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RESEARCH ARTICLE

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Factors influencing health and safety practices among Vietnamese nail salon technicians and owners: A qualitative study

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Objective: This qualitative study explored factors that influence health and safety practices among Vietnamese nail salon technicians and owners.

Methods: We conducted semi-structured focus group discussions and individual interviews with a sample of 17 Vietnamese nail salon technicians and owners in the Philadelphia metropolitan area, Pennsylvania.

Results: Analysis of transcripts revealed perceived health benefits/concerns, knowledge about work-related hazards, salon's management and policies attributed to owners, client influence, external policies/regulations, and protective equipment-specific challenges were among factors affecting workplace health promotion practices at the salons.

Conclusions: The study highlighted a complex interplay among the various stakeholders including nail technicians, owners, clients, policy makers, and enforcers. Interventions addressing barriers at the personal and organizational levels, as well as public policy change and enforcement are needed to create sustainable behavioral and organizational change in nail salons.

KEYWORDS
health disparities, multilevel interventions, nail salon workers, occupational health

1 | INTRODUCTION

The nail salon industry has experienced rapid growth within the last 20 years, seeing an increase of over 300% in the number of both nail salons and technicians.[1] Nationally, the population of licensed technicians has grown to over 430 000, and remains predominately comprised of females of reproductive age.[2] The average annual wage for a salon worker is estimated at $24 330[3] and many tend to work long hours and are responsible for over half of their household's income.[2] Many nail technicians also do not have basic health care coverage.[4] Over half of nail salon workers identify as Vietnamese in the United States (US),[2] a significant increase from only 10% in 1987.[5,6] Vietnamese immigrants have been able to occupy a major portion of the industry workforce because of limited training requirements, the ability to work without English fluency, and gaps in legislation and regulation.[4,5,7] Many nail salon employees, facing economic pressures to continue working, end up compromising their overall health.[8]

Nail salon workers encounter multiple hazards at the salons including chemicals, ergonomic hazards, and potential infectious diseases transmission from clients. Workers are exposed to hazardous chemicals, such as toluene, formaldehyde, and dibutyl phthalate[1,7,9–14] that are abundantly found in nail products. The long-term effects of these chemicals have been associated with risk of reproductive and cognitive development harm, cancer, allergies, and irritation to the

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respiratory, dermatological, and central nervous systems in other settings.[7,11,14–20] While chronic adverse health effects such as pregnancy complications, poor birth outcomes or cancers among nail salon workers remain uncertain,[21,22] acute health symptoms such as dermal and respiratory irritations and musculoskeletal pains, have been consistently reported in several studies.[7,11,14] In the literature, most studies of salons focus on exposure assessment of chemicals such as toluene, ethyl acetate, isopropyl acetate, methyl methacrylate,[12,23] indoor air quality,[12,24,25] and health outcomes.[11,14,21,22] Qualitative studies that explore facilitators and barriers to adoption of occupational health best practices in immigrant-owned nail salons are lacking. To our knowledge, there is only one qualitative study conducted in California with Vietnamese nail salon workers and owners that identified the role of key stakeholders, such as workers, owners, consumers, and governmental regulators, in promoting worker health.[26]

Philadelphia, Pennsylvania is home to approximately 16 682 Vietnamese-Americans, which is the 9th largest Vietnamese population among US cities.[27] There are about 396 salons in Philadelphia county, of which close to half are owned by Vietnamese owners.[28] The Pennsylvania State Board of Cosmetology regulates the practice and licensure of nail technicians, nail salons, teachers of nail technicians, and training schools and apprentice programs.[28] Requirements to become a licensed nail technician is minimal, which include a minimum educational level equivalent to 10th grade, 200 h of training at a licensed cosmetology school and an exam. The Board also prescribes management of nail salons including physical space and health and safety practices such as sanitation and sterilization of equipment,[29] largely designed to protect the customers not workers. Nail salons in Philadelphia must meet building codes in accordance with the International Building Code,[30] which in this case would require a source capture system (also known as local exhaust ventilation [LEV]) at each table.[31] However, many salons in Philadelphia do not have these systems. The Philadelphia Department of Public Health Environmental Health Services Division may also inspect and fine salons for sanitation violations. The Air Management Services regulates local and federal air quality standards for the city but it does not regulate air quality in nail salons.[32] Fragmented local regulations and the lack of safe nail products regulations at the federal level[4] lead to potentially unsafe exposures to chemicals and other hazards to nail salon workers. To our knowledge, there are no health promotion programs to assist nail salons workers in the Philadelphia metropolitan area.

This qualitative study is part of a larger needs assessment project. The purpose of the qualitative component of the assessment is to identify personal and environmental factors that influence health protective work practices among Vietnamese nail salon technicians and owners in the Philadelphia metropolitan area. Results from this study, along with findings from a literature review and insights from a community advisory board, will be used to develop a multilevel occupational health intervention program for nail salon workers and owners.

2 | METHODS

2.1 | Participant recruitment and study procedures

We recruited Vietnamese nail salon technicians and owners in the Philadelphia metropolitan area using a snowball sampling approach, due to the fact that this is a hard-to-reach and vulnerable population.[33] We initially tried cold calling without success and quickly learned from other nail technicians that referrals from former/current co-workers, friends, and relatives was needed to reach this population. Part-time and full-time nail technicians and owners (including former nail technicians) between the ages of 18 and 65 years were recruited to join the study between September 2016 and April 2017.

We sent a detailed informed consent document in either English or Vietnamese (whichever language was indicated as preferred) in advance to participants who were willing to provide their contact information to us. Not all participants provided their contact information to the research team in advance. Some preferred to meet the team at a specified location. Prior to the start of each interview/focus group, we orally went through the consent form, provided participants with information regarding the purpose of the study, procedure of the interview/focus group, permission to audio record, plan to protect anonymity and confidentiality, and voluntary participation. Each interview and focus group lasted approximately 30-45 min. Participants were offered a $20 gift card as compensation for their time. We provided participants a copy of the consent form to keep at the end of the session. The research protocol was reviewed and approved by the Institutional Review Board at Drexel University. Verbal informed consent was sought for each participant; signed written informed consent was waived because it would be the only record that linked participants to the study.

2.2 | Data collection

In this formative study, we employed both focus group discussion and one-on-one interview methods in order to accommodate participants' schedules and preference. We organized two focus group discussions with nail technicians. We met one group of young female technicians ($N = 7$, ages between 18 and 24 years old) at an Asian tea shop they selected. The other focus group ($N = 4$, ages between 25 and 53 years old) occurred at the private home of a technician who helped us recruit other technicians. Based on participant preference, we also conducted one-on-one interviews with four nail technicians and two female owners. Owners/managers typically preferred to be interviewed at their salons, whereas technicians preferred to meet outside of their salons so they would feel more comfortable expressing their opinions. Regardless of the salons they worked at, we separated the owner/manager group from the technicians to avoid owner's influence on the technician's responses. The interviews and focus groups were conducted in the participants' preferred language. Six were conducted in Vietnamese, two were in English. We created two semi-structured interview guides (one for salon owners/managers and one for technicians) which were used for both the focus groups and one-on-one interviews.[34] Though

some questions were worded slightly differently for owners and workers, the open-ended questions from both interview guides covered the same topics. We started out asking "warm-up" questions about: (i) how they entered the nail profession; (ii) health symptoms they experience, and then moved on to substantive questions probing around; (iii) knowledge of workplace hazards; (iv) current preventive practices relating to chemical protection and ergonomics; and (v) attitudes and barriers about certain occupational health best practices (eg, use of personal protective equipment or ventilation system). After each session, participants were also asked to complete a short anonymous demographic survey.

The Principal Investigator (PI) conducted all of the interviews and focus group discussions. The research assistants (ND and NT) took notes throughout each session to note interview or focus group dynamics and engaged in informal unrecorded talks with participants (such as how and why they came to the US, their family, their career aspirations) before and after each meeting so they would feel comfortable talking with us. After the first focus group, questions were modified and additional ones were included to further explore themes that emerged from the first discussion. The interviews were audiorecorded, transcribed in Vietnamese, and translated to English by bilingual and bicultural research assistants and reviewed by the PI for completeness of the translation.

2.3 | Analytic methods

Data consisted of eight transcripts that were uploaded into and coded using Atlas.ti version 8 (Cleverbridge AG, Cologne, Germany). The coding team included the PI, part-time nail technicians who were also undergraduate student research assistants (ND, NT), and graduate research assistants who were not knowledgeable about the industry (SS, NV). The coding process began with multiple coders performing open coding on two transcripts using a grounded theory approach.[35] The team met to discuss and resolve differences between coders and the initial list of codes. Next, focused codes were created and discussed that were relevant to the research questions. Once a coding scheme was finalized through an iterative process of coding, team discussion and consensus-building, all the transcripts were coded using the final scheme by multiple coders. Additional codes were added to the coding scheme as they arose and were later reviewed for group consensus. After the coding was completed, emerging themes were identified. Illustrative quotes were extracted to substantiate the findings derived from the themes and codes. Pseudonyms were used to protect the privacy of participants. The inclusion of multiple coders with diverse perspectives throughout the process helped the team maintain objectivity and avoid biased interpretation of the data.

2.4 | Participant characteristics

Seventeen adults participated in the study, including 15 females (88%) and two male technicians (12%) (Table 1). They represented eight salons from different neighborhoods in both central Philadelphia and surrounding suburbs. We were able to visit only three of these salons (one located inside a large mall and two on relatively busy streets) where we interviewed two female owners and a female technician who appeared to have some managerial role in the salon. The majority of participants were technicians (88%), born in Vietnam (88%), and primarily speak Vietnamese at home (59%). On average, study participants were 33 years old (range = 18-53 years). The mean number of years living in the US was 15 years, ranging from being born in the US to having been in the US for 33 years. The reported time being in the nail profession ranged from 1 to 17 years and the majority of participants reported working more than 40 h per week. Study participants had a variety of educational backgrounds obtained in either Vietnam or the US. Three (17%) were college graduates. One manager was a US college graduate who took over the ownership of her mother's salon so that her mom could work less and the other used to work part-time while

TABLE 1 Demographics of Vietnamese Participants in the Study ($N = 17$)

Characteristic	N	%
Salon position		
Owner/Manager[a]	2	12%
Technician	15	88%
Estimated salons represented[b]	8	
Gender		
Female	15	88%
Male	2	12%
Marital Status		
Married	7	41%
Single	10	59%
Age in years (Mean/SD)	33 (12)	
Birthplace		
Vietnam	15	88%
US	2	12%
Years in US (Mean/SD)	15 (11)	
Years doing nail (Mean/SD)	7 (5.5)	
Hours worked/week (Mean/SD)	48.5 (16)	
Education		
Some high school	1	6%
High school	6	35%
Some college	7	41%
College	3	17%
Language spoken at home		
Vietnamese	10	59%
English	1	6%
Both	6	35%

[a]There was one participant whose managerial status was confirmed with us through her co-worker but she preferred to consider herself to be a technician. Most Vietnamese managers and owners also work as technicians.
[b]Number of salons represented was estimated because there were three participants whom we were not able to confirm where they worked.

attending school. We had no background information on the third college graduate. Seven participants had some college education (41%) which included a couple of college dropouts who ended up working full-time at the salons and the rest were full-time students at a community college or university working part-time during the school year and full-time in the summer. Other full-time nail technicians were older or recently came to the US with limited English skills. Almost all got into the profession through connections with family or friends. We did not ask about their nail licenses as such sensitive question might affect their engagement during the discussion.

3 | RESULTS

Analysis of the transcripts revealed three major themes relating to our core research question: (i) health symptoms experienced; (ii) protective practices; and (iii) factors that influence the adoption of health and safety best practices in the nail salons. We identified sub-themes related to the third theme and explored how they could serve as motivators or barriers to performing protective actions by the nail technicians and owners/managers (Table 2). Similarities and differences between the groups in their perspectives were also reported.

3.1 | Health symptoms experienced

Most participants reported having experienced adverse health symptoms that they thought could be related to chemicals in nail products such as acetone, glue, liquid used in acrylic nails (methyl methacrylate or MMA), and gel nails. These symptoms included sneezing, eczema, eye irritations, dry/cracked and itchy skin on the hands, and headaches. For instance, one female technician mentioned her issue with gel nails:

> *"When I do gels, my eyes feel sticky and itchy... When I don't do gel, I don't have those symptoms. I do not have those issues with acrylic nails, only with gel nails. My eyes feel like there is a pus in my eyes. It's slightly sticky. I'm just not comfortable working with gel." (Female nail technician).*

One older male technician, however, thought some of these symptoms could be related to pollens or allergens outside of work. It should be noted that this male technician consistently dominated the group discussion and refuted health concerns brought up by other participants. Our informant later told us that he was a manager but he had indicated to us that he was a technician.

In addition to chemical concerns, musculoskeletal symptoms such as shoulder and back pain were also mentioned, "I have shoulder and back pain," said one female technician from the group discussion. Another female nail technician mentioned hearing about nail workers needing surgery on their fingers, "There are people who have to have surgery on their fingers because they hold customers' hands for too long... Some people lost sensation on their finger."

TABLE 2 Summary of Major Themes

Adverse health symptoms mentioned
Respiratory irritation
Eyes irritation
Headaches
Dry crack skin, eczema
Musculoskeletal pain (shoulder, back, hands)
Protective practices
Chemical protection
Turning on general ventilation system
Using personal protective equipment such as gloves, surgical masks
Keeping salon clean
Opening doors to ventilate the space
Proper handling of chemicals (e.g., label containers, store chemicals soaked cotton balls in a small container, take out trash at the end of the day)
Musculoskeletal prevention
Siting up straight
Not using too much force on the hands
Doing exercises such as walking and yoga
Standing up to walk between customers
Taking pain relievers
Getting help from family members
Using a raised platform to support hands
Factors influencing health and safety practices
Perceived health benefits/concerns
Knowledge about health and safety at work
Salon's management and policies attributed to owners
Client influence
External regulations/policies
Protective equipment-specific challenges

We found that the owners/managers reported either less or no negative health symptoms or concerns compared to the nail technicians:

> *"I have done nails for a long time but have not seen any effect. No regular illness... I'm not sure about new workers but I myself have worked for a long time and I feel fine. Just normal. (Female owner)"*

3.2 | Protective practices

3.2.1 | Chemical protection

All participants indicated that they adopted some forms of protective practices when working at the salons. These practices included the use of ventilation (eg, fans, general mechanical ventilation or keeping the

door open), wearing personal protective equipment, proper storage and handling of chemicals (eg, transferring bulk chemicals into smaller containers with labels, storing chemicals soaked cotton balls in a small container and discarding them at the end of the day), having indoor plants, and keeping the salon clean.

The use of gloves and surgical masks were mentioned more often than other practices. These practices appeared to vary between study participants, the type of nail services being performed, and salons. All participants reported using surgical masks for dust and chemical protection. All but one young male technician were unaware of the N-95 respirator for dust protection. The male technician talked about his preference for the N-95 respirator but it was unclear whether it was accessible to him. All participants reported using gloves and they used gloves for pedicures more often than manicures. One female participant described her typical gloves use:

> *"It's normal when doing pedicure, just uncomfortable when doing manicure." (Female nail technician)*

3.2.2 | Musculoskeletal prevention

Regarding musculoskeletal prevention, more experienced workers appeared to know how to better protect themselves than less experienced ones. Some participants reported not doing anything about the muscular pain they experienced. Others recounted examples of measures that they took, which included being aware of the posture, sitting up straight, not putting too much force on the hands, working out or doing yoga after work, standing up to walk between clients, taking pain relievers, or having family members help at the shop so that they can work less. One female owner thought that handling hands constantly could cause shoulder pain and shared how she took care of herself, "You have to be aware of your posture when you are sitting instead of hunching over. You have to sit up straight. Most people want to get close to customer's nails so that you can see the details. A lot of people have bad posture." In addition, she and her sister also worked at the salon so their mom can work less, "My sister and I are here helping her so she can work less."

Another seasoned female owner shared that she used a raised platform to rest her hands so that she did not have to use too much force holding the client's hands:

> *"I always have this cushion to support my hands when I work. There are many people who do not know. Just pull their hand up and lift. I put my hand on this cushion. No need to lift or hold people's hands up. Then I have the right angle to work." (Female owner)*

When asked about doing body stretches during free time at work, one young female participant in a focus group said that she would not do it because she did not think her owner would support it and even if they did, she might consider doing very light exercises, " I would just do something light that does not require too much force. We're in a salon. Doing stretches like you're dancing would make you look like a crazy person."

Overall, the owners/managers tended to report better adherence to safety practices in their salons compared to the nail technicians.

3.3 | Factors influencing adoption of health and safety practices

3.3.1 | Perceived health benefits/concerns

Most participants mentioned self-protection as one of the reasons they performed safe work practices. This attitude is shared by both the nail technician and the owner/manager groups.

> *"Because there are many nails disease that you may not know. When someone who has a disease gets cut, you can get infected. So the gloves are a must-have." (Female nail technician)*

3.3.2 | Knowledge about health and safety at work

The level of health and safety knowledge appeared to vary among participants and topics. Many participants mentioned that they knew working with chemicals can affect their health:

> *"[Acrylic] has liquid, then when we file, there are dusts from the powder. You will inhale those dusts, it is not good." (Female nail technician)*

Some had no knowledge of the potential risks of chemicals:

> *"I do not know if it actually affects our health." (Female nail technician)*

> *"I don't really know if there is anything we have to really be worried about health risk. Like anything in life that you are doing, there is always risk of cancer. I don't think I have seen it here or I have heard of it." (Female owner)*

Knowledge appeared to be gained and/or reinforced by the health effects that they or people they know experienced at work:

> *"At that time I did not know, but after working for a while, I realized it." (Female nail technician)*

Similarly, personal experience seems to shape the participant's perceived susceptibility and severity of the potential health effects more than knowledge. A female owner recalls her pregnancies:

> *"I was nervous at first. Because I heard that women who work in the nail industry during pregnancy, may have some effects on their children later on. I also asked the doctor. The doctor also advised me to wear protective masks and other things. . . We should also pay attention to any little thing at*

the time of pregnancy. When I have three children, all three children are healthy. There are many people in my family who do not do nails but their kids are not healthy. I think it may just depend on each of our body types." (Female owner)

Participants have basic knowledge of ways to protect their health from chemical and infectious diseases transmission such as use of gloves and masks. Many participants did not know about local exhaust ventilation. When shown pictures of individual mobile local exhaust machine, none of the participants said their salons had such machines or similar units. People generally know about the general ventilation but not the local exhaust ventilation.

We found having the knowledge does not necessarily translate to consistent practices due to barriers discussed below.

3.3.3 | Salon's management and policies attributed to owners

Results showed support from owners was related to technicians' health and safety behaviors. Many Vietnamese salons are family-owned and owners typically hire Vietnamese technicians. The work environment is often perceived like family:

"Everybody looks out for everybody in the salon, you know. It is very much we are in a close group." (Female owner)

However, not all technicians felt that way. Management styles and organizational policy varied between owners and salons. Some owners treat employees better than others and also encourage using protective equipment.

While owners/managers could be a source of motivation, they can also be barriers. One former nail technician revealed that when she used to work at a family owned salon, she sensed that the owner was not happy with her using some of the personal protective equipment so she did not use them even though they were available at the salon.

Another technician told us that "Some owners just don't care." She knew of one owner who did not want her technicians to wear gloves because she feared that wearing gloves might leave a bad impression on the customers:

"I actually know the lady that own the nail salon that did not want people to wear gloves, cause she [the owner] took different way, thinking when you wear gloves, you grossed out the clients, and she did not want the client to feel like what's wrong with my feet. There were times that she said you guys should stop wearing gloves." (Female nail technician)

Instead of providing gloves to workers, some owners/managers may suggest that the technicians buy gloves themselves:

"Only worker will support it [wearing gloves] because owner does not want to provide it. But sometimes the boss is also nice enough to suggest buying gloves ourselves." (Female nail technician)

3.3.4 | Client influence

Customers can play a big role in influencing nail salon's practices in a positive way which can reinforce the technician's and owner's protective practices:

"In the beginning, when you first introduce to that concept, I think they [clients] were taken back. . . But after a while, they understand it. I mean you are working with the chemical, it's dirty stuff. They started to understand more. It is actually protecting the clients and also the workers." (Female nail technician)

There is, however, variability in customers' perceptions and preferences toward certain salon health and safety practices that could make it difficult for the workers to adhere to good practices. For instance, if clients were allergic to latex, technicians were requested not to wear gloves:

"There are also people who are allergic to latex gloves that they let you know. So I do not wear gloves at their request." (Female owner)

Or when the salon's door is kept open to facilitate air circulation, clients might express their dislike of noise or insects:

"But many times the customers do not like the door to be opened. Sometimes the flies can come in or the noise of traffic is annoying." (Female nail technician)

Client preference affected both the owner/manager and nail technician groups.

3.3.5 | External regulations/policies

Owners had the responsibility to be compliant with the laws and thus were more responsive to legal/contractual requirements and law enforcers compared to the nail technicians:

"When opening the shop [in the mall], they required me to install a ventilation system. . . Here this [general] ventilation costs thousands of dollars." (Female owner)

3.3.6 | Protective equipment-specific challenges

While many nail technicians supported the use of protective equipment (masks and gloves), they also expressed challenges in using them. These included discomfort, blurriness in their glasses (masks use), slipperiness, and slowing them down (gloves use).

When asked about potential challenges of having or using a local exhaust ventilation unit, participants talked about the potential noise, entanglement, too busy to turn it on, or that the owner might not want to install it because of the cost:

> *"I do not think the owner would like that because it costs [money] to install and fixes it if something big breaks. Or if you have too many customers coming in you do not have time to turn it on." (Female nail technician)*

4 | DISCUSSION

The purpose of the study was to identify factors that influence the adoption of safe practices among Vietnamese nail salon technicians and owners in the Philadelphia metropolitan area. Our findings revealed a complex interaction between personal and environmental factors that affect health and safety practices in nail salons.

Nail salon workers talked about several acute health symptoms related to chemical use, ergonomics, and infectious disease hazards that they or their co-workers experienced such as headaches, respiratory, eye, and skin irritation, and pain in the shoulders, back, and hands. However, they were less certain about more serious health risks such as pregnancy-related outcomes or cancers. Acute symptoms reported by our participants were consistent with the literature from several quantitative cross-sectional health surveys of nail salon technicians in different states, including California and Massachusetts.[7,11,14] The owners and managers were more likely to be dismissive of the health risks than the nail technicians in their responses.

Cognitive behavioral factors such as knowledge, perceived health risks and benefits were influencing factors among both the nail technicians and owners and managers. We learned that even though some workers and owners may report knowing about potential health hazards, their perceived susceptibility and severity of more serious adverse health conditions were generally low. This may be due to the perceived lack of evidence of the longer-term health risks associated with working at nail salons that they or people in their network encountered. The statistics of severe chronic health conditions associated with the nail profession is also limited in the literature, which might be due to the difficulty in conducting research in this hard-to-reach population and healthy worker effects where seriously-ill workers tend to leave their jobs.

While some basic knowledge about the hazards and control measures were generally known among the participants, misconceptions about certain health and safety practices also existed. These included, but were not limited to, the use of surgical masks for dust and chemical protection or the belief that muscular pains is mostly due to aging. Some of these misunderstandings were consistent with reports of nail salon practices from other states,[7] which might indicate that information/training gaps persist not only in Philadelphia but potentially among the larger nail salon industry's niche involving nail salon workers and owners. One potential reason for the continued use of these surgical masks was that they were much less expensive, more comfortable to wear, and friendlier looking than the recommended N-95 respirators. While outreach programs targeting existing technicians and owners will address short-term training gaps, more sustainable efforts might need to involve changing curriculum in cosmetology schools, apprentice programs, and nail salon regulations.

Our qualitative analysis also found several important workplace environmental factors that played significant roles in shaping nail salon safety practices. First, different owners have different management styles and organizational policy within their salons that can affect technicians' behaviors. Educating owners and managers of health and safety best practices may help owners establish better organizational policy and reinforce health promoting behaviors for workers. Second, clients can also either positively or negatively influence a salon's practices. Thus, it would be interesting to compare salon practices by neighborhoods (eg, customers from affluent neighborhood may be more willing to pay for higher prices for safer and more expensive products). Lastly, owners and technicians are generally responsive to external requirements and law enforcement. Many family-owned salons operate on low profit margins so strict regulations such as installing local exhaust ventilation might negatively impact small businesses due to potential high cost of implementing and maintaining the system. Therefore, consideration of a balanced regulatory approach (eg, providing economic assistance to small businesses) might attract more owner's buy-ins and bring more sustainable change in this industry.

The results of our study may be impacted by several limitations. One limitation is the small sample of nail technicians and owners that may not be representative of the experiences of all Vietnamese nail salon workers in Philadelphia. Although our sample size is relatively small, we found repeated themes in most of the transcripts which indicated to us that some level of thematic saturation was reached. Another limitation is the limited inference to other ethnic groups that make up the rest of the nail industry's workforce including English-speaking Non-Hispanic Whites and African Americans, other Asian ethnic groups and Latino/Hispanic minorities. We recommend future research to explore the experiences and organizational culture of workers from those racial/ethnic groups in order to better understand industry-wide best practices and optimize outreach efforts. However, it is possible that some of what we found among Vietnamese workers, most of whom were immigrants, could be applicable to salon workers who emigrated to the US from other countries. It is also possible that our results may be unique geographically because other municipalities and states may have different requirements for nail salon operations and thus would impact their safety practices. For instance, New York has now implemented ventilation regulation for nail salons requiring a source capture system at each nail table[36] but some cities in California use a voluntary approach where salons are incentivized to be legally recognized as being a healthy nail salon.[37] There is also a possibility of social desirability bias and misclassification of the participants' roles in the salons, particularly among the owners and managers. There were two participants who self-reported to be nail technicians but we later learned through our

informant that they were managers. Managers of small nail salons often also work as technicians and thus would sometimes prefer to classify themselves as technicians. While we took their actual status into account in our transcript analysis, this status misclassification may pose challenges in future study where we may not have informants to confirm their backgrounds and thus identify any potential bias in their response.

There were differences that arose from combining individual interviews and focus group discussions into one analysis. Responses from individual interviews tend to be more in-depth than focus groups, as the interviewer could probe and clarify responses. On the other hand, moderators of the focus group discussions had to navigate dynamics between dominant and shy participants. Yet these discussions took advantage of the dynamic nature of a focus group discussion, including the stimulation of richer responses and the ability to build consensus. We felt that having both methods allowed us to balance the breath and depths of the topics. It also allowed us to engage nail technicians who would not have agreed to participate without being able to do so with their trusted peers. Thus allowing participants to self-select into focus group discussion or interview helped to increase our response rate in this formative study. Lastly, much of the information was obtained via focus groups rather than individual-level surveys, thus precluding us from learning the frequency with which certain views are shared within this sample. That said, the knowledge gained from conducting these focus groups will inform the development of a survey instrument that could assess prevalence and frequency of experiences in future phases of the study.

Despite these limitations, a major strength of this study was the use of qualitative methods to gain a more in-depth understanding of the complex interplay between the personal and environmental factors that contributed to the current occupational health practices of Vietnamese nail salon technicians and owners. These formative findings provide a foundation upon which to expand the research such as interviews with policy makers, cosmetology school educators, and customers. They will also inform the development of a healthy nail salon intervention program and help us identify opportunities for outreach and policy changes for more sustainable prevention efforts for this worker population.

5 | CONCLUSIONS

Our study highlighted a complex interplay between personal and environmental factors that influence health and safety practices among Vietnamese nail technicians and owners. Our results confirm the need to incorporate linguistic and cultural components in future intervention programs but also highlight barriers to healthier salons and worker behaviors that must be addressed at multiple levels as much as possible. This will require key stakeholders such as technicians, owners, cosmetology educators, researchers, public health professionals, community organizations, the public, and policy makers working in synergy to create more sustainable behavioral and system changes for the health and well-being of workers in the nail industry.

AUTHORS' CONTRIBUTIONS

TBH conceptualized the study, led the collection, analysis, and interpretation of the data, and manuscript preparation. TBH is responsible for all aspects of the work. NG and NT assisted in the data acquisition and analysis. SS and NV were involved in the data analysis. All authors (including AC) contributed to the interpretation of the data and editing of the manuscript.

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ETHICS APPROVAL AND INFORMED CONSENT

This study was approved by the Institutional Review Board at Drexel University's Office of Human Research Protection. All participants provided oral informed consent.

DISCLOSURE (AUTHORS)

The authors declare no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

Steven B. Markowitz declares that he has no conflict of interest in the review and publication decision regarding this article.

DISCLAIMER

None.

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