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# Colorectal Cancer Screening: Knowledge and Practice among Private General Practitioners in Northeast Peninsular Malaysia

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## ABSTRACT

Colorectal cancer screening is an important screening to detect colorectal cancer. Thus, the aim of this study is to determine the knowledge, practice and its associated factors of colorectal cancer screening among private general practitioners (PGPs) in Northeast Peninsular Malaysia. Cross-sectional study was conducted involving 127 PGPs in Kelantan. The study used a validated self-administrated questionnaire that contained three domains. The domains were sociodemographic, knowledge and practice of colorectal cancer screening. The inclusion criterion was doctors working in a private clinic for more than six months, while the exclusion criteria were non-residential doctors and doctors practicing in private specialised clinics. Only 21.3% of PGPs had good knowledge and 3.9% had good practice on colorectal cancer screening. The duration of practice as a PGP was significantly associated with good practice for colorectal cancer screening. Only 58.3% were aware of the current recommendation on colorectal cancer screening. Most PGPs would refer patients for a colonoscopy, but screening with faecal occult blood test (FOBT) in average-risk patients was low. Only 4% of PGPs followed the recommended guidelines for colorectal cancer screening. The main reasons for not offering FOBT screening were patients' refusal, patients were not regular patients of the doctor and the referral system for colonoscopy was found to be difficult. This study noted that knowledge and practice of colorectal cancer screening among PGPs were inadequate. Overcoming barriers for screening is important to promote colorectal cancer screening.

**Keywords:** *Colorectal cancer, Cancer screening, Private general practice, Primary care*

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## INTRODUCTION

Colorectal cancer has the highest fatality rate worldwide. The countries with the highest numbers include the United Kingdom, Australia, Canada and the United States. The number of patients in the Asian region diagnosed with colorectal cancer are also increasing (1). Colorectal cancer is the second most prevalent cancer following breast cancer. Colorectal cancer makes up 12.3% of all cancer cases. It occurs mostly among Chinese males, aged more than 50 years old, followed by Malays and Indians (2).

The Asia-Pacific consensus recommends that individuals who have reached the age of 50 years old should undergo colorectal screening (3–4). Annual colorectal screening may help reduce the mortality due to colorectal cancer up to 33% (5). Hence, earlier screening is recommended especially to those who are at risk, namely people who have a history of adenomas polyps, inflammatory bowel disease, a family history of colorectal cancer and inherited genetic risk such as hereditary nonpolyposis and familial adenomatous polyposis colorectal cancer (6–8). Most of the colorectal cancer patients presented in this study were already at the advanced stage (8). This is mainly due to the lack of public awareness regarding screening, symptoms and treatment (9).

In many Asian countries, activities related to colorectal cancer screening are uncommon due to limited resources, especially among those living in rural areas and low socioeconomic communities (10). In Malaysia, a study done among average-risk patients showed that only 0.7% of them underwent screening for colorectal cancer (11). This number is similar to other cancer screenings such as cervical and breast cancer screenings despite the government's recommendations. A study among private general practitioners (PGPs) in the United States found that the screening practices were also low and most people aged beyond 50 years old were not screened for

colorectal cancer. Lack of awareness and limited resources (most probably due to the high cost for screening) contribute to the low screening rate for colorectal cancer (12). Another study noted that only 25.9% of PGPs implemented good practice on colorectal screening (13).

The PGPs in Malaysia contribute a significant number of doctors practicing in primary health care. The knowledge regarding colorectal cancer screening is crucial since they provide preventive services. PGPs are regarded as the patients primary authority in providing the necessary health information. Thus, the aim of this study is to determine the knowledge, practice and its associated factors of colorectal cancer screening among PGPs in Northeast Peninsular Malaysia.

## METHODS

This is a cross-sectional study carried out among 180 PGPs in the whole state of Kelantan. The inclusion criterion was doctors working in the private clinic for more than six months. The exclusion criteria were non-residential doctors and doctors practicing in private specialised clinics such as ophthalmology, dermatology, paediatric and dental clinics.

### Data Collection

All PGPs in Kelantan were selected using universal sampling. The list of the PGPs was taken with the permission of the Kelantan State Health Office. There were 175 registered PGPs in Kelantan, but 8 clinics on the list had ceased operations and another 11 clinics were registered as dental or eye clinic. After excluding these clinics, 156 clinics were suitable for this study. The research team approached the listed PGPs via phone call or face-to-face meetings for their consent to participate in the study.

This study used a self-administered questionnaire which was delivered by hand. For clinics that were more than 50 km away

from the study centre, the questionnaire was sent via e-mail. Participants were requested to complete the questionnaire within two weeks. Those who did not respond within the time limit were reminded twice through e-mails or phone calls and were given another two weeks to complete the questionnaires. Those who failed to respond or returned incomplete questionnaires (absence of response in more than 5% of the items) are considered as non-respondents.

### Research Tools

This study used a questionnaire which was adapted from a previous study on the knowledge, attitude and practice of colorectal cancer screening among moderate-risk patients (13–14). The Cronbach' alpha for the knowledge, attitude and practice domains were 0.65, 0.82, and 0.60, respectively. A pilot study of the adapted questionnaire was done among health care providers in primary care facilities and showed Cronbach's alpha value of 0.75 for knowledge, 0.44 for attitude and 0.65 for practice. The research team decided that only the knowledge and practice domains would be used in this study.

The self-administered questionnaire comprised of three sections. The sections were divided into socio-demographic, knowledge and practice. The knowledge section covers knowledge related to the prevalence, risk factors and symptoms of colorectal cancer, awareness of the current recommended guidelines and recommended screening modalities for high-risk groups. The practice section was divided into Section A and Section B. Section A covers indication for colonoscopy, faecal occult blood test (FOBT) and reasons for not performing FOBT on average-risk persons. While Section B was constructed to identify the current practice on colorectal cancer screening and whether they adhere to the recommended guidelines. The Likert scale of 5 was used for scoring. The scale is set to strongly agree, agree, neutral, disagree and strongly disagree. The positives items were

scored at 5, 4, 3, 2, and 1 and the reversed scores were applied for the inaccurate items. The summation of the total score was calculated for each domain and transformed into a percentage score.

The minimum score for the knowledge section was 18 and the maximum was 90. For the practice section, the minimum and maximum score were 25 and 125, respectively. The level of knowledge and practice were considered good if the total score was at least 80% or more (13–14). A score below the cut-off points was regarded as having poor knowledge and practice.

### Statistical Analysis

The tool used to analysed the data was the IBM SPSS version 20.0. Descriptive analysis was used to analyse the data. Percentage was used to convey categorical variables while mean (SD) was used to assert numerical variables. Simple and general linear regression were used to establish the associated factors for knowledge and practice. Age, gender, duration of practice, post-graduate qualifications, type of practice, and percentage of patients who pay in cash were the independent variables and the dependent variable was the total score of practice.

The research topic was approved by the Department of Family Medicine and Research and Ethics Committee, School of Medical, Health Campus, University Sains Malaysia (ref no. 00007718).

## RESULTS

The total number of respondents who were invited to participate in this study was 156 but only 127 PGPs completed the questionnaires. About 29 PGPs did not complete or refused to answer the questionnaires because of their busy schedule. Therefore, the resulting response rate was 81.4%.

The age of PGPs in this study had a mean of 49.5 years old whereas the mean duration of PGPs working in private practice was 15 years. Most of the PGPs were from Kota Bharu (47.2%) and located in the urban area. Rural areas such as Gua Musang and

Jeli have a low number of PGPs. This study involved mostly Malay doctors who had no postgraduate training. Table 1 illustrates the respondents' sociodemographic characteristics.

**Table 1:** Respondents' sociodemographic characteristics ( $n = 127$ )

| Variables  | <i>n</i> (%)                   |
|--|--------------------------------|
| Age (years old)  | 49.5 ( $\pm 15$ ) <sup>a</sup> |
| Duration of practice as PGP (years)                        | 15 (18) <sup>b</sup>           |
| Gender   |                                |
| Male   | 88 (69.3)                      |
| Female   | 39 (30.7)                      |
| Postgraduate training                                      |                                |
| Yes  | 6 (4.7)                        |
| No   | 121 (95.3)                     |
| Any patients with colorectal cancer seen for past one year |                                |
| No   | 85 (66.9)                      |
| Yes  | 42 (33.1)                      |
| If seen, how many patients                                 |                                |
| <5   | 38 (29.9)                      |
| 6–10   | 4 (3.1)                        |
| None   | 85 (66.9)                      |
| Screening services available                               |                                |
| Pap smear only   | 36 (28.3)                      |
| FOBT only  | 22 (17.3)                      |
| Pap smear, FOBT and mammography                            | 2 (1.6)                        |
| Pap smear and FOBT   | 25 (19.7)                      |
| None   | 42 (33.1)                      |
| If available, covered by panel/insurance                   |                                |
| Yes  | 63 (74.1)                      |
| No   | 22 (25.9)                      |
| Type of practice   |                                |
| Solo   | 114 (89.8)                     |
| Group  | 13 (10.2)                      |
| Location PGPs  |                                |
| Kota Bharu   | 60 (47.2)                      |
| Pasir Mas  | 13 (10.2)                      |
| Tanah Merah  | 13 (10.2)                      |
| Tumpat   | 9 (7.1)                        |

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**Table 1:** (continued)

| Variables   | n (%)   |
|-------------|---------|
| Bachok      | 8 (6.3) |
| Pasir Puteh | 7 (5.5) |
| Kuala Krai  | 7 (5.5) |
| Machang     | 5 (3.9) |
| Gua Musang  | 4 (3.1) |
| Jeli        | 1 (0.8) |

Note: <sup>a</sup>Mean (SD), <sup>b</sup>Inter quartile range.

### Knowledge of Colorectal Cancer Screening among PGP

The knowledge total score obtained was a normal distribution which ranged from 53% to 86% with mean (SD) 69.8 (7.9). The percentage of good knowledge was 27 (21.3%). Table 2 presents the degree of

colorectal cancer knowledge among PGPs. Most of the PGPs answered correctly on the questions regarding colorectal cancer. Two items were mostly answered incorrectly which were awareness that diabetes is a risk factor (78%) and the option for screening method for colorectal cancer is FOBT (79.5%).

**Table 2:** Knowledge of colorectal cancer (n = 127)

| Questions   | Variables                           | Correct (%) | Incorrect (%) |
|---|-------------------------------------|-------------|---------------|
| Colorectal cancer is the most common cancer among males in Malaysia                                     | Prevalence                          | 71 (55.9)   | 56 (44.1)     |
| Risk factors for colorectal cancer are?   | Smoker                              | 83 (65.4)   | 44 (34.6)     |
|   | Colorectal polyp                    | 117 (92.1)  | 10 (7.9)      |
|   | History of colorectal cancer        | 121 (95.3)  | 6 (4.7)       |
|   | Family history of colorectal cancer | 120 (94.5)  | 7 (5.5)       |
|   | Inflammatory bowel disease          | 98 (77.2)   | 29 (22.8)     |
|   | Diabetes                            | 28 (22.0)   | 99 (78.0)     |
| Symptoms of colorectal cancer are?  | Elderly                             | 81 (63.8)   | 46 (36.2)     |
|   | Altered bowel habit                 | 126 (99.2)  | 1 (0.8)       |
|   | Per rectal bleeding                 | 119 (93.7)  | 8 (6.3)       |
|   | Abdominal mass                      | 103 (81.1)  | 24 (18.9)     |
|   | Abdominal pain                      | 80 (63.0)   | 47 (37.0)     |
|   | Tenesmus                            | 83 (65.4)   | 44 (34.6)     |
|   | Dysphagia                           | 82 (64.6)   | 45 (35.4)     |
| I am aware of the current recommendation for colorectal cancer screening                                | Anaemia                             | 113 (89.0)  | 14 (11.0)     |
|   | Yes                                 | 74 (58.3)   | 53 (41.7)     |
|   | No                                  | 53 (41.7)   | 74 (58.3)     |
| For individuals at high risk for developing colorectal cancer, the recommended screening modalities are | Colonoscopy                         | 108 (85.0)  | 19 (15.0)     |
|   | FOBT                                | 26 (20.5)   | 101 (79.5)    |

### Practice Score on Colorectal Cancer Screening among PGPs

The practice total score had a normal distribution which ranged from 46.4% to 83.2%. The mean (SD) practice was 70.8 (56.7). The percentage of good practice was 3.9% on colorectal screening. Table 3 shows the practices of colorectal cancer screening. Most PGPs agree that 50 years old men with positive FOBT, with recurrent per rectal bleeding and high-risk patients were reasons to be referred for colonoscopy. Only a small

number (33.8%) of PGPs consistently performs FOBT on asymptomatic patient aged 50 years old while less than 25% of PGPs asked about family history of their patients regarding colorectal cancer.

Table 4 shows the barrier for not performing FOBT. The main reasons for not offering FOBT screening were because of patients' refusal, patients were not regular patients of the doctor and the referral system for colonoscopy was found to be difficult.

**Table 3:** Practices on colorectal cancer screening ( $n = 127$ )

| Variables  | <i>n</i> (%) | Good practice<br><i>n</i> (%) | Poor practice<br><i>n</i> (%) |
|--|--------------|-------------------------------|-------------------------------|
| Refer for colonoscopy  |              |                               |                               |
| 50 years old male patient presented with recurrent per rectal bleeding         | –            | 117 (92.2)                    | 10 (7.8)                      |
| FOBT positive  | –            | 112 (88.2)                    | 15 (11.8)                     |
| Patient has sibling/parent with colorectal cancer                              | –            | 108 (85.1)                    | 19 (14.9)                     |
| Perform FOBT   |              |                               |                               |
| Patient with previous history of colonic polyp                                 | –            | 24 (18.9)                     | 103 (81.1)                    |
| Asymptomatic in 50 years old female patients                                   | –            | 43 (33.8)                     | 84 (66.2)                     |
| 35 years old male with sibling/parent with colorectal cancer                   | –            | 44 (34.7)                     | 83 (65.3)                     |
| 60 years old female with constipation  | –            | 79 (62.2)                     | 48 (37.8)                     |
| I ask about family history of colorectal cancer approximately...of my patients |              |                               |                               |
| None   | 12 (9.4)     | –                             | –                             |
| <25%   | 70 (55.1)    | –                             | –                             |
| 25%–50%  | 22 (17.4)    | –                             | –                             |
| >50%–75%   | 14 (11.0)    | –                             | –                             |
| >75%   | 9 (7.1)      | –                             | –                             |
| I order FOBT in approximately...of my patients who are at risk                 |              |                               |                               |
| None   | 52 (41.0)    | –                             | –                             |
| <25%   | 49 (38.6)    | –                             | –                             |
| 25%–50%  | 5 (3.9)      | –                             | –                             |
| >50%–75%   | 15 (11.8)    | –                             | –                             |
| >75%   | 6 (4.7)      | –                             | –                             |

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**Table 3:** (continued)

| Variables   | n (%)     | Good practice<br>n (%) | Poor practice<br>n (%) |
|---|-----------|------------------------|------------------------|
| I follow the recommended guidelines for colorectal cancer screening...of the time |           |                        |                        |
| None  | 47 (37.0) | –                      | –                      |
| <25%  | 42 (33.1) | –                      | –                      |
| 25%–50%   | 18 (14.2) | –                      | –                      |
| >50%–75%  | 15 (11.8) | –                      | –                      |
| >75%  | 5 (3.9)   | –                      | –                      |
| Guidelines on colorectal cancer screening   |           |                        |                        |
| Malaysian Clinical Practice Guidelines  | 61 (48.0) | –                      | –                      |
| None  | 49 (38.6) | –                      | –                      |
| American Cancer Society   | 4 (3.1)   | –                      | –                      |
| United States Preventive Services Task Force                                      | 1 (0.8)   | –                      | –                      |
| Others  | 12 (9.5)  | –                      | –                      |

**Table 4:** Barrier not performing FOBT

| Variables   | n (%)     |
|---|-----------|
| Assume other health care provider will screen the patient       | 58 (45.7) |
| Lack of time  | 55 (43.3) |
| Test is not available   | 60 (47.2) |
| Test is not covered by patient's medical insurance              | 50 (39.3) |
| No proper follow-up system is available in my clinic            | 54 (42.5) |
| Difficult to get a hospital appointment if the test is positive | 69 (54.3) |
| It causes trouble for the patient                               | 57 (44.9) |
| Poor patient awareness  | 38 (30.0) |
| Patient refuse  | 76 (59.8) |
| Patient is afraid of the test result                            | 51 (40.2) |
| Patient do not follow instructions                              | 46 (36.3) |
| Patient is in hurry   | 59 (46.5) |
| Patient is not my regular patient                               | 78 (61.4) |

### Associated Factors Regarding Practice

Table 5 shows the associated factors concerning the practice of PGPs using

simple and multiple linear regression. The duration of practice was shown to be the most significant factor that indicated if a PGPs has a good practice.

**Table 5:** Associated factors regarding practice among respondents using general linear regression ( $n = 127$ )

| Variables                      | Simple linear regression<br>b <sup>a</sup> (95%CI) | p-value | General linear regression<br>b <sup>b</sup> (95%CI) | t-statistics | p-value |
|--------------------------------|--|---------|---|--------------|---------|
| Age                            | 0.06 (-0.16, 0.15)                                 | 0.112   | -0.13 (-0.29, 0.04)                                 | -1.5         | 0.13    |
| Gender                         |  |         |   |              |         |
| Male                           | 1  |         | -   | -            | -       |
| Female                         | 0.13 (1.67, 1.93)                                  | 0.886   | -   | -            | -       |
| Duration of practice           | 0.10 (0.03, 0.18)                                  | 0.008   | 0.21 (0.05, 0.37)                                   | 2.6          | 0.01    |
| Post graduate qualification    |  |         |   |              |         |
| No                             | 1  |         | -   | -            | -       |
| Yes                            | 1.96 (1.94, 5.87)                                  | 0.322   | -   | -            | -       |
| Type of practice               |  |         |   |              |         |
| Solo                           | 1  |         | -   | -            | -       |
| Group                          | -1.07 (-3.8, 1.67)                                 | 0.441   | -   | -            | -       |
| Percentage of patient pay cash |  |         |   |              |         |
| ≤ 50%                          | 1  |         | -   | -            | -       |
| > 50%                          | -0.38 (-2.3, 1.52)                                 | 0.69    | -   | -            | -       |

Note: <sup>a</sup>Crude regression coefficient; <sup>b</sup>Adjusted regression coefficient ( $R^2 = 0.072$ ); There are no interaction and no multicollinearity problems. The model reasonably fits well. Model assumptions are met.

## DISCUSSION

The rate of response was 81.4%, similar to the study in the Klang Valley which was 86.4% (15). The response rate in this study is considered acceptable if compared to other studies that obtained 50%–60% response rate (16–17). It is because the questionnaires were given by hand to most of the PGPs instead of using an email or postal mail.

The results showed that 21.3% of PGPs had a good knowledge and 3.9% had a good practice on colorectal cancer screening, which is inadequate. This is similar to a recent study done in Klang Valley, a government clinic in Malaysia which noted that the knowledge mean score was  $48.7\% \pm 17.7\%$  and concluded that the knowledge

of the PGPs in the clinic was also still inadequate (15). From the comparison between the studies, it appears that colorectal screening is not widely practiced by PGPs due to lacking in knowledge (15). Another study conducted in the United States among the physician found that even in a high-risk population, knowledge of screening on colorectal cancer was also poor as they are quite unconcerned to the current guidelines (18).

The prevalence knowledge of colorectal cancer is also an important predictor for patients being screened for colorectal cancer. About half of the respondents had a good knowledge on colorectal cancer. Studies in the United States and Italy also noted similar findings. The respondents in their studies did not know the incidence and

mortality figure in regard to their population and they were not aware that colorectal cancer was the highest fatality rate (17, 19). This reflects on the poor awareness of the PGPs about the diseases which led to suboptimal screening of colorectal cancer.

The risk factors for colorectal cancer is also another important knowledge. Primary care providers need to know at which age the risks increased and what the available screening options that are available. A comprehensive evaluation showed that the PGPs had a good knowledge of the risk factors contributing to colorectal cancer. The item which asked whether diabetes was another risk factor for colorectal cancer, scored low. The reason being that diabetes was not included in the risk stratifications in the Malaysian Clinical Practice Guidelines (CPG) (20).

The practice of colorectal cancer screening in this study is low (3.9%) which was consistent with the study done by Ooi et al. (15), where 69.9% of their respondents disclosed that they practiced colorectal cancer screening but only 25.9% of their patients being screened. They concluded that their respondents' practices of colorectal cancer screening were also inadequate. The reason for the low number of screening was because the patients had to pay for the test themselves unless it was covered by medical insurance. In the study conducted by Şahin and Aker also came to a similar conclusion. Their findings suggests that improved communication between doctor and patient as well as good monitoring and observation may help increase the screening practice (21).

There are other factors that contribute to the poor practice of colorectal screening. The factors are low percentage of performing FOBT on the average-risk group of patients, incorrect recommendations of FOBT in the high-risk group, low percentage of doing stratification risk for their patients, and a majority of the PGPs did not adhere to the colorectal cancer screening recommended guidelines. While

FOBT is among the simplest, cheapest and easily available test in Malaysia even in the private sector, only a few PGPs (8.6%) performed FOBT on patients aged more than 50 years old. Another study in Malaysia found that among health care providers also documented that only 21% recommended FOBT at least to 50% of eligible patients (14). The author also concluded that the practice was also below the acceptable level.

More than half (61.4%) of the PGPs did not perform FOBT because of their patients were not their regular patients. Furthermore, the majority of PGPs in Kota Bharu were seeing around 30 to 40 patients a day. This limits the doctor-patient consultation time to allow discussion on other aspects of their patients' health issues, particularly on prevention measures. A previous study reported that having personal health care providers or personal doctors is a predictor for an up-to-date colorectal cancer screening (22). Therefore, it is recommended that patients see the same doctor.

Patients who refused to have the screening also contribute to the factor of a low number of performed FOBT. In this study, PGPs reported a high refusal rate (59.8%) among their patients. Guerra et al. (23) also identified that patients' refusal for screening a major hindrance for physicians to recommend the test. The findings also showed that 57 (44.9%) of PGPs agreed that FOBT would cause trouble to patients in terms of sample preparation and 51 (40.2%) agreed that patients were afraid of the test results. Studies in Italy and the United States also documented similar findings (17, 24). All these factors might affect physicians' decisions in performing FOBT. A local study reported that "patient refusal" and "patient in a hurry" happened due to poor awareness on colorectal screening test (13–14).

There were three main guidelines used by the PGPs in the study, which were the

Malaysian CPG for colorectal cancer, American Cancer Society guidelines and the United States Preventive Services Task Force (USPSTF) guidelines. Surprisingly, 48% of PGPs referred to the Malaysian CPG, 3.1% referred to the American Cancer Society and 0.8% used the USPSTF. This showed that many of the PGPs preferred the local CPG guidelines as their main reference. Similarly, a study done in Italy observed the use of the national guideline and government's recommendation had a positive association with the knowledge score (17). CPG is important to guide doctors in terms of knowledge, evidence-based medicine, types of screening tools and management of the disease. The latest Malaysian CPG was published in 2017 (20).

In this study, 47.2% of PGPs stated that the unavailability of FOBT in their practice is one of their reasons for not or rarely performing FOBT since the specimen had to be sent to private medical labs for analysis which can be costly. A study among physicians in Greece reported that only one-third of their PGPs performed FOBT due to same reason (25). PGPs in Italy also expressed that they have lack time, which became the main reason for non-compliance to screening. Physicians with more patients have less time to do counselling; much less to carry out a colorectal cancer screening (23).

The absence of a proper follow-up system also contributes to the poor recommendation for FOBT. Some studies suggested an introduction of a good office and tracking systems to overcome the problem. PGPs will then be reminded to perform the tests later or include them in annual health check-ups (23, 26–27). Other factors such as no direct access to FOBT, no experience in performing FOBT and a backlog of colonoscopy appointments which also lead to this problem (23).

The duration of practice as general practitioners was found to be significant as it indicated the amount of experience a PGP

has. The duration of PGPs services in this study ranged from 1 year to 40 years. Most of the PGPs had experience for 15 years in services as general practitioners. Similarly, a study in Hong Kong among primary care physicians in the private and public sectors also found the duration of practice as a significant factor. Their respondent's duration of practice was approximately 5 years to 10 years. Furthermore, their respondents were experienced, had family medicine training and some of them were academicians in the university (28).

It is apparent that from the findings, improvement in knowledge of colorectal cancer screening through continuous medical learning and attending conferences or workshops on cancer prevention among PGPs should be encouraged. Oncology is a rapidly evolving field and relevant guidelines such as the Malaysian CPG should be updated regularly in view that it was last updated in 2017. To reform the practice of colorectal cancer screening, the first measure is to correct the practice itself. PGPs need to be aware of how important for patients who are 50 years old and above are average-risk patients, who should be recommended for colorectal cancer screening considering that targeted screening programmes and early intervention can improve the prognosis of the disease (7). Another measure that needs to be considered is the government's support to allow PGPs to perform colorectal cancer screening, such as providing efficient laboratories to perform the necessary test or to subsidise the screening test, whether fully or partially. The Korean government, for example, covers 100% of the cost for the low-income group and 50% for the rest (29).

## LIMITATIONS

There are a few limitations to this study. Firstly, the study is limited to only one state in Malaysia, which is Kelantan. Thus, the study is not a full representation of

all the PGP's in Malaysia. Secondly, the data is self-claimed while the questions were based on the agreed practice and not the actual practice, that could be under or overestimated. Thirdly, there is no validation of the data was made with medical records or claims or with other sources. Fourthly, a significant number of PGP's did not respond to this study most probably due to their hectic schedule, hence the practice rate could be underestimated. Finally, this study did not assess other modes of screening tests such as colonoscopy and sigmoidoscopy, thus, there is a high probability of underestimation in the practice of screening among our population.

## CONCLUSION

The level of knowledge and practice among private PGP's on colorectal cancer screening were inadequate. However, there is discrepancy between knowledge and practice, despite their awareness on the recommendation in the guidelines. Therefore, awareness on colorectal cancer and its screening among patients is important. The public should be made aware that it is among the most common cancer and promising treatment is possible in the early stage. This can be done by the authority through regular campaign using mass media, social media and health talks. To improve the practice on colorectal cancer screening by health practitioners, screening test should be easily available with easy access for further investigation such as colonoscopy if required. Colonoscopy services should be more widely available. Tackling the barriers is one of the focuses to improve screening practice.

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