Examination of provider knowledge, attitudes, and behaviors associated with lung cancer screening among Black men receiving care at a federally qualified health center

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ABSTRACT

The study's goal was to look at providers' knowledge, attitudes, and behaviors regarding lung cancer screening among Black male smokers served by a federally qualified healthcare center. Participants in the study were interviewed in depth. Participants completed a short (5-10 minute) survey that assessed demographics, training, and attitudes toward lung cancer screening. For quantitative data, descriptive statistics were used, and for qualitative data, deductive thematic analysis was used. This study included ten healthcare professionals, the majority of whom identified as Black (80%) and were trained as advanced practice providers (60%). The majority of providers (90%) have heard of LDCT lung cancer screening; however, participants reported only being "somewhat" familiar with the LDCT eligibility criteria (70%). Despite generally positive attitudes toward LDCT, patient referral rates for screening were low. Barriers included a lack of provider knowledge about screening eligibility, a lack of use of shared decision-making tools, and patient concerns about screening risks. The reasons for the low referral rates varied, but they included a preference to refer patients for smoking cessation rather than screening, low screening completion and follow-up rates among referred patients, and a lower likelihood that Black smokers will meet pack-year requirements for screening. Additionally, providers discussed patient-level factors such as a lack of information, mistrust, and transportation. The study findings add to the body of knowledge about lung cancer knowledge and screening practices among providers in FQHC settings. This data can be used to create health promotion interventions aimed at smoking cessation and lung cancer screening in Black males and other high-risk smokers.

Introduction

Lung cancer is the leading cause of cancer-related deaths in the U.S. (Siegel et al., 2021; Siegel et al., 2019). Stark inequalities in lung cancer outcomes have been observed based on gender and race/ethnicity (Alexander et al., 2016; National Cancer Institute, 2018). Nationally, Black men have the highest lung cancer incidence and mortality rates (Siegel et al., 2017). Known as the Black smoker's paradox (Feigelman & Lee, 1995), lung cancer

incidence and mortality rates are 15% and 18% higher among Black men than among non-Hispanic White men (American Cancer Society, 2019) despite similarities in tobacco use. Further, Black individuals, regardless of gender, are more likely to develop lung cancer at a younger age (DeSantis et al., 2019) and to be diagnosed at a more advanced disease stage (DeSantis et al., 2019). Despite these well-known inequalities, interventions to narrow these disparities are limited (Prosper, Brown, Schussel, & Aberle, 2020; Watson et al., 2020).

Two large trials have demonstrated the benefits of low-dose CT (LDCT) lung cancer screening in reducing lung cancer mortality rates (De Koning, Van Der Aalst, Ten Haaf, & Oudkerk, 2018; National Lung Screening Trial Research Team, 2011). Additional sub-analyses of the National Lung Screening Trial (NLST) data found that Black smokers experienced the largest survival benefit (Tanner et al., 2015). This finding was replicated in an innovative secondary analysis of the NLST trial that used a synthetic sample to model the effects on lung cancer mortality among Black participants (Prosper et al., 2021). Both studies highlight the benefits of increasing LDCT screening among Black adult smokers.

The U.S. Preventive Services Task Force (USPSTF) recommends annual lung cancer screening among eligible smokers; however, uptake remains low (Pham et al., 2018). Historically, Black men have experienced barriers to cancer screening (Haddad et al., 2020), including fatalism (Prosper et al., 2020), low health literacy (Coughlin et al., 2014), poor access (Coughlin et al., 2014), and medical mistrust (Powell et al., 2019). Although gender-based differences have yet to be described, Black smokers face barriers to lung cancer screening. First, Black smokers are less likely to be eligible for screening based on existing guidelines (Aldrich et al., 2019). Specifically, Black smokers are less likely to meet smoking pack-year eligibility thresholds (Li et al., 2019) due to light or intermittent smoking (Rivera et al., 2020). However, research suggests that even when eligible, Black patients are less likely to receive screening following referral, with the lowest rates occurring among Black men (Lake et al., 2020). The cause of these disparities in receipt of screening has not been identified (Lake et al., 2020).

Healthcare providers can positively impact patients' cancer screening activities (Peterson et al., 2016) with direct recommendations by providers increasing initial and routine screening among patients (Martinez et al., 2022). However, barriers to provider-assisted lung cancer screening have been identified, including a lack of knowledge about screening guidelines, insurance coverage, and shared decision-making, to name a few (Zeliadt et al., 2018). Further, data suggest that providers are less likely to talk to Black patients than to White patients about lung cancer screening (Chalian et al., 2019) or refer them for screening (Japuntich et al., 2018). These findings suggest the importance of understanding the attitudes and behaviors of providers to develop interventions that reduce barriers to lung cancer screening. To address this gap in the literature, we examined the lung cancer screening knowledge, behaviors, and recommendations of healthcare providers serving low-income Black men in a federally qualified health center.

Materials and Methods

Study design

The data analyzed for this study were part of an ongoing study of lung health promotion among Black men. The study protocol and objectives for the complete study were previously described (Watson et al., 2020). The Exploration, Preparation, Implementation, and Sustainment (EPIS) framework (Aarons et al., 2011) guided the current phase of the research. The EPIS framework describes the implementation process and its outer contextual and inner organizational factors that influence changes in clinical practice settings (Moullin et al., 2019). Based on the EPIS framework, this study explored organizational factors affecting lung cancer screening implementation, particularly provider factors.

The study used a descriptive qualitative study design. Semi-structured interviews explored providers' knowledge, attitudes, and behaviors associated with lung cancer screening. Participants also completed a brief survey on demographic characteristics, training, and attitudes toward lung cancer screening to supplement qualitative findings. The study was conducted at a federally qualified healthcare center (FQHC) in Chicago, a large urban city in the Midwest of the United States. The FQHC includes six clinics across the city which serve over 299,000 residents (10% of Chicago's population). The FQHC patient population is primarily Black (74%), and 98% of patients live below the federal poverty level (Mile Square Health Center, 2020). Interviews were conducted from June to August 2022. The study was approved by the University of Illinois Chicago Institutional Review Board (IRB # 2021-1121).

Participants

A recruitment email was sent to all healthcare providers in the FQHC system. The inclusion criteria included being employed as a healthcare provider in one of the six FQHC clinics, working with adult primary care patients, and having a practice caseload inclusive of Black males. A total of ten providers met the eligibility criteria and consented to participate.

Data Collection Procedures

Two trained research staff performed semi-structured interviews via Zoom. First, participants completed informed consent and a 30-item survey using an online data collection platform. The survey covered the providers' de-

mographic characteristics and clinical training, with questions measuring knowledge of and attitudes toward lung cancer screening. Survey items were adapted from prior research (Ersek et al., 2016; National Cancer Institute, 2006). A separate meeting time was scheduled to conduct the 45-minute zoom interview.

An interview guide was developed based on the literature describing lung cancer screening in clinical practice settings (Kota et al., 2022; Lin et al., 2022; Rodríguez-Rabassa et al., 2020). The guide covered awareness and knowledge of lung cancer screening, practice behaviors, patient barriers to screening, and recommendations for increasing screening. For example, questions such as: "Tell me about your medical establishment's lung cancer screening practices" and "When discussing lung cancer screening with your Black patients, what things do you consider?" were included. The interviews were audio-recorded and transcribed verbatim, and the transcripts were reviewed for accuracy by a trained research assistant. All participants received a $100 gift card upon completing the interviews.

Data analysis

Qualitative interview data were analyzed using deductive thematic analysis (Patton, 1990), which involves approaching the data analysis with predetermined themes and categories. Predetermined codes were identified (e.g., knowledge, screening referral patterns, barriers to referral) based on the interview guide, aligning with primary study inquiry areas. Data not captured by the predetermined codes were analyzed as additional codes. The primary author and a trained research assistant coded the initial interview transcripts. Then, the coded data were reviewed by two other co-authors (RJ and SK). The study authors organized the codes into themes using an iterative process, discussing and documenting analytic decisions. Thematic saturation was determined when successive interviews and data analysis consistently revealed redundant themes without introducing new significant insights. Thematic saturation was corroborated through regular comparison and reflection on existing themes, supported by the collective judgment of the research team (Morse, 2015; Patton, 1990). Additionally, descriptive statistics were used to summarize survey results.

Quantitative results

Of the ten study participants, eight were African American, six held advanced practice degrees, and nine worked in family medicine (Table 1). Provider lung cancer screening knowledge and attitudes are summarized in Table 2. Most providers knew of LDCT screening, but familiarity with eligibility criteria was limited. Providers expressed concerns about patient anxiety, radiation exposure, and unnecessary diagnostic procedures; however, most felt that the benefits outweighed the risks. Nevertheless, referral of patients for screening was low.

Qualitative results

Table 3 includes a summary of qualitative findings. Below, we describe primary themes and subthemes with illustrative quotations, as appropriate. Participants' identification numbers follow each quote.

Provider awareness of and knowledge about lung cancer screening

Familiarity with screening guidelines

Most providers reported limited familiarity with screening guidelines due to their clinical practice, for example: "I've done more urgent care than primary care. So, I'm not a familiar with the guidelines" (7). Other providers reported being partially familiar with eligibility criteria. As one participant described, they knew the eligibility guidelines had changed; however, they were unfamiliar with the criteria: "It used to be 55 to 70, I believe, with a 30-year pack history. I think they have lowered the age to 50 to 70" (2). These findings are consistent with the literature on provider awareness of screening guidelines (Lewis et al., 2019).

Alternatively, a few providers reported knowledge about LDCT and understood screening eligibility. Further, they could describe the benefits of recently revised guidelines for increasing the eligibility of lower-frequency smokers, as demonstrated by a provider who said, "I do know that they recently dropped the threshold [pack-year eligibility], which catches a lot more people that way" (4). Another provider specifically noted the benefits of the revised guidelines for Black patients: "I thought that it should be lowered to capture patients who are at risk, particularly African American patients" (2). These responses suggested that providers were aware of the racial/ethnic

Table 1. Characteristics of the participants (N=10).

Characteristics	N
Race	
Black or African-American	7
Native Hawaiian or other Pacific Islander	2
White	1
Ethnicity	
Hispanic or Latino	1
Not Hispanic or Latino	9
Current rank	
Attending Physician	2
Advance Practice Provider (PA/ARNP)	6
Other	2
Specialty	
Family Medicine	9
Other	1
Primary outpatient clinic locations	
Community FQHC	6
School-Based Clinic	1
Other	3

disparities in meeting eligibility for lung cancer screening based on the original guidelines (Li et al., 2019).

Awareness of the benefits of LDCT

Most providers were aware of the benefits of LDCT compared to conventional screening methods. One provider highlighted the increased likelihood of detecting small tumors: "Low-dose CT will detect it [a tumor] sooner than an x-ray" (7)." Still, others noted the lowered radiation exposure: "It [LDCT] uses less radiation than conventional CAT scans" (8) and improved imaging with LDCT: "I would say that the LDCT gives a better picture, so it's a step up from an x-ray" (10).

Table 2. Participants' Knowledge and attitudes toward lung cancer screening (N=10).

	N
Ever heard of LDCT lung cancer screening?	
Yes	9
No	1
How familiar are you with the eligibility criteria for LDCT?	
Very	2
Somewhat	7
Not at all	1
How effective do you believe the screening procedures listed below are in reducing lung cancer mortality for Current Smokers?	
1. *Chest X-ray*	
Very effective	1
Somewhat effective	6
Not effective	2
Don't know	1
2. *Sputum Cytology*	
Very effective	0
Somewhat effective	4
Not effective	4
Don't know	2
3. *Low radiation dose spiral CT*	
Very effective	6
Somewhat effective	1
Not effective	0
Don't know	3
During the past 12 months, did any of your patients ask if they can or should be screened for lung cancer?	
Yes	4
No	6
How many patients asked if they should be screened for lung cancer?	
0 - 1	7
2 - 3	0
4 - 5	3
How often should LDCT screening be performed for high-risk patients?	
Every year	10
Does Medicare/Medicaid cover the cost of LDCT screening?	
Yes	8
No	0
Not sure	2
Perceived benefits of LDCT screening	
Reduces lung cancer mortality.	9
It increases the chances of finding lung cancer at an earlier stage	9
Perceived risks of LDCT screening	
Positive screening rarely results in a lung cancer diagnosis	1
Psychological stress or anxiety for the patient	9
It may lead to unnecessary diagnostic procedures	5
Exposure to radiation increases cancer risk	6

	N
Best practice style concerning LDCT screening	
1. I recommend screening to patients without discussion of risks and benefits	1
2. I discuss risks and benefits and then recommend screening	5
3. I discuss risks and benefits and then let the patients decide whether to be screened	3
5. I do not discuss risks and benefits or recommend screening	1
How often do you discuss the risks and benefits of LDCT screening with patients at high risk for lung cancer?	
Always	3
Frequently	4
Sometimes	0
Infrequently	1
Never	2
What is the number of patients who were referred for LDCT screening in the last 12 months?	
1	5
2-4	1
5-0	3
>10	1
If a patient recommended for LDCT screening initially declines, I still encourage him/her to get screened.	
Agree	10
The benefits of LDCT screening outweigh the risks for patients at high risk for lung cancer.	
Strongly agree	7
Agree	3
If cost were not an issue, I would recommend LDCT screening to my patients at high risk for lung cancer.	
Strongly agree	8
Agree	1
Neutral	1
Disagree	0
Strongly disagree	0
The rate of false positives for LDCT is too high.	
Strongly agree	0
Agree	1
Neutral	7
Disagree	1
Strongly disagree	1
LDCT creates enough anxiety to negate the value of screening.	
Strongly agree	0
Agree	0
Neutral	2
Disagree	6
Strongly disagree	2
The scientific evidence is strong enough to warrant a screening guideline for high-risk patients.	
Strongly agree	5
Agree	3
Neutral	2
Disagree	0
Strongly disagree	0

Table 3. Summary of qualitative findings.

Main themes	Subthemes	Qualitative findings	Quotations
1. Provider awareness of and knowledge about lung cancer screening	1.1 Familiarity with lung cancer screening guidelines	Mixed levels of familiarity with lung cancer screening guidelines were mentioned	"I've done more urgent care than primary care. So, I'm not a familiar with the guidelines and recommendations." (7)
	1.2 Knowledge of LDCT	A few reported knowledge of LDCT and an understanding of the current screening eligibility criteria	"I do know that they recently dropped the threshold. The U.S. Preventative Services Taskforce dropped the threshold [pack-year eligibility], which catches a lot more people that way." (4)
	1.3 Awareness of the benefits of LDCT	More awareness of the benefits of LDCT compared to conventional lung cancer screening methods	"Low-dose CT will detect it [a tumor] sooner than an x-ray. That's just my thought process from what I was reading and then from what I see." (7)
2. Practice behaviors related to lung cancer screening	2.1 Knowledge about lung cancer screening resources	Some participants knew about the lung cancer screening program and referred their patients for screening	"I know that at the hospital, pulmonology department, there is a lung cancer screening program which is where we're referring to, we refer patients to, and that's how I came to know about low-dose CT screening for patients." (2)
	2.2 Referring patients for lung cancer screening	Low rates of referring their patients for LDCT lung cancer screening were reported. Also, rates of provider-initiated referrals for lung cancer screening were low	"In my experience, about five to 10 percent [of patients have asked about screening]." (5) "I can, but I honestly, have not. I'm not gonna lie to you. I go towards smoking cessation more often than I would think about lung cancer screening." (3)
	2.3 Discussing LDCT with patients who smoke	Started timing for discussion, and the factors that influenced the timing of screening discussions were reported	"I typically go over their history, where I ask about any history of cancers, in general… their smoking history…and depending on their age, I will go ahead and do the pack-year history and kinda get a sense of if they are eligible for the low-dose CT scanning. I do the pack per year history but save the discussion about low-dose CT scanning until the end of the visit." (2) "During my initial assessment, if I'm doing – especially if I'm doing an annual physical – I inquire about smoking. And my nurse puts it in their chart that they're current smokers, so that's part of the triage process, those questions are raised." (10)
	2.4 Shared Decision-Making	A few participants reported using a standardized decision aid with their patients; however, other methods were provided, such as educational materials from the electronic health record (Epic)	"So, most of it is done via conversations, not necessarily like specific materials." (4) "Well, we have a screening tool in Epic." (8)
3. Patient receptivity toward lung cancer screening	3.1 Differences in screening receptivity	Screening receptivity differed between current smokers and those who had quit, but were still eligible for LDCT screening	"I think that current smokers tend to do the screening a little bit more than former smokers." (10)
	3.2 Factors influencing patient receptivity to the screen	Several factors were reported as influencers of receptivity to lung cancer screening	"I would say for Black patients, it is a lack of information. I feel like that's probably the biggest thing and trying to empower them with information and understanding to overcome their preconceived notions." (3)
	3.3. Additional barriers to screening	Less likely that Black males scheduled appointments for preventive healthcare services	"They'll come in when there's an issue or problem. So, that's when we have to grab more screening opportunities." (7)
		The lung cancer screening center is far from the clinic and their patients' residential areas	"Our clinic is not close to the main hospital, so that is kind of the barrier. However, for someone that is interested, we can surely put it in, and they will have to go to the main hospital, which is about 20 to 30 miles from the clinic." (5)

To be continued on next page

Table 3. Continued from previous page.

Main themes	Subthemes	Qualitative findings	Quotations
		Work schedules affected their patients' decision to get lung cancer screening	"Patients having to take time off of work, which is a giant hassle a lot of times and a lot of my patients can't really afford to miss work, depending on the job and stuff like that." (4)
4. Recommendations for improving lung cancer screening	4.1 Determining patient eligibility for lung cancer screening	All healthcare providers should be involved in assessing patient eligibility and counseling patients about the screening	"I think all providers…. I think all providers should know of the guidelines for smoking." (1)
	4.2 Framing patient discussions about screening	Providers should discuss straightforward smoking and the risks of lung cancer and emphasize early detection and increasing survival rates	"If I think you're at high enough risk, then screening you is important because if we catch something early, that may help you live." (8)
	4.3 Timing of screening discussion	Providers should address LCDT screening at every visit, and patients should be exposed to screening information before their scheduled appointments	"But yeah, given my barriers in discussing the low dose CT, I think that starting somewhere before the visit so that it's on the patient's mind, and they're thinking about it would be incredibly helpful for me in the small amount of time that I have with the patient." (4)
	4.4 Use of shared decision-making tools	Although the Agency for Health Research Quality (AHRQ) lung cancer screening shared decision-making material was helpful, the document needed to be simplified and shortened for patients	"I mean it looks super thorough. I mean it does a good job of covering everything." (4) "There are so many things that we're screening for that it's hard when the material has too much information." (6)
	4.5 Increasing education and awareness	Patients should receive more information regarding smoking risks for lung cancer and cancer screening	"I think that there should be more available information about risks associated with smoking and developing lung cancer…" (2) "You know how the studies have shown that people who are detected at an earlier state with low-dose CT have a longer quality of life by X amount of years or have a higher survivability rate? I think that's helpful for patients to equate the reason why they need to do and what the outcome can be." (7)
	4.6 Addressing culturally specific factors	Providers should be aware of issues related to trust and the history of racism in healthcare. Also, the educational materials should be developed explicitly for Black male patients	"I don't want people to feel like they're being brushed off as they historically have been. So, I want people to feel like they're getting the best care that they can. So, some people wanna feel that, that this is the standard, and you should get, it too." (6) "But also including pictures of African Americans in it. So, it's important to include the population we're trying to help because that's what they're gonna see. Like, 'Oh yeah, this connects to me.' " (9)

Practice behaviors related to lung cancer screening

Subthemes associated with practice behaviors included knowledge about screening resources, referral rates, discussing screening with patients, and shared decision-making.

Knowledge of screening resources

Several participants were aware of the lung cancer screening program at the hospital system affiliated with the FQHC. For example, Provider 2 noted, "I know there is a lung cancer screening program in the pulmonology department which is where I refer." Other participants were aware of the lung screening program, but had not referred any patients: "I haven't had to order it. But I'm sure that they do" (7). And others reported being unaware of specific protocols due to repeated changes, for example: "We've gone from this thing to this thing to this thing. So, I don't know what's going on now" (8).

Patient referrals

Providers estimated that less than 10% of their smoking patients have inquired about lung cancer screening. As one provider stated, "In my experience, about five to 10% [have asked about screening]" (5). Another provider stated that none of their patients had inquired: "None. Patients don't ask too much about it" (7). Provider-initiated referrals for lung cancer screening were also low. The rationale for the low levels of referrals varied and included a preference for smoking cessation: "I'm not gonna lie to you. I go towards smoking cessation more often than lung cancer screening" (3). Providers noted additional barriers, including low follow-up rates among referred patients, for example: "A little over half get referred. And then out of that, I'd say 10% of them will follow through" (4). Further, they reported the decreased likelihood that Black smokers will meet pack-year requirements: "Now that they've lowered the pack-year history, I will probably have an increase in screening [referrals]" (2).

Discussing LDCT with patients

Although not a routine part of their practice, providers described approaches for discussing screening with patients. Many providers start by assessing smoking history, age, and pack-years. If patients are eligible, providers indicate they initiate a discussion about screening. The following quote illustrates this perspective: "I typically go over their history. I do the pack-per-year history, but save the discussion about screening until the end of the visit" (2).

Several factors influence the timing of screening discussions. Some providers discussed screening at every visit, for instance: "Every time they come in, it's always the chance to assess smoking. I recommend smoking cessation and screening" (5). Others initiated discussions after determining a patient is eligible: "So, the majority of my patients are African American, and so, if I find that they meet the criteria for screening, I bring it up" (2). Other providers indicated that they discuss screening during annual exams, "If I'm doing an annual physical, I inquire about smoking" (10). Additionally, the development of physical symptoms led to discussions: "When someone who smokes and has bad symptoms, then I'll pull for them to get screening" (5).

Shared decision-making

The Centers for Medicare and Medicaid Services (CMS) require shared decision-making before patient screening (Centers for Medicare & Medicaid Services, 2015). Few providers interviewed reported using a standardized decision aid with their patients. Instead, they verbally discussed screening. Provider 4, for example, said "So, most of it is done via conversations, not necessarily like specific materials." Others reported using a template created by a colleague, "So, it's a template that I had that the nurse practitioner developed, so that's what I use" (2). Finally, they reported giving patients educational materials from the electronic health record: "Well, we have a screening tool in Epic" (8). These results suggest the need for protocols to increase shared decision-making about lung cancer screening.

During the interview, providers were provided with a copy of the Agency for Health Research Quality (AHRQ) lung cancer screening shared decision-making material and asked to comment on the documents. Generally, providers felt that the material was easy to understand, covered all the content that patients should know, including eligibility for screening, and helped with individual decision-making. Provider 7, for example, stated,

> So, I haven't seen any of those forms. This is helpful. It helps to drive the conversation. I would utilize any decision-making tools to show a patient and present it so that they can totally understand the benefits of what this testing is for.

Although providers felt the materials were helpful, they also expressed concerns such as feeling that the document needed to be simplified and shortened for patients. Further, they felt that the emphasis on the harms of screening could scare patients and reduce their willingness to screen. As Provider 4 explained, "My concern would be that with the discussion of the harms is pretty big, and I think that might scare people away from it." Providers also raised concerns about the time required to cover the material with patients during a clinical encounter: "There are so many things that we're screening for that it's hard when the material has too much information" (6). As such, they suggested that patients should be given the information before visiting their providers, since there was limited time for each visit. Provider 8, for example, said,

> It would be good if this could be something like the nurse could give it to the patient when they're doing the intake. The patient could read it over, fill out whatever they need to do, and then we could go over the form in brief instead of trying to administer it during a visit.

Patient receptivity toward lung cancer screening

Providers reported that patient responses to screening recommendations were mixed and related to several factors discussed below.

Differences in screening receptivity

First, providers noted differences in screening receptivity based on smoking status, reporting that current smokers were more likely to accept a referral for screening than those who had quit smoking. For example, one provider stated, "So, those who are not actively smoking do kinda feel like they don't need to do the screening" (1). In addition, another provider noted that many current smokers were receptive to screening: "So, I haven't had

people be vehemently against having the low-dose CT scan when I bring it up. They are willing to do it" (2).

Factors influencing patient receptivity to be screened

Beyond smoking status, knowledge was indicated as necessary to receptivity, as stated by Provider 3: "I would say for Black patients, it is a lack of information. I feel like that's probably the biggest thing and trying to empower them with information and understanding to overcome their preconceived notions." In terms of information, many providers recognized the importance of hearing about screening from a trusted source, for example: "They're a bit more receptive [when hearing about it from a trusted source] because I think when they don't understand, they look to somebody that they trust to help them receive more information" (7). The normalization of screening was also reported as a factor influencing patient receptivity: "Anybody, but especially Black patients, I would present it just like you get a pap smear. All smokers are at risk for lung cancer. So, you wanna get that screening" (6). Finally, some providers noted that personalizing the discussion increases receptivity to screening referrals, for example: "I typically will try to relate it in another way, whether it's something that is related to me or related to another patient or a family member, or just someone else that I know. So, I think it can be helpful" (8).

Additional patient-level barriers to screening

Providers identified several patient-level barriers to lung cancer screening, noting, for example, the reduced likelihood of Black men receiving preventive healthcare services. As such, they reported having fewer opportunities to talk with these patients about screening, as exemplified by Provider 7: "They'll come in when there's an issue or problem. So, that's when we have to grab more screening opportunities." The absence of reliable transportation was described as an additional barrier. For example, Participant 5 stated, "Our clinic is not close to the main hospital, so that is kind of the barrier." Finally, work schedules were viewed as a potential barrier to screening, as patients are hesitant to take time off work for screening: "Patients having to take time off of work, which is a giant hassle a lot of times, and a lot of my patients can't afford to miss work" (4).

Recommendations for improving lung cancer screening

Study participants discussed several issues that have implications for improving lung cancer screening activities in an FQHC setting, as follows.

Determining patient eligibility for lung cancer screening

Most participants indicated that all healthcare providers should be involved in assessing patient eligibility and counseling patients regarding screening, for instance, "I think all providers, I think all providers should know of the guidelines for smoking" (1). In addition, providers felt that a team-based approach was needed to increase screening rates as noted, for example, by Provider 10: "I think it's the medical providers, the nurses, the front desk staff, and the back-end staff."

Framing patient discussions about screening

In discussions with patients, participants described the importance of frank discussions. For example, one provider stated, "Given that you've been smoking for this long and you're at this age, we need to do it to ensure there is no cancer. That's what I say" (1). An additional strategy is to emphasize increasing survival rates as part of the discussion: "Screening is important because if we catch something early, that may help you live" (8).

Timing of screening discussion

Next, providers indicated that screening should be addressed at every visit as part of general health promotion; however, due to time constraints, providers felt patients should be educated before their scheduled appointments. As Provider 4 stated, "I think that starting somewhere before the visit so that it's on the patient's mind and it would be incredibly helpful for me in the small amount of time that I have with the patient."

Increasing education and awareness

Providers indicated that their patients were less likely to be concerned about the risks of lung cancer. As such, they felt patients should receive information that addresses risk and is easy to understand. One provider indicated, "I think there should be more information about risks associated with smoking and developing lung cancer" (2). Further, patients should be provided with information that screening for lung cancer has positive benefits, including earlier detection of lung cancer, improved quality of life, and increased survivability rate: "I think that's helpful for patients to equate the reason why they need to do [screening] and what the outcome can be [early detection]" (7). Additionally, providers noted that increasing knowledge about smoking-related illnesses could help smokers to reduce smoke consumption. Moreover, participants felt that they should be responsible for educating their patients about smoking-related health risks at every visit, and support staff was viewed as essential in helping educate patients about smoking and smoking cessation resources. As one participant noted, "I think with more education and also as a provider, if we're able to focus on this with every visit" (5).

Addressing culturally specific factors

Given the history of racism in healthcare settings, Black patients' trust levels can be lower than other groups of patients (Idan et al., 2020), and research suggests that

higher levels of mistrust are associated with reduced cancer screening activities (Rogers et al., 2022). Providers in the current study, concurred, pointing to mistrust as a potential barrier to lung cancer screening. As Provider 1 put it, "African Americans are not very trusting of the medical community in general." Consequently, one provider indicated the importance of being aware of issues related to trust and the history of racism in healthcare and assuring patients that they receive standard, evidence-based care: "I don't want people to feel like they're being brushed off as they historically have been. So, I want people to feel like they're getting the best care possible" (6) The same provider said, "I think they should know this is the standard. Sometimes, patients, particularly Black patients, feel like the medical system is trying to trick them. I told them this is the standard, and here is some information."

To overcome mistrust, providers felt that educational materials should be developed explicitly for Black male patients. Many providers felt that to be maximally effective, educational materials should describe higher rates of lung cancer among Black men, the mortality rates associated with advanced lung cancer, and the benefits of lung cancer screening for early detection: "I think they should know how many African Americans are dying from lung cancer…. They should know the reasons why they're dying from lung cancer and for it to not just say cigarettes" (1). Further, they suggested using pictures of Black men to increase saliency, for instance, "Include pictures of African Americans in it so they're gonna see, 'Oh yeah, this connects to me'" (9).

Discussion

The primary study's purpose was to examine lung cancer screening knowledge, behaviors, and recommendations of healthcare providers serving low-income Black men in an FQHC setting. As described in the EPIS framework (Aarons et al., 2011), provider attitudes and behaviors are essential to implementing new clinical recommendations. This study's results shed light on the knowledge and awareness gaps among healthcare providers regarding LDCT lung cancer screening. For example, while providers demonstrated a general awareness of its benefits for high-risk smokers, deficiencies were observed in understanding eligibility criteria, shared decision-making approaches, and referral processes. These findings align with existing literature suggesting relatively limited training among providers related to LDCT (Lewis et al., 2019).

Further, findings suggest the need for targeted training and educational interventions to enhance provider knowledge and promote effective implementation of LDCT lung cancer screening programs in underserved communities. Incorporating structured training on LDCT screening guidelines, how to assess for eligibility, and fostering effective communication about LDCT can empower healthcare providers to better inform and guide their low-income Black male patients toward appropriate lung cancer screening. Additionally, future research should focus on evaluating the impact of enhanced training initiatives on provider practices and patient outcomes in this demographic.

Regarding practice behaviors, our results highlight a concerning discrepancy between positive patient attitudes toward lung cancer screening and the low referral rates observed in practice. Despite providers expressing a favorable outlook on screening, various factors, such as limited provider knowledge about guidelines and referral procedures, contribute to these low rates. The findings underscore a critical need for educational efforts and resource allocation to facilitate the effective implementation of national guidelines on shared decision-making and lung cancer screening criteria within community healthcare settings. Moreover, providers' concerns about potential patient distress and unnecessary procedures emphasize the necessity for comprehensive patient education and support strategies to address these apprehensions and ultimately enhance referral behaviors for lung cancer screening. Future interventions should address these barriers to ensure increased uptake of lung cancer screening and improved outcomes for at-risk individuals.

Consistent with the extant literature (Kota et al., 2022), providers identified several patient-level barriers to LDCT including cost, insurance coverage, and lack of patient awareness. Additionally, the literature documents racial/ethnic differences in screening completion rates following referral (Haddad et al., 2020; Lake et al., 2020). In our study, providers identified additional patient related barriers including limited receptivity, poor knowledge, and medical mistrust. The CMS requires counseling and shared decision-making visits before LDCT referrals (Centers for Medicare & Medicaid Services, 2015) which may serve to overcome some identified barriers such as knowledge gaps. Our findings also showed that the providers do not utilize available shared decision-making tools with high-risk patients. Combined, these barriers to LDCT suggest the need for provider, patient, and system-level interventions to assist providers in improving lung cancer screening rates among Black males and other high-risk smokers.

Implications and recommendations

Smoking rates are elevated among lower-income Black men (National Cancer Institute, 2018), and providers in FQHC settings are essential for improving lung health promotion. The EPIS framework (Aarons et al., 2011) has been used to guide implementation research, and providers in this study described several factors related to the inner context (i.e., lack of training and referral systems) that have implications for increasing screening uptake. First, healthcare professionals must be thoroughly trained on the eligibility criteria for LDCT lung cancer screening and protocols for identifying potentially eligible

patients. Provider training should describe eligibility criteria, including ages 50 to 80, the absence of lung cancer symptoms, a 20-year smoking pack-year history, and if a former smoker has quit within the past 15 years.

Although the assessment of smoking status is a requirement in all FQHC settings, numerous studies have described inconsistencies in the documentation of smoking history (Groenhof et al., 2020), including insufficient data to calculate pack-years (Peterson et al., 2021). Solutions to improving the availability of accurate pack-year history include enhanced training of staff and providers to collect smoking history and the development of functions within electronic health records that automate the calculation of pack-years by inserting data on daily cigarettes smoked and the number of years smoked. Similar to the progress made with breast cancer screening (Qureshi et al., 2021), these quality improvement recommendations create opportunities for flagging and proactive outreach to eligible patients.

CMS requires counseling and shared decision-making visits before ordering an LDCT scan (Centers for Medicare & Medicaid Services, 2015). During this visit, providers must determine patient eligibility, engage in shared decision-making, reinforce the importance of adherence to screening, and provide smoking cessation counseling (if applicable). Shared decision-making should include using a decision aid that covers the benefits and harms of screening, follow-up diagnostic testing, overdiagnosis, false-positive rate, and total radiation exposure (Centers for Medicare & Medicaid Services, 2015). The data from the current study suggest that healthcare professionals do not routinely utilize available shared decision-making tools with patients. Given the importance of shared decision-making, interventions are needed to distribute and educate providers on shared decision-making guides and counseling approaches. Further, systems-level interventions targeting primary healthcare settings such as FQHCs are needed to improve data collection around accurate risk assessment and to assist referrals for screening and follow-up.

Many FQHCs lack radiographic equipment to conduct screenings. As such, patient referral procedures need to be developed and understood by providers. Ensuring equity in referral patterns is also critical to the training of providers. Emerging literature on lung cancer screening has identified racial/ethnic differences in screening referral rates and completion (Haddad et al., 2020; Lake et al., 2020), and providers interviewed for this study reported low screening referral rates of Black patients. Barriers discussed included low referral acceptance and completion rates among patients referred for screening. Specific factors contributing to barriers to provider referral and patient follow-through have yet to be described. Additional research is needed to understand better the factors associated with these findings and the development of interventions to eliminate disparities.

Finally, providers discussed the need for educational materials and shared decision-making tools that address the needs of Black men. Recommendations were made by providers that can inform the development of educational materials. Many providers felt educational materials should be tailored to Black men (i.e., pictures and statistics). Further, they indicated that the materials should be easy to understand and emphasize the benefits of screening, including increased survivability rates.

Limitations

Although appropriate for qualitative studies, our study included a small sample of providers from a single FQHC in a single geographical location. Generalizability is not a goal of qualitative research; however, healthcare providers working in other locations may have other experiences germane to screening among Black men. As such, the study should be replicated with more providers from differing FQHC settings. Finally, limited information was collected about the providers' training, which may influence knowledge and behaviors.

Conclusions

This study provides insight into healthcare professionals' attitudes, behaviors, and beliefs concerning lung cancer screening. While many studies examine patients' attitudes and knowledge and barriers to lung cancer screening, healthcare providers influence how patients' lung cancer risk factors are screened and documented and how screening referrals are made. Our study highlights the importance of enhanced provider education and training regarding screening and the development of clinic-level guidelines and patient materials to ensure the delivery of guideline-concordant care among Black men who smoke.

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