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Colorectal cancer screening knowledge among community pharmacists: A national survey

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Declaration of interests

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Abstract

Background: Colorectal cancer (CRC) screening can reduce CRC morbidity and mortality. Community pharmacies could be a viable option for delivering home-based CRC screening tests such as fecal immunochemical tests (FITs). However, little is known about community pharmacists' knowledge about CRC screening guidelines.

Objective: We assessed community pharmacists' knowledge about CRC screening to identify education and training needs for a pharmacy-based CRC screening program.

Methods: Between September 2022 and January 2023, we conducted an online national survey of community pharmacists practicing in the United States (US) (Responders were eligible if they were currently-licensed community pharmacists and currently practiced in the US. The survey assessed knowledge of national CRC screening guidelines, including recommended starting age, frequency of screening, different screening modalities, and follow-up care. Using multiple linear regression, we evaluated correlates of community pharmacists' level of CRC screening knowledge, defined as the total number of knowledge questions answered correctly from "0" (no questions correct) to "5" (all questions correct).

Results: 578 eligible community pharmacists completed the survey, with a response rate of 59%. Most community pharmacists correctly answered the question about the next steps following a positive FIT (87%) and the question about where a FIT can be done (84%). A minority of community pharmacists responded correctly to questions about the age to start screening with FIT (34%) and how often a FIT should be repeated (28%). Only 5% of pharmacists answered all knowledge questions correctly. Community pharmacists answered more CRC screening knowledge questions correctly as their years in practice increased. Board-certified community pharmacists answered more CRC screening knowledge questions correctly compared to those who were not board-certified.

Conclusion: To ensure the successful implementation of a pharmacy-based CRC screening program, community pharmacists need to be educated about CRC screening and trained to ensure comprehensive patient counseling and preventive service delivery.

Keywords

Colorectal cancer screening; pharmacists; fecal immunochemical testing

1. BACKGROUND

Colorectal cancer (CRC) is among the top five leading causes of cancer-related death in men and women in the United States (US).[1,2] Various CRC screening tests are available and multiple studies have shown them to be effective in reducing CRC-associated morbidity and mortality.[2–7] Despite the benefits of CRC screening, national screening rates are lower than the Healthy People 2030 target of 74.4%.[8,9] Disparities exist in CRC screening rates among people of color, those with lower socioeconomic status, and those who reside in rural and medically underserved areas, contributing to higher CRC-associated morbidity and death in those populations.[9–12] Meta-analyses evaluating interventions to enhance CRC screening in the US found that mailed reminders with home-based CRC screening kits, patient navigation, and general CRC education significantly increased screening rates.[13,14] While these interventions are effective, they can be resource-intensive and constrained by the setting in which they are delivered, limiting their reach and ability to close health inequity gaps. More strategies and novel settings are needed to increase equitable access and opportunities for CRC screening for underserved patients, particularly those living in rural or low-resource settings in the US.

CRC screening tests are typically administered and distributed in primary care clinics, but due to poor access to primary care in health professional shortage areas, equitable distribution of CRC screening could be hindered.[15] Since more than 95% of the US population lives less than 10 miles from a community pharmacy and individuals in rural areas visit community pharmacies more often than primary care settings, community pharmacies could be ideal in promoting equitable access to CRC screening.[16,17] Over the past decades, pharmacies have increased the number of screening and preventive services they provide, such as influenza tests, rapid COVID tests, health and wellness counseling, and genetic testing.[18,19] Fecal immunochemical testing (FIT) is one of the recommended CRC screening modalities. FIT-based intervention programs have shown the use of FITs to be successful in increasing access to CRC screening for patients with low socioeconomic status and who reside in rural areas.[14,20,21] FITs have been successful at increasing access to CRC screening because they are inexpensive, easy to store, do not require a prescription to dispense, and can be completed at home and mailed directly to a community laboratory for processing, making them a viable service for community pharmacies to provide.[7,22]

Recently, epidemiological evidence suggests that CRC rates have been rising among young adults, indicating an increased need in early CRC detection.[23–25] As formative research is exploring the possibility of expanding certain types of screening services in pharmacies, like FIT, it is important for pharmacists to understand how to provide these screening services or be a source of information if the patient has questions.[26–29]

Although community pharmacies have the potential to substantially increase access to CRC screening through home-based tests like FIT, little is known about community pharmacists'

knowledge of CRC screening. Assessing knowledge is essential to understanding the educational and training needs of pharmacists who want to implement CRC screening services.

2. OBJECTIVE

This study aimed to understand community pharmacists' knowledge about CRC screening guidelines for FIT.

3. METHODS

3.1 Participants and procedures

Our national survey was comprised of practicing community pharmacists across the US. We recruited participants through purposive sampling from market research panels contracted with QualtricsXM, an online survey research company.[30] Qualtrics contacted participants via email and sent email reminders to potential participants. Participants who completed the survey were compensated by Qualtrics. Non-mutually exclusive sampling quotas were applied to ensure a third of the entire sample practiced in independent pharmacies and half of the sample was female (+/−10%).[31] Eligible participants were licensed pharmacists currently practicing in community pharmacies in the US.

3.2 Ethical approvals and human subjects.

The University of North Carolina Institutional Review Board approved this study (IRB#18-1337).

3.3 Measures

The National PharmFIT™ (a pharmacy-based FIT distribution program) Pharmacist Survey instrument was created by our research team comprising health services researchers, pharmacists, physicians, and other research staff. The survey incorporated newly-developed items as well as items adapted from published sources.[32–34] The survey covered ten topics about the responder: Pharmacy/Pharmacist characteristics; Pharmacy services; CRC screening knowledge; PharmFIT design; Diffusion of innovation; Willingness to provide FIT; Social determinants of health; Telehealth; and Demographic characteristics. We focus on CRC screening knowledge in this paper. Qualtrics piloted the survey with 63 community pharmacists from existing survey panels to ensure appropriate survey functioning. Respondents provided informed consent and completed the survey between September 2022 and January 2023. The full survey instrument is available online at [https://dataverse.unc.edu/dataverse/cpcrn-4cnc-pharmfit].

CRC screening knowledge.—Five survey items assessed community pharmacists' CRC screening knowledge based on the United States Preventive Services Task Force (USPSTF) CRC screening recommendations:[5] 1) the age to start CRC screening (correct response: "45"); 2) whether a FIT can be done at home (correct response: "True"); 3) whether national guidelines recommend FIT and colonoscopy equally for CRC prevention (correct response: "True"); 4) how often patients should complete FIT for routine screening (correct response:

"Annually"); and 5) the appropriate step a patient should take after receiving a positive (abnormal) FIT result (correct response: "The patient should complete a colonoscopy"). The unique counts of community pharmacists who answered each of the five survey items correctly were collated and categorized based on the number of correct answers each pharmacist had. We categorized the level of CRC screening knowledge into a six-item numeric variable based on the number of correct responses each pharmacist gave (e.g., 0=no question answered correctly, 5=all questions answered correctly). Considering that CRC screening is not a part of patient care services routinely given in a pharmacy, we defined getting three or more questions correct as good screening knowledge.

Pharmacists' demographics and pharmacy characteristics.—The survey assessed community pharmacists' demographic characteristics, including race, ethnicity, gender, level of pharmacy education, board certification, and years of practice. The survey also asked pharmacists to provide information about the community pharmacy in which they primarily practiced and whether they provided chronic disease management services.

3.4 Statistical analyses

We performed bivariate analyses using chi-square (categorical variables) and ANOVA (continuous variables) to assess the level of CRC screening knowledge by demographic and pharmacy characteristics. Then, we used multiple linear regression to evaluate the correlates of community pharmacists' CRC screening knowledge. We also conducted a sensitivity analysis, allowing for partially correct answers for two survey items. We allowed partial credit for community pharmacists who selected "50" (rather than the correct answer of "45") for the survey item that asked about the start age for CRC screening because national screening guidelines recently changed (2021).[35] We also allowed partial credit for community pharmacists who selected "FIT screening every two years" (rather than the correct answer of "annually") for the survey item asking about recommended screening frequency because evidence suggests that FIT screening that happens every two years may also be beneficial.[36] All analyses were two-tailed with a critical alpha=.05 and were conducted using Stata 16.1 (Stata Corp, College Station, TX).

4. RESULTS

4.1 Demographics and Level of CRC Screening Knowledge

A total of 1,452 pharmacists accessed our survey. After accounting for panel members who did not practice in a community pharmacy (n=279), not currently practicing as a licensed pharmacist (n=112) and excluding participants whose survey responses were flagged for data quality issues (failed reCAPTCHA or bot: n=10; duplicate surveys: n=6 or speeding through survey questions: n=67), 474 respondents were deemed ineligible. Of the 978 eligible pharmacists, our final sample which includes the pilot group consisted of 578 pharmacists who completed the survey, yielding a response rate of 59% (578/978).[31] Respondents came from 41 US states, Washington D.C., and Puerto Rico. The average age of our sample was 47 years. About half were female (48%), and most self-identified as White (78%) and non-Hispanic (95%). Two-thirds had a Doctor of Pharmacy degree. The

average years of practice was 21 years, with most practicing in national chain (36%) or independent (31%) pharmacies (Table 1).

Around two-thirds of community pharmacists answered three or more out of the five CRC knowledge questions correctly (68%; 392/578). A minority of community pharmacists got all questions correct (5%; 30/578) or none of the questions correct (3%; 15/578; Table 1). For individual knowledge questions, most pharmacists responded correctly to the appropriate step a patient should take after receiving a positive FIT result (correct response: “The patient should complete a colonoscopy”; 87%; 504/578) and whether a FIT can be done at home (correct response: “True”; 84%; 484/578). More than half responded correctly that national guidelines equally recommend colonoscopy and FIT testing for CRC prevention (57%; 329/578). A minority answered correctly the age to begin CRC screening (correct response: “45”; 34%; 198/578) and frequency of screening with FIT (correct response: “Annually”; 28%; 162/578; Appendix A). Regarding the sensitivity analysis, those who answered that “50 years” was the age to begin CRC screening was 39% (225/578), and those who answered that “every 2 years” was the frequency of screening with FIT was 16% (94/578).

4.2 Correlates of pharmacists’ level of CRC screening knowledge

Community pharmacists who were in practice for more years answered more CRC knowledge questions correctly (β=0.02, CI_{95}%: 0.01, 0.03). Board-certified community pharmacists answered more CRC knowledge questions correctly than non-board-certified (β=0.38, CI_{95}%: 0.10, 0.66; Table 2). There were no other significant predictors of CRC screening knowledge.

Our sensitivity analysis did not reveal a significant difference from our main analysis (Appendix B); therefore, we present only the main analysis.

5. DISCUSSION

To our knowledge, this is the first national survey to evaluate community pharmacists’ understanding of CRC screening guidelines. Examining community pharmacists’ knowledge about CRC screening is important to evaluate their educational needs so they can be effective at implementing and providing CRC screening services for their eligible patients. Our study demonstrates that many community pharmacists have some knowledge of CRC screening guidelines (such as that FIT can be done at home). However, only a small proportion correctly answered questions about the age to start routine screening and the frequency of FIT screening, demonstrating a gap in knowledge about CRC screening guidelines. Community pharmacists who were board-certified or had more years of practice had more CRC screening knowledge, which could be attributed to the level of exposure afforded by additional training and time spent in clinical practice. Increasing educational outreach about screening and avenues for CRC screening training could be of great value to community pharmacists to keep abreast with current guidelines and be another source of patient education and counseling—independent of whether they supply FITs to their patients.

Past studies that have investigated pharmacy-based CRC screening services found them to be successful.[37–40] In one of the studies involving a partnership between the School of Pharmacy and the Colon Cancer Prevention Program at the University of Connecticut, community pharmacists were credentialed in CRC epidemiology, screening, and appropriate counseling methods before delivering FITs to eligible patients.[39] Similarly, the study by Santolaya and colleagues included training on providing FIT for community pharmacists before they delivered the intervention.[40] These studies highlight the importance of training for community pharmacists as a precondition for successfully implementing CRC screening in their pharmacies.[39,40] However, there was no indication these past studies assessed pharmacists' CRC and CRC screening knowledge gaps. Our study results show that there are some CRC knowledge gaps among pharmacists nationally, underscoring that widespread adoption of CRC screening services will require some form of education and training for community pharmacy staff.

The Exploration, Preparation, Implementation, Sustainment (EPIS) framework[41,42] posits that for an evidence-based intervention to be successfully implemented, like FIT delivery in pharmacies, those involved with the program implementation need to be adequately trained to deliver the intervention. Our current study, which utilizes the EPIS framework, builds upon formative research our study team has conducted for the PharmFIT™ program. The findings from our formative research involving interviews and a national survey showed that patients, community pharmacists, and primary care physicians (PCPs) support PharmFIT™.[27–29,34,43] However, these studies revealed that all three groups (patients, community pharmacists and physicians) expect community pharmacists to receive adequate training on CRC screening guidelines and modalities before implementing this cancer prevention program.[27–29,34,43] Our formative research, along with this current study, further supports the need to develop comprehensive continuing education and training for community pharmacy staff, which can be offered through continuing pharmacy education (CPE) so they can confidently implement and deliver CRC screening services in their pharmacies.

For example, the American College of Gastroenterology (ACG) and the American Journal of Gastroenterology (AJG) offer continuing medical education (CME) to physicians to expand their CRC knowledge.[44,45] CPE tailored to community pharmacists could be delivered as professional development sessions at conferences or webinars through state and national associations, using educational content in sessions offered by ACG/AJG that are pharmacist-specific.[39] For example, in the Connecticut study, community pharmacists were given hands-on training and mock-practice sessions to develop CRC counseling skills, which would be crucial components to consider when developing a training that is both knowledge- and skill-based.[39] We found that community pharmacists have some knowledge about the guidelines, but there is still a need to address the knowledge gaps identified in this study. Additionally, knowledge alone might not be enough to build competency. So, future training should be structured to build skills (e.g. communication skills) that would lead to competency in delivering CRC screening services while also considering the pharmacy's context and patient population.

This study has notable strengths, including the analysis of a large national sample of community pharmacists with a good representation of those who primarily practice in independent pharmacies (31%, 181/578), which disproportionately provide healthcare for medically underserved communities.[46–48] Additionally, our survey was developed by a multidisciplinary team of researchers, pharmacy, and medical practitioners who informed the development of survey items that assess CRC screening guideline knowledge.

Our study also had limitations. First, we did not obtain responses from community pharmacists from all 50 US states, which may skew our survey findings. However, our survey findings are likely still generalizable since our respondents represented all US regions. Second, we were unable to assess community pharmacists' desire for training types and components, which could have provided a better understanding of educational needs to facilitate pharmacy-based CRC screening implementation. Our team is developing CPE with guidance from practicing pharmacists, and our future studies will expand upon our formative work to identify formats for effective training programs and methods for education dissemination. Our research team will continue this investigation through an implementation trial where we will test the effectiveness of PharmFIT™.

6. CONCLUSION

Our study revealed that community pharmacists have some knowledge about CRC screening and that those with more years of practice or were board-certified had more CRC screening knowledge. Our other formative research showed that patients, community pharmacists, and PCPs support pharmacy-based CRC screening services with the caveat that community pharmacists are well-trained to deliver the service.[27,28,34,43] Hence, to ensure successful implementation and uptake of a pharmacy-based CRC screening program such as PharmFIT™, community pharmacists need to receive continued education and training to stay updated with CRC screening guidelines.

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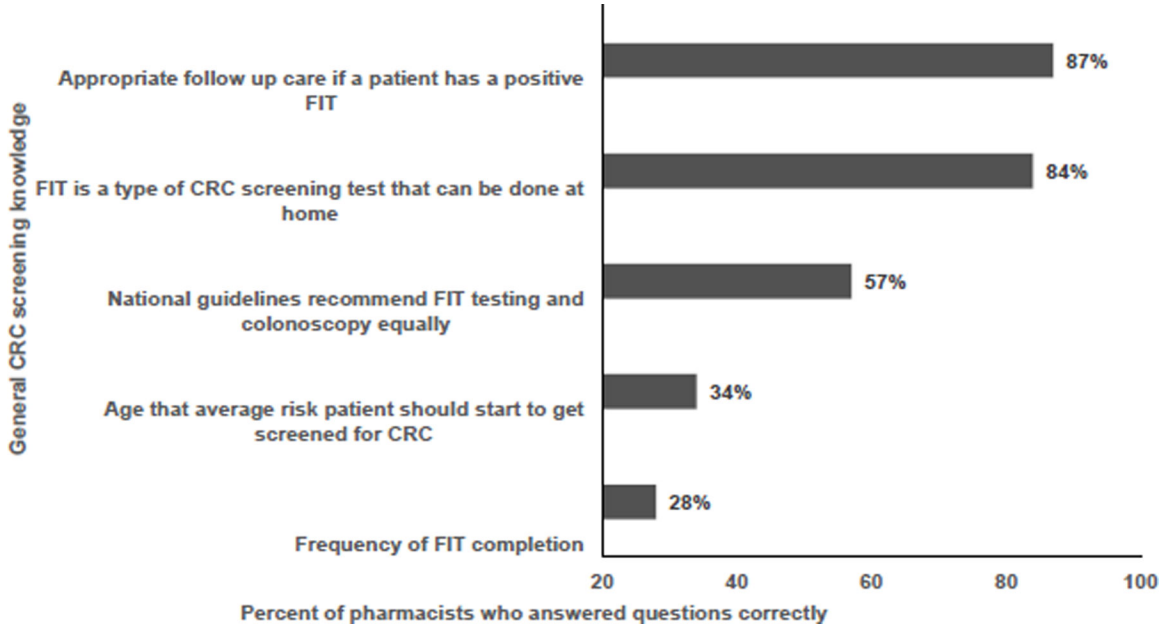
Data Availability:

The data used in this study are available on request from the corresponding author.

Appendix A



Proportion of pharmacists who answered CRC screening questions correctly (N= 578)
Figure note: FIT-Fecal immunochemical test; CRC-Colorectal cancer.

Appendix B

Correlates of pharmacists' level of CRC screening knowledge (Sensitivity Analysis)

	B coefficient (CI_{95}%)
Years of practice	01 (.003, .03) *
Gender	
Men	*Ref*
Women	.04 (−.15, .23)
Non-binary	−.16 (−1.29, .97)
Race	
White	*Ref*
Black	.23 (−.24, .70)
Asian	.18 (−.11, .47)
Other race/multiracial	−.13 (−.55, .29)
Hispanic or Latino	
No	*Ref*
Yes	.14 (−.30, .58)
Board certification	
No	*Ref*
Yes	.36 (.07, .65) *
Pharmacy degree	
Bachelor of science in pharmacy	*Ref*

	B coefficient (CI_{95}%)
Doctor of pharmacy	.08 (−.19, .35)
Graduate degree	.74 (−.19, 1.67)
Chronic disease management	
No	*Ref*
Yes	.15 (−.03, .33)
Pharmacy structure	
National chain	*Ref*
Independent	.01 (−.22, .24)
Small group	−.04 (−.40, .31)
Regional chain	−.04 (−.37, .29)
Supermarket	−.01 (−.30, .27)

Note.
* for *p*-value <0.05

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Key Points

Background

- Colorectal cancer (CRC) screening is highly effective in reducing CRC morbidity and mortality but is underused.
- Disparities exist in the uptake of CRC screening nationally, especially in medically underserved regions.
- Community pharmacies are easily accessible to patients and could be used to deliver CRC screening services like fecal immunochemical test (FIT) to address healthcare inequities.

Findings

- Overall, community pharmacists demonstrated good knowledge of CRC screening guidelines.
- Board certification and years in practice were associated with higher levels of CRC screening guideline knowledge.
- Educational outreach and training could help community pharmacists effectively deliver CRC screening services for their eligible patients.

Table 1:

Characteristics of pharmacists and their level of CRC screening knowledge

		Number of CRC screening knowledge questions correct						
	Total (*n*= 578)	**0 (*n*=15)**	**1 (*n*=38)**	**2 (*n*=133)**	**3 (*n*=225)**	**4 (*n*=137)**	**5 (*n*=30)**	***p*-value**
Age	47 (11.17)	46 (12.4)	46.5 (13.1)	45.3 (12)	46.2 (10.1)	49.8 (11)	49.5 (11.6)	0.016
Years of practice	20.7 (11)	20.1 (11.8)	20 (12.8)	19 (11.3)	20.1 (10.4)	23.3 (10.9)	22.3 (10.6)	0.033
Gender								0.73
Women	280 (48)	9 (60)	17 (45)	64 (48)	104 (46)	74 (54)	12 (40)	
Men	293 (51)	6 (40)	21 (55)	67 (50)	118 (52)	63 (46)	18 (60)	
Non-binary	5 (1)	0 (0)	0 (0)	2 (2)	3 (1)	0 (0)	0 (0)	
Race								0.95
White	446 (78)	12 (80)	30 (79)	103 (79)	177 (79)	99 (73)	25 (83)	
Black	24 (4)	0 (0)	2 (5)	4 (3)	9 (4)	8 (6)	1 (3)	
Asian	74 (13)	1 (7)	5 (13)	16 (12)	29 (13)	20 (15)	3 (10)	
Other race/multiracial	30 (5)	2 (13)	1 (3)	7 (5)	10 (4)	9 (7)	1 (3)	
Hispanic or Latino								0.87
No	551 (95)	15 (100)	35 (92)	127 (95)	215 (96)	130 (95)	29 (97)	
Yes	27 (5)	0 (0)	3 (8)	6 (5)	10 (4)	7 (5)	1 (3)	
Board certification								0.055
No	505 (87)	15 (100)	36 (95)	118 (89)	200 (89)	113 (82)	23 (77)	
Yes	73 (13)	0 (0)	2 (5)	15 (11)	25 (11)	24 (18)	7 (23)	
Pharmacy degree								0.57
Bachelor of science	210 (36)	7 (47)	16 (42)	44 (33)	76 (34)	56 (41)	11 (37)	
Doctor of pharmacy	361 (63)	8 (53)	22 (58)	88 (66)	147 (66)	78 (57)	18 (60)	
Graduate degree	6 (1)	0 (0)	0 (0)	1 (1)	1 (0.5)	3 (2)	1 (3)	
Chronic disease management								0.14
No	298 (52)	7 (2)	23 (8)	76 (26)	120 (40)	58 (19)	14 (5)	
Yes	280 (48)	8 (3)	15 (5)	57 (20)	105 (38)	79 (28)	16 (6)	
Pharmacy structure								0.28
Independent	181 (31)	6 (40)	15 (39)	33 (25)	64 (28)	56 (41)	7 (23)	
Small group	49 (8)	1 (7)	0 (0)	18 (14)	16 (7)	11 (8)	3 (10)	

		Number of CRC screening knowledge questions correct						
	Total (*n*= 578)	**0 (*n*=15)**	**1 (*n*=38)**	**2 (*n*=133)**	**3 (*n*=225)**	**4 (*n*=137)**	**5 (*n*=30)**	***p*-value**
Regional chain	56 (10)	1 (7)	3 (8)	14 (11)	23 (10)	13 (9)	2 (7)	
National chain	209 (36)	6 (40)	13 (34)	51 (38)	88 (39)	37 (27)	14 (47)	
Supermarket	83 (14)	1 (6)	7 (18)	17 (13)	34 (15)	20 (15)	4 (13)	

Notes. Each column shows the number of questions pharmacists answered correctly. Rows report n (%) for categorical variables and averages (SD) for continuous variables. ANOVAs were used for Age and Years in practice variables. Chi-squared tests were used for all other categorical variables.

Table 2:

Correlates of pharmacists' level of CRC screening knowledge

	B coefficient (CI_{95}%)
Years of practice	.02 (.01, .03)*
Gender	
Men	*Ref*
Women	.04 (−.14, .22)
Non-binary	−.37 (−1.45, .71)
Race	
White	*Ref*
Black	.12 (−.33, .57)
Asian	.17 (−.11, .45)
Other race/multiracial	−.02 (−.43, .39)
Hispanic or Latino	
No	*Ref*
Yes	.08 (−.34, .50)
Board certification	
No	*Ref*
Yes	.34 (.06, .63)*
Pharmacy degree	
Bachelor of science in pharmacy	*Ref*
Doctor of pharmacy	.15 (−.11, .40)
Graduate degree	.62 (−.27, 1.51)
Chronic disease management	
No	*Ref*
Yes	.15 (−.03, .33)
Pharmacy structure	
National chain	*Ref*
Independent	.02 (−.21, .24)
Small group	−.07 (−.41, .27)
Regional chain	−.06 (−.38, .26)
Supermarket	.1 (−.18, .37)

Note.

* for *p*-value <0.05