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BRIEF REPORTS

Rural community pharmacists' ability and interest in administering COVID-19 vaccines in the Southern United States

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ABSTRACT

Background: Community pharmacists are often the most accessible health professional in rural areas, which makes them well positioned to increase vaccine access in their communities. This study sought to document rural pharmacists' ability to and interest in administering coronavirus disease 2019 (COVID-19) vaccinations.

Methods: A sample of community pharmacists participating in a rural community pharmacy practice-based research network in the United States completed an online survey that assessed (1) demographic characteristics, (2) previous COVID-19 vaccine training, and (3) ability to administer COVID-19 vaccines. Data were collected between late December 2020 and mid-February 2021. Descriptive statistics and correlations were calculated.

Results: A total of 69 of 106 pharmacists completed the survey (response rate = 65%). Approximately half of pharmacists were ready (52%) or actively taking steps (39%) to provide COVID-19 vaccines in the next 6 months. Pharmacies had a median of 2 staff members who were authorized to administer COVID-19 vaccines. Almost half (46%) estimated they could administer more than 30 vaccinations per day. Most pharmacies could store vaccines at standard refrigeration (90%) and freezing (83%) levels needed for thawed and premixed vaccines, respectively. Most pharmacists planned to access COVID-19 vaccines through an agreement with a state or local public health entity (48%) or by ordering through group purchasing organizations (46%). Only 23% of pharmacists had received any COVID-19 vaccine training, and only 48% very much wanted to get the vaccine themselves. Several variables, including pharmacy type and pharmacists' vaccine attitudes and previous COVID-19 training, were significantly associated ($P < 0.05$) with the anticipated number of COVID-19 vaccines pharmacies could administer daily.

Conclusion: Even early in the nation's COVID-19 vaccine rollout, most rural pharmacies were interested in and preparing to administer COVID-19 vaccines. Few rural pharmacists had received COVID-19 training, and many expressed some hesitancy to receive the vaccine themselves. The number of vaccines pharmacists could administer varied with pharmacy and pharmacist characteristics.

Coronavirus disease 2019 (COVID-19) death rates in rural areas of the United States surpassed those in urban areas in September 2020.[1,2] A high prevalence of COVID-19 risk factors, such as older age, obesity, and diabetes,[3,4] and a lack of health services infrastructure[5,6] may contribute to these higher death rates. Thus, prevention of COVID-19 is key to protecting the health of rural populations.[7,8]

Vaccine hesitancy, defined as a "delay in acceptance or refusal of vaccination despite availability of vaccination services,"[9] is also more common in rural areas.[10] In a February

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2021 national survey, more rural residents reported they would not get the COVID-19 vaccine compared with urban residents (29% vs. 16%).[10] These lower intentions to vaccinate have translated to lower vaccination rates, particularly in the rural south, which, as of July 2021, had the 2 states with the lowest rates of vaccinated adults in the country.[11-13]

As one of the most accessible[14,15] and trusted[16] sources of medication information, rural community pharmacists are well positioned to increase vaccine access in their communities and address vaccine hesitancy. Rural patients visit their community pharmacist an average of 14 times per year versus only 5 primary care visits, providing rural pharmacists monthly opportunities to offer the vaccine.[17] However, whether rural pharmacists were prepared to offer COVID-19 vaccines early in the pandemic is unknown. Moreover, whether rural pharmacists have received COVID-19 vaccination training and their personal attitudes toward the vaccine have not been documented.

More research is needed to determine how rural community pharmacies are managing COVID-19 vaccinations, especially in the rural south where vaccination rates are low. We specifically assess rural southern pharmacists' preparedness to administer the vaccine and also report whether pharmacists had received previous COVID-19 vaccine training and their own vaccine attitudes. We also explore whether pharmacy and pharmacist characteristics are associated with the number of COVID-19 vaccines pharmacies could administer and pharmacists' vaccine attitudes.

Methods

Participants

This cross-sectional survey study was conducted with a sample of rural community pharmacists who were part of the Rural Research Alliance of Community Pharmacies, a multistate practice-based research network that comprises 106 rural southeastern community pharmacies.[18]

Procedures

Participants received an e-mail describing the study and a link to the online 65-item Qualtrics survey. Data were collected between late December 2020 and mid-February 2021, when vaccines were first becoming available to pharmacies and pharmacists were granted the authority to administer COVID-19 vaccinations. Pharmacists received a $25 incentive to complete the approximately 20-minute survey. Two reminder e-mails were sent. The Institutional Review Board at the University of North Carolina deemed the study exempt.

Measures

Pharmacists answered 7 demographic questions (e.g., age, highest level of pharmacy education, pharmacy type). Pharmacy rurality was measured via rural-urban commuting area (RUCA) codes, where large rural towns were designated by RUCA 4-7, small rural towns as RUCA 8-9, and isolated rural towns as RUCA 10.[19]

Seven questions assessed COVID-19 vaccine preparedness. One item assessed the pharmacy's stage of readiness to provide COVID-19 vaccines within the next 6 months, with responses ranging from 1 ("not planning on providing vaccines in the next 6 months" [precontemplation]) to 5 ("we are ready to provide vaccines in the next 6 months" [action]).[20] Pharmacists also reported the number and type of staff members who were authorized to administer the vaccine, the maximum number of vaccines they felt they could administer per day, available cold storage units, and plans for acquiring vaccines.

Pharmacists answered 1 item regarding whether they had received any previous COVID-19 vaccination training.

One vaccine hesitancy item taken from the World Health Organization measure of vaccine attitudes[21] assessed how much pharmacists wanted to get the vaccine ("not at all" [1] to "very much" [4]).

Data analysis

Analyses calculated descriptive statistics using IBM SPSS Statistics (v 25.0; IBM Corp, Armonk, NY). We explored associations among the maximum number of vaccines pharmacists thought they could administer per day and vaccine readiness, number of staff members authorized to administer the vaccine, vaccine attitudes, and demographic variables. We also examined associations between pharmacy and pharmacist characteristics and the vaccine attitudes item. Spearman correlations and chi-square tests were used, as appropriate, to explore associations; alpha was set at 0.05. To categorize and tally responses to the open-ended question to identify themes in these responses, coders used Microsoft Excel (Microsoft Corporation).[22]

Results

Sample characteristics

A total of 69 of 106 pharmacists completed the survey (response rate = 65%) (Table 1).

COVID-19 vaccine preparedness

Notably, 37 pharmacists (52%) reported their pharmacy would be ready to provide COVID-19 vaccines in the next 6 months (by June to August 2021), with 27 (39%) actively taking steps to provide the vaccine and only 3 (4%) not planning to offer the vaccine. A median of 2 staff members were authorized to administer COVID-19 vaccines, with 28 pharmacies (41%) having 3 or more authorized individuals. In addition to pharmacists, 11 pharmacies (16%) had interns and pharmacy students authorized to administer, whereas 5 (7%) had authorized technicians. Three pharmacies (4%) had registered nurses who assisted with vaccinations. Almost half of pharmacists (n = 33, 48%) estimated that the maximum number of vaccines their pharmacies would be able to administer daily was between 11 and 30, whereas 32 (46%) estimated they could administer more than 30 daily.

In terms of cold storage capacity, most pharmacies had standard refrigeration (between 2°C and 8°C) and freezer storage between −50°C and −15°C (n = 62, 90%, and n = 57, 83%, respectively). Three (4%) had dry ice storage. Most pharmacists planned to acquire COVID-19 vaccines through an agreement with a state or local public health entity (n = 33,

Table 1
Sample characteristics (n = 69)

Characteristic	n	%
Age (y)		
18–29	5	7
30–39	16	23
40–64	39	56
≥ 65	9	13
Gender		
Female	31	45
Male	36	52
Nonbinary or transgender	1	1
Prefer not to answer	1	1
Race		
Black	3	4
White	63	91
Prefer not to answer	3	4
Highest level of pharmacy education		
BSPharm	22	32
PharmD	44	64
Other (please specify)	1	1
Did not answer	2	3
Length of time worked in pharmacy practice		
0–3 y	4	6
4–11 y	9	13
≥ 12 y	56	81
Length of time worked at current pharmacy		
0–3 y	15	22
4–11 y	24	35
≥ 12 y	30	43
Type of pharmacy		
Single independent	37	54
Multiple independents (i.e., 2 or more stores under same ownership)	24	35
Grocery store or regional chain	6	9
National chain	2	3
Rurality[19]		
Large rural town (RUCA 4–6)	30	44
Small rural town (RUCA 7–9)	27	39
Isolated rural town (RUCA 10)	12	17

Abbreviation used: RUCA, rural-urban commuting area.
Note: Values are n (%).

48%) or by federal retail pharmacy program partners including group purchasing organizations such as the Community Pharmacy Enhanced Services Network (n = 32, 46%) and wholesalers (n = 23, 33%). Just 7 (10%) planned on a direct ordering mechanism through the Centers for Disease Control and Prevention, and 9 (13%) were unsure of how they would acquire COVID-19 vaccines.

Previous COVID-19 training

Only 16 pharmacists (23%) had received previous COVID-19 training.

Pharmacists' vaccine attitudes

Only 33 pharmacists (48%) wanted to get the vaccine "very much" and 16 (24%) "moderately" wanted the vaccine. Of the remaining pharmacists, 12 (18%) did not want to get the vaccine at all and 7 (10%) wanted to get the vaccine a little.

Correlations

Pharmacies in later stages of readiness to administer the vaccine ($r_{(69)} = 0.30$, $P = 0.01$) and that had more staff members who could administer the vaccine ($r_{(69)} = 0.33$, $P < 0.01$) anticipated being able to administer more vaccines. In addition, the anticipated number of daily vaccinations varied by pharmacy type ($\chi_{(16)} = 73.5$, $P < 0.001$), with 80% of grocery chain pharmacies reporting that they could administer more than 30 vaccines per day versus 50% or less for the other pharmacy types. Pharmacists with more positive vaccine attitudes ($r_{(69)} = 0.26$, $P = 0.03$) and who had previous COVID-19 vaccine training ($r_{(69)} = 0.31$, $P = 0.01$) anticipated being able to administer more vaccines.

Older pharmacists ($r_{(68)} = 0.28$, $P = 0.02$) and male pharmacists ($\chi_{(9)} = 18.4$, $P = 0.03$) had more positive vaccine attitudes.

Discussion

This study provides insight into the ability and preparedness of rural pharmacists in the Southern United States to administer COVID-19 vaccines. As of February 2021, most pharmacies in our sample were planning to administer COVID-19 vaccines, with many capable of administering more than 30 vaccines daily. Most pharmacists had the staff and cold storage units needed to administer vaccines. At the time the survey was administered, the Pfizer-BioNTech vaccine required ultracold storage and could only be refrigerated for 5 days. Since that time, refrigeration guidelines have changed significantly: Moderna and Pfizer-BioNTech vaccines can both now be stored for up to 30 days between 2°C and 8°C; close to 90% of pharmacies in our sample have this level of cold storage capability. Rural pharmacists were planning to use a variety of mechanisms for acquiring COVID-19 vaccines, including agreements with public health entities, federal retail pharmacy program partners, and ordering through wholesalers. These findings underscore that rural pharmacies were capable of providing COVID-19 vaccines and mitigating a general lack of health care resources in rural areas.[5,6] As of August 5, 2021, retail pharmacies have administered more than 108 million doses across the United States,[23] making pharmacies a major contributor to the vaccine rollout across the nation."[24]

Several variables were significantly associated with the anticipated number of COVID-19 vaccinations that rural pharmacies could administer daily. Unsurprisingly, pharmacies that were in later stages of readiness to administer the vaccine and that had more staff members who could administer the vaccine reported being able to administer a greater number of vaccines.[25] Interestingly, a greater percentage of grocery store chain pharmacies reported being able to administer 30 or more daily COVID-19 vaccines compared with other pharmacy types. Several grocery store chain pharmacies in our sample were involved very early with the federal retail pharmacy program, which may partially explain this result. In addition, pharmacists who had more positive vaccine attitudes and previous COVID-19 vaccine training reported being able to administer a greater number of vaccines. More qualitative investigation into the association between vaccine attitudes and vaccine administration is warranted—is it that pharmacists who are less hesitant are more likely to engage in

the process of acquiring and administering the vaccine at their pharmacy or does working at a pharmacy that is planning to administer large numbers of vaccines positively influence pharmacists' vaccine attitudes?

Fewer than 1 in 5 pharmacists had received COVID-19 vaccine training. Many COVID-19 trainings for pharmacists have been developed, including the American Pharmacists Association's Vaccine Confident website,[26] which contains materials such as example verbiage to address vaccine hesitancy. Because training was significantly associated with the anticipated maximum number of daily COVID-19 vaccinations a pharmacy could administer, it is especially important that rural pharmacists be able to easily access up-to-date relevant training materials.

At the time of survey administration, less than half of rural pharmacists "very much" wanted to get a COVID-19 vaccine, with younger pharmacists and women having more negative attitudes toward the vaccine, which is similar to what has been found in the general population.[25] This is important because a recommendation to vaccinate from a trusted provider is an effective intervention to increase vaccine uptake.[27] Pharmacists who are more confident in the vaccine may be more likely to recommend it, which could ultimately increase vaccine uptake in rural communities. In a previous survey conducted before the COVID-19 vaccine emergency use authorization, 67% of pharmacists were willing to receive a vaccine and 63% were willing to recommend the vaccine to patients at or less than 1 year from the time of vaccine approval.[28] Now that the Pfizer-BioNTech vaccine has received full Food and Drug Administration approval, levels of vaccine hesitancy may be lower. Nonetheless, interventions to address pharmacists' vaccine hesitancy may be worthwhile, because these pharmacists may hold similar concerns to those in their communities and could be trustworthy sources to address hesitancy concerns. Negative vaccine attitudes were also associated with the maximum number of daily COVID-19 vaccinations a pharmacy could administer; thus, additional research is warranted to explore what underlies pharmacists' attitudes toward COVID-19 vaccines.

Limitations

Using a sample of rural pharmacists in 5 southeastern states limits study generalizability. In addition, all pharmacists were part of a newly formed practice-based research network, so those pharmacists may be more likely to participate in research projects than the general population of pharmacies. Most of the pharmacists in our sample worked in independent pharmacies; pharmacists who work for chain pharmacies may have different opinions. There was also variability across states on when pharmacists were enrolled as providers to receive vaccines, either through their state or the federal retail pharmacy program, which could have affected pharmacists' perceived readiness to offer the vaccine. For example, community pharmacists in Arkansas were eligible providers as early as December 2020, whereas most independent community pharmacies in Mississippi did not start vaccinating until March or April. Pharmacists were also offered a nominal incentive of $25 to thank them for their time, but the incentive could have influenced who chose to participate. Finally, most surveys were completed in January 2021, and pharmacists' attitudes toward the vaccine could have changed significantly since that time. In addition, given that this was a cross-sectional survey, causal inferences cannot be made. Despite these limitations, this study still offers unique insights into rural pharmacists' ability and interest in administering COVID-19 vaccines.

Conclusion

Even early in the nation's COVID-19 vaccine rollout, many rural pharmacists were ready to administer COVID-19 vaccines. Pharmacists reported that their pharmacies had both adequate staffing and the cold storage necessary to administer the vaccine in their communities. However, few had received COVID-19 training and less than half reported strong positive attitudes to get the vaccine themselves. These findings suggest the rural pharmacists in our sample were well positioned to increase vaccine access in their communities but may need more information about the safety and efficacy of the vaccine to address their own vaccine hesitancy.

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