instituted by the gastroenterology and endoscopy specialty societies, henceforth.

Conclusion and Recommendations

In conclusion, through an online survey, colonoscopic polypectomy preferences among gastrointestinal endoscopists in the Philippines for different polyp scenarios were obtained. Adherence to CSP for small or diminutive polyps was generally very poor. Based on statistical analysis, factors associated with the choice of CSP for diminutive or small lesions were identified. Based on these identified factors, the investigators highly recommend conducting more workshops on polypectomy and IEE, targeted especially to endoscopists in areas other than the NCR and those who perform fewer colonoscopies. This may help improve adherence to the most recent evidence-based polypectomy guidelines. Adherence to the most recent practices that maximize effectiveness and safety of the performance of polypectomies and minimize morbidity and death from CRC in the Philippines.

Conflicts of Interest

The authors declare no conflicts of interest.

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