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Knowledge, Attitudes, and Practices (KAP) of inpatient nursing staff regarding bowel preparation before colonoscopy: A cross-sectional study

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ABSTRACT

Background: Instructions for bowel preparation are primarily provided to admitted patients by inpatient nurses. We conducted a cross-sectional study aimed to determine the extent of knowledge and practice of inpatient nursing staff on colonoscopy preparation at King Abdulaziz University Hospital (KAUH). **Method:** A total of 171 nurses were involved in the study, and 136 of them responded to the questionnaire. **Result:** (80.9%) of participants identified the color of the stool that reflects a patient suitable for a colonoscopy. 64.7% of respondents, agreed that the scheduled timing of colonoscopy has an impact on how they provide bowel preparation instructions. Moreover, 13.2% of respondents considered that patients should be instructed to follow low fibers and clear liquids before having a colonoscopy. The majority of nurses (85.3%) agreed the ideal time to give inpatients their first dose of split bowel preparation is one day before a colonoscopy. **Conclusion:** According to the current study's findings, the participating nurses had a fair level of knowledge and practice regarding bowel preparation before colonoscopy.

Keywords: Saudi Arabia, Ottawa Bowel Preparation Scale, Arabic language, inpatient nurse, bowel preparation, colonoscopy.

1. INTRODUCTION

Colonoscopy is an important diagnostic procedure for multiple diseases and is considered a screening tool with both diagnostic and therapeutic value (Millien and Mansour, 2020; Sharma et al., 2020). Thirty percent of all patients show inadequate bowel preparation during colonoscopy (Dikanoğlu et al., 2021). This leads to insufficient visualization of the mucosal layer and

eventuates in lesions in the colon frequently being missed, thus affecting early diagnosis and delaying proper treatment (Rex et al., 2015; Tan et al., 2018). Noncompliance of patients with the prescribed preparation instructions is one of the most frequent causes of inadequate bowel preparation, with inconvenience mainly underlying noncompliance (Hsu and Imperiale, 1998).

A study showed that a patient's positive fecal occult blood test result and constipation were important indicators of poor preparation (Ness et al., 2001). In addition, ingesting the preparation agent in time is important for preparation quality and for patients achieving better outcomes in the afternoon (Frommer, 1997; Church, 1998). Ness et al., (2001) revealed that the inpatient status was a risk factor for bowel preparation. Failure of bowel preparation in inpatients can result from several factors including ongoing acute illness, multiple comorbidities, and dehydration. Insufficient bowel preparation can increase the number of rescheduled colonoscopies and prolong hospital stay. Thus, it is important to determine the factors associated with bowel preparation in hospitalized patients (Ness et al., 2001).

Multiple studies have shown the impact of nurse education on bowel preparation, and a prospective study in 2015 showed that a ward with nurses educated in bowel preparation yielded better scores on the Ottawa Bowel Preparation Scale (OBPS) than a control ward lacking education. Additionally, the time required for cecal intubation and from preparation to colonoscopy (PC interval) were lower in the educated ward. Moreover, adenomas were more easily detected in patients who received preparations from educated nurses (Lee et al., 2015).

Inpatient nurses play a major role in providing instructions to admitted patients for bowel preparation, which leads to shorter hospital stays and improves the quality of colonoscopies; however, specific studies were conducted with 175 inpatient nurses, revealing that their knowledge regarding the proper administration of bowel preparation procedures is low (Allencherril et al., 2018). Unfortunately, there are insufficient studies in Saudi Arabia assessing the level of knowledge of inpatient nursing staff regarding bowel preparation before colonoscopy. Thus, our study aimed to determine the extent of knowledge and practice of inpatient nursing staff on colonoscopy preparation at King Abdulaziz University Hospital (KAUH).

2. MATERIALS AND METHODS

Study design

This is non-interventional, Cross-sectional study conducted from August to November 2022. A total of 171 nurses were involved.

Setting

This study was conducted at King Abdulaziz University Hospital in Jeddah, Saudi Arabia.

Target Population

All the participants are nursing staff at KAUH in medical and surgical wards.

Sampling and Sample size

All KAUH nurses from medical and surgical wards including males and females with expected numbers 171 nurses. All incomplete results and duplicated responses were excluded. No specific sample size calculator was used as all the nurses were included in the study.

Data collection

A predesigned questionnaire was prepared according to the European Society for Gastrointestinal Endoscopy. Informed consent was obtained from all participants to collect data on the nurses' position, experience, native language, ability to communicate with patients in Arabic, work as endoscopy nurses, and involvement in preparing inpatients for colonoscopy. The second section included items to assess the nurses' knowledge and practice of colonoscopy and their confidence towards dealing with this procedure. The total knowledge score ranged from 0 to 4, with a higher score denoting better knowledge. The practical part consisted of eight questions. A score of 1 was awarded for "true" and a score of 0 for "false" or "not sure," with individual scores less than 50%, 51–75%, and 76–100% being considered poor, fair, and good, respectively (Baig et al., 2020; Abd-El-Hady, 2016).

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences version 26 (IBM Corp., Armonk, NY, USA). The chi-squared (χ^2) test was applied to qualitative data, expressed as numbers and percentages, to examine relationships between

variables. Quantitative data were expressed as the mean \pm standard deviation, and Spearman's correlation analysis was used. Statistical significance was set at a p-value of < 0.05 .

Ethical considerations

Ethical approval for this study was obtained from the Research Ethics Committee of KAUH, Jeddah, Saudi Arabia, reference number: (422-22).

3. RESULTS

A total of 171 participants, 136 of them responded to the questionnaire, 52.9% were working in medical and 47.1% in surgical wards. Moreover, 6.6% of the nurses were native Arabic speakers, and 37.5% were able to communicate with patients in Arabic language. Regarding their work experience, 34.6% stated that they had > 10 years of experience as ward nurses. The majority of the nurses (85.3%) had never worked in an endoscopy unit before. Approximately 41.9% had occasionally and 14.7% had frequently been involved in preparing inpatients for colonoscopy in their practice (Table 1).

Table 1 Distribution of nurses participating in the study according to their position, experience, native language, ability to communicate with patients in Arabic, working as endoscopy nurses, and involvement in preparing inpatients for colonoscopy (n = 136)

Variable	No. (%)
What kind of nurse are you?	
Medical ward	72 (52.9)
Surgical ward	64 (47.1)
How many years of experience do you have as a ward nurse?	
2-5 years	40 (29.4)
6-10 years	38 (27.9)
Less than 2 years	11 (8.1)
More than 10 years	47 (34.6)
Is Arabic your native language?	
No	127 (93.4)
Yes	9 (6.6)
Are you able to communicate with patients in Arabic language?	
No	3 (2.2)
Yes	51 (37.5)
Yes, with difficulty	82 (60.3)
Have you ever worked as an endoscopy nurse?	
No	116 (85.3)
Yes	20 (14.7)
In your practice, how often are you involved in preparing inpatients for colonoscopy?	
Frequently	20 (14.7)
Never	5 (3.7)
Occasionally	57 (41.9)
Rarely	54 (39.7)

Regarding the nurses' specific colonoscopy knowledge (Table 2), 63.2% had received formal education on bowel preparation before colonoscopy. Most nurses (84.6%) responded that adequate bowel preparation before colonoscopy was very important. A total of 60.3% knew that cleansing enemas should be used for all patients before colonoscopy, and the majority of the nurses (80.9%) were able to recognize the correct stool color, which indicates that a patient is clear for colonoscopy.

Table 2 Distribution of studied nurses according to their response to knowledge items regarding colonoscopy (n = 136)

Variable	No. (%)
Have you ever received formal education on bowel preparation before colonoscopy?	
No	50 (36.8)
Yes	86 (63.2)
Is adequate bowel preparation important before colonoscopy?	
Not important	2 (1.5)
Somewhat important	19 (14)
Very important*	115 (84.6)
Should cleansing enemas be used for all patients before colonoscopy?	
No	23 (16.9)
Not sure	31 (22.8)
Yes*	82 (60.3)
Which of the following stool colors indicates patient is clear for colonoscopy?	
A	3 (2.2)
B	1 (0.7)
C	1 (0.7)
D	21 (15.4)
E*	110 (80.9)

The participants' colonoscopy practices are in (Table 3). Among the participating nurses, 78.7% mentioned that they correctly followed the written instructions of the responsible physician for each case of bowel preparation, with 24.3% of the nurses choosing either verbal, image, or video as the method of explanation for bowel preparation instructions. The majority of the nurses (64.7%) agreed that the scheduled timing of colonoscopy affected how they provide bowel preparation instructions. Only 13.2% agreed that low fibers and clear liquids constituted the correct diet that patients should be instructed to follow prior to colonoscopy.

Regarding the inpatients scheduled for morning colonoscopy, most of the nurses (85.3%) mentioned that the recommended time for inpatients to receive their first dose of split bowel preparation was one day before colonoscopy. In addition, 1.5% of them agreed that providing the patient with the last bowel preparation dosage and keeping them NPO two hours before colonoscopy was the best preparation strategy. Only 20.6% mentioned that the recommended timing to receive the second dose of split-dose bowel preparation solution for inpatients scheduled for colonoscopy was five hours before procedure time. Most of the nurses (68.4%) routinely assessed and documented the patient's ability to take the bowel preparation solution and the presence of any adverse effects.

Table 3 Distribution of nurses participating in the study according to their response to practice items regarding colonoscopy (n = 36)

Variable	No. (%)
What best describes how bowel preparation is carried out at your institution?	
Nurses follow a standardized bowel preparation order set	29 (21.3)
Nurses follow written instructions by the responsible physician for each case*	107 (78.7)
How do you explain preparation instructions to your patient (choose all that apply)?	
Verbal instructions	68 (50)
Verbal instructions, Written instructions	26 (19.1)
Verbal instructions, Written instructions, Images *	23 (16.9)
Verbal instructions, Written instructions, Images, Videos*	8 (5.9)
Written instructions	9 (6.6)
Written instructions, Images*	2 (1.5)
Does the scheduled timing for colonoscopy (morning or afternoon) affect how you provide bowel preparation instructions?	

No	19 (14)
Not sure	29 (21.3)
Yes*	88 (64.7)
What diet are you instructing patients to consume on the day preceding colonoscopy?	
Clear liquids only	108 (79.4)
High fiber diet and any liquids	6 (4.4)
Low fiber diet and clear liquids*	18 (13.2)
Regular diet	4 (2.9)
Until what time before colonoscopy can patients drink the bowel preparation solution and/or clear liquids before they are kept NPO?	
2 hours before colonoscopy*	2 (1.5)
4 hours before colonoscopy	13 (9.6)
6 hours before colonoscopy	30 (22.1)
8 hours before colonoscopy	91 (66.9)
Regarding inpatients scheduled for morning colonoscopy, what is the recommended timing to receive the first dose of split dose bowel preparation solution?	
1 day before colonoscopy*	116 (85.3)
2 days before colonoscopy	9 (6.6)
3 days before colonoscopy	2 (1.5)
Morning of colonoscopy	9 (6.6)
Regarding inpatients scheduled for colonoscopy, what is the recommended timing to receive the second dose of split dose bowel preparation solution?	
Five hours before procedure time*	28 (20.6)
More than 8 hours before procedure time	90 (66.2)
Two hours before procedure	18 (13.2)
Do you routinely assess and document the patient's ability to consume the bowel preparation solution and any adverse effects (e.g., nausea, vomiting)?	
No	8 (5.9)
Yes, for all patients*	93 (68.4)
Yes, only when patient unable to tolerate	35 (25.7)

Figure 1 illustrates that 72.1% of nurses were confident or very confident about dealing with bowel preparation before colonoscopy. Figure 2 represents the mean knowledge (2.88 ± 0.91 , range: 0–4) and practice (3.56 ± 1.02 , range: 1–6) scores. Furthermore, the knowledge levels of nurses were 8.1%, 64.7%, and 27.2%, representing poor, fair, and good knowledge levels, respectively. Table 4 shows that nurses working in medical wards, who had never worked as endoscopy nurses and were confident or very confident about dealing with bowel preparation before colonoscopy, had a significantly higher percentage of good knowledge ($p < 0.05$).

Figure 3 shows that nurse who received formal education had significantly higher confidence in dealing with bowel preparation before colonoscopy ($p \leq 0.05$). As in Table 5, there was a higher confidence rate in dealing with bowel preparations before colonoscopy among nurses in medical wards with 10 years of work experience who were native Arabic speakers ($p \leq 0.05$). A significant positive correlation was found between the knowledge and practice scores (N.B.: $r = 0.29$, $p < 0.001$) (Figure 4).

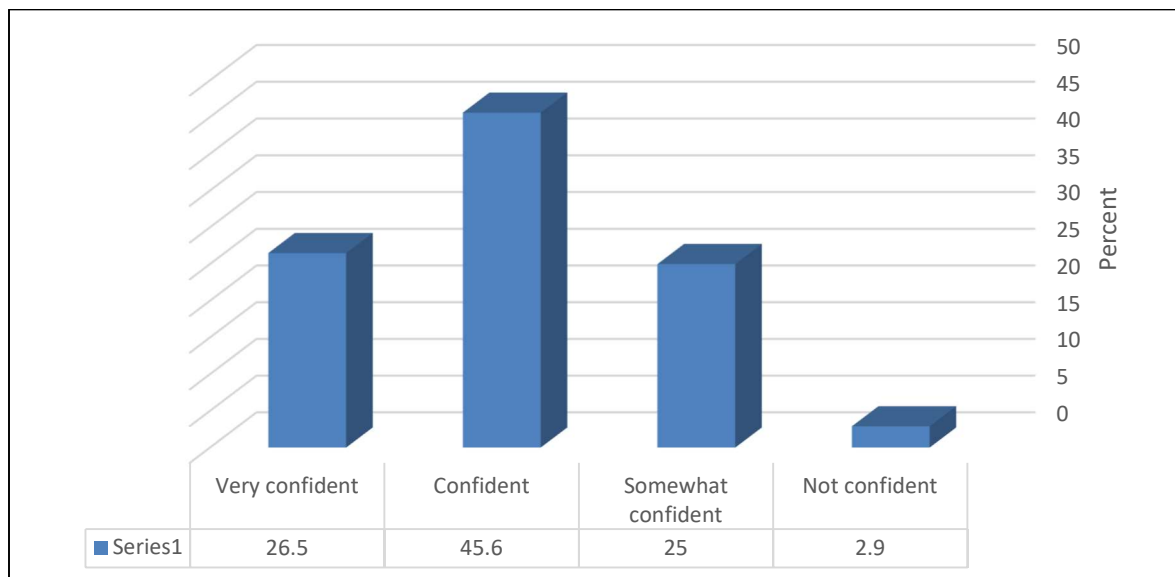


Figure 1 Percentage distribution of studied nurses according to their confidence level in dealing with bowel preparation before colonoscopy (No.: 136)

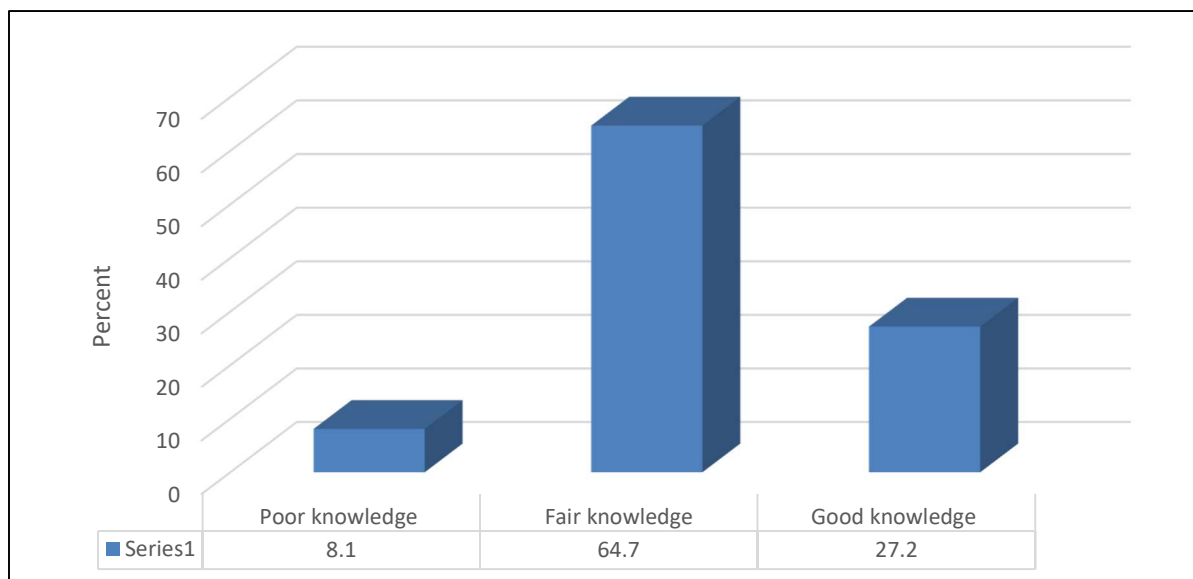


Figure 2 Percentage distribution of studied nurses according to their knowledge level regarding colonoscopy (No.: 136)

Table 4 Distribution of nurses participating in the study according to their position, experience, native language, ability to communicate with patients in Arabic, working as endoscopy nurses, and involvement in preparing inpatients for colonoscopy (n = 136)

Variable	Knowledge level			χ^2	P-value
	Poor No. (%)	Fair No. (%)	Good No. (%)		
What kind of nurse are you?				13.97	0.001
Medical ward	2 (18.2)	42 (47.7)	28 (75.7)		
Surgical ward	9 (81.8)	46 (52.3)	9 (24.3)		
How many years of experience do you have as a ward nurse?				9.2	0.163
Less than 2 years	3 (27.3)	5 (5.7)	3 (8.1)		
2-5 years	1 (9.1)	25 (28.4)	14 (37.8)		

6-10 years	4 (36.4)	25 (28.4)	9 (24.3)		
More than 10 years	3 (27.3)	33 (37.5)	11 (29.7)		
Is Arabic your native language?				3.3	0.192
No	9 (81.8)	82 (93.2)	36 (97.3)		
Yes	2 (18.2)	6 (6.8)	1 (2.7)		
Are you able to communicate with patients in Arabic language?				4.7	0.319
No	1 (9.1)	2 (2.3)	0 (0.0)		
Yes	2 (18.2)	34 (38.6)	15 (40.5)		
Yes, with difficulty	8 (72.7)	52 (59.1)	22 (59.5)		
Have you ever worked as an endoscopy nurse?				6.32	0.042
No	8 (72.7)	80 (90.9)	28 (75.7)		
Yes	3 (27.3)	8 (9.1)	9 (24.3)		
Overall, how confident are you dealing with bowel preparation before colonoscopy?				26.94	<0.001
Not confident	2 (18.2)	2 (2.3)	0 (0.0)		
Somewhat confident	6 (54.2)	26 (29.5)	2 (5.4)		
Confident	1 (9.1)	40 (45.5)	21 (56.8)		
Very confident	2 (18.2)	20 (22.7)	14 (37.8)		

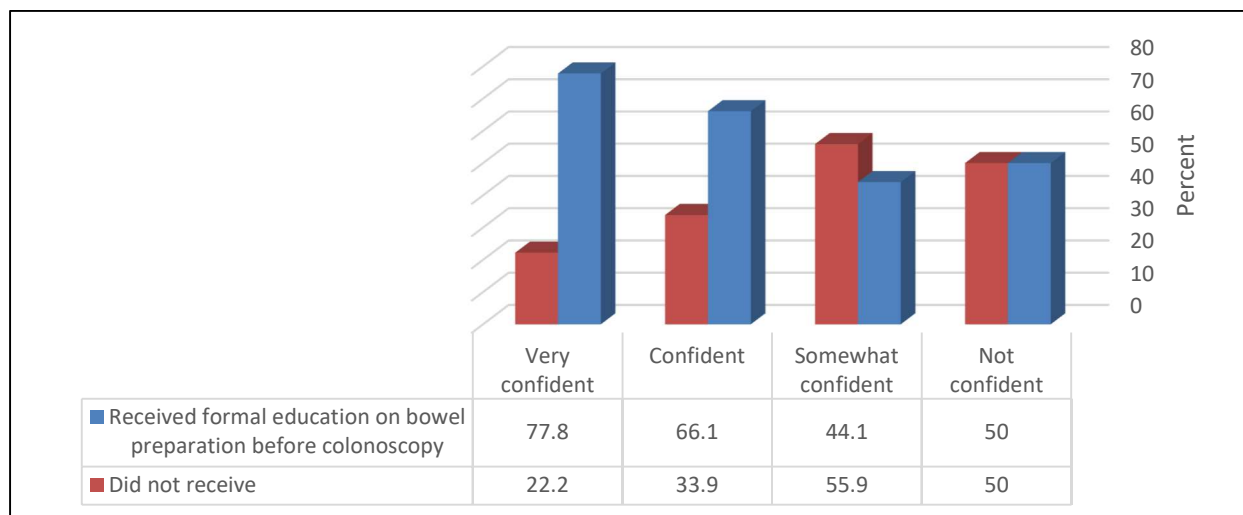


Figure 3 Relationship between nurses' confidence in dealing with bowel preparation before colonoscopy and previous formal education on bowel preparation (No.: 136)

N.B.: ($\chi^2 = 9.14$, p-value = 0.027)

Table 5 Relationship between the participating nurses' confidence in dealing with bowel preparation before colonoscopy and their position, experience, and ability to communicate with patients in Arabic (n = 136)

Variable	Not confident	Somewhat confident	Confident	Very confident	χ^2	p-value
	No. (%)	No. (%)	No. (%)	No. (%)		
What kind of nurse are you?					30.2	<0.001
Medical ward	0 (0.0)	6 (17.6)	40 (64.5)	26 (72.2)		
Surgical ward	4 (100)	28 (82.4)	22 (35.5)	10 (27.8)		
How many years of experience do you have as a ward nurse?					33.6	<0.001
Less than 2 years	3 (75)	3 (8.8)	4 (6.5)	1 (2.8)		
2-5 years	1 (25)	11 (32.4)	21 (33.9)	7 (19.4)		
6-10 years	0 (0.0)	13 (38.2)	14 (22.6)	11 (30.6)		

More than 10 years	23 (37.1)	0 (0.0)	23 (37.1)	17 (47.2)		
Are you able to communicate with patients in Arabic language?					20.22	0.003
No	1 (25)	1 (2.9)	1 (1.60)	0 (0.0)		
Yes	2 (50)	7 (20.6)	22 (35.5)	20 (55.6)		
Yes, with difficulty	1 (25)	26 (76.5)	39 (62.9)	16 (44.4)		

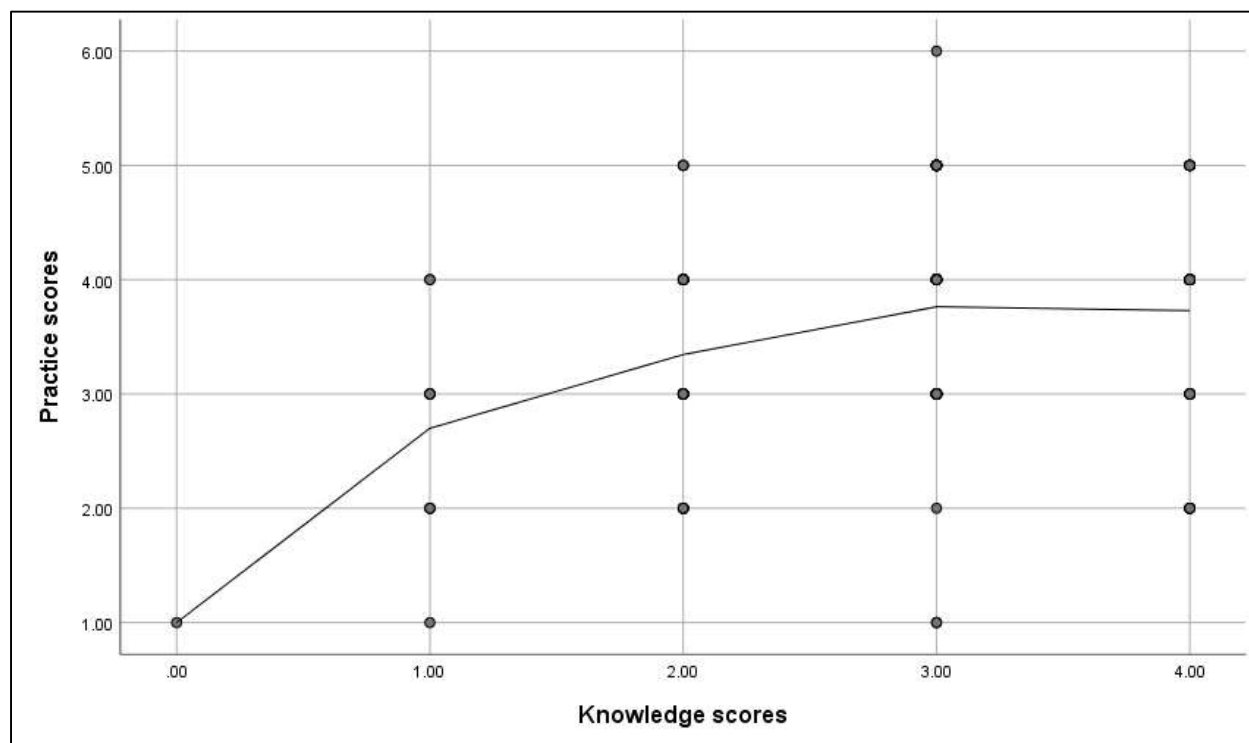


Figure 4 Spearman's correlation analysis between knowledge and practice scores

N.B.: ($r = 0.29$, $p\text{-value} < 0.001$)

4. DISCUSSION

This study assessed the knowledge and practices of inpatient nurses regarding bowel preparation in KAUH. Ward nurses play an essential role in the outcome of bowel preparation of hospitalized patients; those who obtained instructions from educated ward nurses demonstrated better understanding with greater adherence to the instructions, which led to proper bowel preparation (Lee et al., 2015; Amer et al., 2015). Our study included 136 inpatient nurses, 72 from medical wards and 64 from surgical wards, in line with another study that included 157 participants, 102 of whom worked in the medical and surgical wards (Nakamura et al., 2018).

Furthermore, 34.6% of the nurses had > 10 years of experience as ward nurses, similar to a study by Mohamed, (2018) which showed that 40% of the participating nurses had > 10 years of experience. The current study revealed that only 20 out of 116 nurses had previous work experience in an endoscopy unit. The study of Mohamed, (2018) showed that 30 participants had endoscopy experience. Regarding the timing of the split-dose bowel preparation, 85.3% of the nurses in our study knew when to administer the first split dose, but only 20.6% knew when to administer the second. In a previous study, these percentages were 51% and 39%, respectively (Nakamura et al., 2018).

Most of the nurses (80.9%) in our study were able to recognize the correct clear stool from illustrated images, whereas in another study, only 60% identified it correctly (Nakamura et al., 2018). Only 1.5% of our participants were able to answer correctly regarding the right time to start preparing a patient. In contrast, a previous study showed that 34% of the nurses could recognize when a patient should stop eating solid foods, and 23% of the nurses knew when drinking liquids should be discontinued before the colonoscopy (Amer et al., 2015).

Concerning their knowledge of bowel preparation, participating nurses had a fair level, whereas the ones partaking in the Mohamed, (2018) study showed a satisfactory level of knowledge. Another study found a low level of knowledge among inpatient nurses (Amer et al., 2015). The current study also has some limitations. It was conducted in a single center with a small sample size,

and the number of the nurses that responded to the questionnaire was less than expected. Moreover, there is a paucity of studies that assess the knowledge and practice of inpatient nurses regarding bowel preparation.

5. CONCLUSIONS

Consistent with the findings of the current study, the participating nurses had a fair level of knowledge and practice regarding bowel preparation before colonoscopy. Nevertheless, certain recommendations need to be made. First, regular evaluation of inpatient nurses regarding their level of knowledge and practice of bowel preparation needs to be implemented. Second, nurses need to be kept informed of the last updated guidelines of bowel preparation. Third, nurses need to conduct regular enhanced educational sessions, followed by individual assessment of their performance. In order to significantly improve the outcome, future researchers should also incorporate demographic information about the participant's age, gender, marital status, and level of education. Furthermore, we recommend increasing the sample size and including multiple centers.

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Author's Contributions

All authors contributed in writing the manuscript. HJ and WG wrote the concept of the study, designed the study, and reviewed and edited the manuscript. WM and RM wrote the concept of the study and designed the study, collected the data, analyzed and interpreted the data, and reviewed and edited the manuscript with the literature review. RK, SM and AS wrote the concept of the study and designed the study, collected the data, analyzed and interpreted the data, and literature review.

Ethical Approval

Ethical approval for the study was obtained from the research ethics committee of King Abdulaziz University Hospital, Jeddah, Saudi Arabia. Reference number (422-22). Written and oral informed consent was obtained from all individual participants included in the study.

Consent to Participate

Informed consent was obtained from all the participants

Funding

This study has not received any external funding.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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