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Louisiana trucking companies' implementation of workplace health promotion programs: Explanatory sequential mixed method case study

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Abstract.
BACKGROUND: Trucking companies may be key partners for workplace health promotion programs to improve heavy and tractor-trailer drivers' health and wellbeing.
OBJECTIVE: To identify barriers and facilitators to implementing workplace health promotion programs among Louisiana trucking companies' leadership and staff.
METHODS: A case study approach following an explanatory sequential mixed method research design was used. A quantitative survey, based on the Theoretical Domains Framework (TDF), was adapted and distributed online to a convenience sample. Survey respondents were recruited for an interview to gain additional insight on multi-level barriers to implementing workplace health promotion programs. Quantitative data was analyzed using descriptive statistics to describe barriers and facilitators following TDF constructs. Qualitative data were independently coded among two researchers following the TDF and the Consolidated Framework for Implementation Research (CFIR) to determine themes.
RESULTS: Eleven workplace leaders or staff took the survey. Two engaged in a follow-up interview. Regarding the quantitative results, most (82%) believed workplace health promotion programs would save their company money, although were not offering them. No TDF constructs were indicated as barriers given mixed results; however, several were facilitators: *Social/Professional Role and Identity*; *Emotion*; *Action Planning*; *Knowledge; Motivation and Goals*; and *Beliefs about Consequences*. Qualitative results captured several *Inner* (e.g., time, money) and *Outer Setting* contextual (e.g., truckers' needs and resources) factors considered important to trucking companies' implementation of health promotion programs.
CONCLUSION: Results suggest leadership and staff of Louisiana trucking companies value workplace health promotion programs, although are challenged by limited resources and the broader trucking environment.

Keywords: Occupational health, health promotion, transportation, diet, food, and nutrition, physical activity

1. Introduction

Short- and long-haul tractor-trailer drivers (i.e., truck drivers) in the United States (U.S.) experience poor health and psychosocial outcomes relative to the general population [1–4]. As such, trucking companies' leadership and staff may be key partners for health promotion programming to improve the health and well-being of the trucking workforce. In comparison to other industries, however, the transport sector

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has been found to offer few comprehensive health promotion programs [5, 6].

Trucking companies' leadership and staff are ultimately responsible for implementing health promotion programs; however, there is limited information about factors that influence implementation decisions in the literature. To our knowledge, only one study by Lemke & Apostolopoulos (2015) has focused on trucking companies' leadership regarding health promotion programming [7]. Authors examined existing health promotion programs among 46 trucking companies and found companies to fall short of adequately addressing truck drivers' health and well-being [7]. Understanding barriers and facilitators to offering evidence-based health promotion programs among trucking companies' leadership and staff could add to a scant literature to advance health promotion program implementation in this sector.

Implementation science, or the "*the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice*" [8] could help to address this research gap. Such approaches echo recent calls for or primers on implementation science in the occupational health field [9, 10]. As such, the purpose of this research was to use implementation science frameworks to investigate Louisiana trucking companies' leadership and staff perspectives about barriers or facilitators to implementing health promotion programs.

2. Materials and methods

A case study approach following an explanatory sequential mixed method research design was used [11]. That is, a quantitative survey was administered online and was followed by an optional interview to help "explain" survey findings. The survey and interview research were determined exempt from human subjects' oversight by the Louisiana State University Agricultural Center Institutional Review Board (IRBAG-21-0044 and IRBAG-21-0122).

2.1. Setting

This study was carried out in Louisiana (site of most co-authors at the time) and was informed by an exploratory search of prominent trucking companies' webpages that found limited evidence workplace health promotion or "wellness" programs were offered [12]. The trucking occupation is critical in Louisiana, as about 78% of Louisiana communities are reliant on truck transport [13].

2.2. Eligibility criteria and recruitment

To participate in a survey and subsequent interview, the following criteria needed to be met: 1) Leadership or staff (i.e., not truck drivers) of a Louisiana-based company that employed drivers of 18-wheel tractor-trailers; 2) at least 18 years of age; and 3) in some capacity responsible for facilitating/making decisions about health promotion programs.

Convenience sampling was used to reach persons eligible to participate in this study. Phone calls and emails using publicly available phone numbers and email addresses identified by searching online for Louisiana-based (i.e., had offices in Louisiana) trucking companies were used to recruit survey participants between March and May of 2021. At least one representative among 71 trucking companies in Louisiana, ranging from small, locally owned companies to larger, multi-state corporations, were contacted up to three times to share details about the survey. Recruitment flyers were also distributed through social media platforms, forums, and local organizations, such as the Louisiana Motor Transport Association. Participants provided informed consent and were offered compensation for study participation (travel mug valued at 15 U.S. dollars).

2.3. Online survey and analytical approach

The purpose of the survey was to understand barriers and facilitators to offering health promotion programs from the perspective of trucking companies' leadership or staff who would be responsible for implementation. For this reason, survey questions followed the Theoretical Domains Framework (TDF), including fourteen domains considered influential regarding individuals' decisions and behaviors: *Knowledge*; *Skills*; *Social/Professional Role and Identity*; *Beliefs about Capabilities*; *Optimism*; *Beliefs about Consequences*; *Reinforcement*; *Intentions*; *Goals*; *Memory*, *Attention and Decision Processes*; *Environmental Context and Resources*; *Social Influences*; *Emotions*; and, *Behavioral Regulation* [14, 15]. The TDF is a widely applied implementation science framework used to understand barriers and facilitators to individuals' decisions or behaviors related to the adoption,

implementation, and sustainment of evidence-based interventions [14, 15].

For this investigation, a pre-existing survey that based on TDF constructs and was created for a healthcare practitioner audience was adapted. The study team perceived the survey questions to be applicable with slight "surface-level" [16, 17] terminology changes to reflect the trucking company and health promotion program context. "Workplace health promotion program" was broadly defined in this research to include several high-priority topics: diet/nutrition; physical activity; mental health; sleep; and/or smoking cessation [1–4]. In addition, several questions were added to the survey to capture characteristics of companies and individuals and interest in or experience with health promotion programs (see Supplement I for the 39-item survey).

Quantitative analysis included computing descriptive statistics (frequencies, means, and standard deviations) using IBM® SPSS® Statistics (version 25, IBM Corp, Armonk, NY, USA). Given the exploratory nature of this work and the small sample size, questions based on the TDF constructs were analyzed in accordance with the majority of responses (>50%) to identify TDF constructs as either barriers or facilitators. Responses to the open-ended survey questions (Supplement I) were merged and analyzed with qualitative data, as described below.

2.4. *Explanatory interviews and analytical approach*

Interviews were designed to further explore survey concepts and the questionnaire was created by the study team after reviewing survey responses (see the interview guide in Supplement II). The aim was to understand leadership and staff perceptions about barriers and facilitators to implementing health promotion programs and the contextual factors that shape opportunities for trucking companies to offer these programs for truck drivers. Interviews were scheduled with survey participants who indicated interest in a follow-up interview. These were conducted over the phone by a trained researcher (PK) and were audio recorded.

Regarding qualitative analysis, interviews were transcribed verbatim using a purchased service, de-identified to protect participant and companies' identities, and quality checked against recordings to ensure transcription accuracy (PK). Because interview responses largely focused on contextual factors external to the individual, study authors (BH, LB) chose to use an additional implementation science framework for coding and analysis to complement the TDF [18]. The Consolidated Framework for Implementation Research (CFIR) [19] was chosen because it is comprehensive determinant framework that provides more nuance with respect to contextual factors that influence decision making in comparison to the TDF, which is heavily focused on individual behavior [14, 15]. The CFIR is an ecologic and implementation science framework with 39 constructs about inner context, outer context, intervention, stakeholder/intermediary, and process variables that influence program implementation [19]. However, one TDF construct, "*Social/Professional Role and Identity*," was used during this process as the CFIR does not have a similar individual-level construct.

The coding of "meaning units" or transcribed text representing a unique concept [20] was completed independently among two researchers (BH, LB) using the CFIR and TDF. Coding discrepancies between the two researchers were addressed using email correspondence and video calls until agreement was reached. Codes were sorted to identify resulting themes regarding the CFIR and TDF constructs considered important for implementation.

3. Results

The survey was completed by 11 participants, representing trucking companies' leadership or staff who would in some way support health promotion program implementation to improve the health and well-being of companies' truck drivers. Five respondents indicated interest in being contacted for a follow-up interview, although two participated (a Financial Coordinator and a Department of Transportation Compliance Manager). The quantitative survey results are presented first, followed by the qualitative results (including the interview and open-ended survey responses).

3.1. *Quantitative results*

Leadership and staff of Louisiana trucking companies who completed a survey (Table 1) were on average 48 years old (SD ± 11), in majority male ($n = 7$; 64%), and had been employed within their companies for 5 or more years ($n = 9$; 82%). Companies were located in Acadia ($n = 1$), Caddo ($n = 1$), East Baton Rouge ($n = 3$), Jefferson ($n = 1$), Lincoln

Table 1
Self-reported position and role of participants employed by Louisiana trucking companies ($n = 11$)

Position	Company role
Chief Financial Officer	Financial planning, supervising accounting team, assessing financial risks and opportunities.
Director of Safety/ Human Resources	All aspects of safety and human resources.
Department of Transportation (DOT) Compliance Manager	DOT compliance for driver policies, procedures, and safety.
Financial Coordinator	Human resources, payroll, accounts payable/accounts receivable, reporting, compliance, maintenance of company accounts/contracts.
Human Resource Coordinator	Hiring and onboarding of all company drivers.
Human Resource Manager	Hiring/termination of employees; employee relations; employee benefits.
Operations Manager	Managing customer accounts, overseeing day-to-day operations, overseeing management team.
President	Overseeing all aspects of the company.
Safety Director	Driver safety and compliance.
Safety Director	Conduct training, Occupational Safety and Health Administration and Federal Motor Carrier Safety Administration compliance, process applicants, monitor drivers' daily activities, incident, injury, and crash investigations.
Safety Director	Safety compliance, driver recruiting, worker compensation, human resources.

Table 2
Existing health promotion programs or programs of interest among Louisiana trucking companies' leadership and staff ($n = 11$)

Health and wellness programs	Offered in the past *n* (%)	Currently offering *n* (%)	Of interest *n* (%)
Healthy eating and beverages (diet, nutrition)	2 (18%)	0	9 (82%)
Physical activity or exercise	0	0	9 (82%)
Mental health or wellness	2 (18%)	2 (18%)	5 (45%)
Sleep quality	1 (9%)	1 (9%)	5 (45%)
Smoking cessation	1 (9%)	1 (9%)	4 (36%)
Biweekly newsletter with information on health[a]	–	1 (9%)	–
Health insurance carrier programs[a]	1 (9%)	1 (9%)	–
Flu shot fair programs[a]	1 (9%)	0	–

[a]Noted in an "other" category.

($n = 1$), Orleans ($n = 1$), Webster ($n = 1$), and West Baton Rouge ($n = 2$) parishes (i.e., 11 separate companies). The size of companies with regard to the number of employed truck drivers ranged from 25 to 1,500 (M 245, SD $\pm$ 426) and the type of freight hauled included hazmat chemicals, heavy equipment, commodity goods, refrigerated food, dry freight, sand, water, bulk liquids, and sulfur. Four participants (36%) reported their companies employed long-haul truck drivers or those away from home for more than 2 consecutive days per week.

Nearly all respondents either strongly agreed ($n = 1$; 9%) or agreed ($n = 8$; 73%) that offering workplace health promotion programs would save the company money. Many noted health promotion programs, such as those focused on nutrition and mental health, had been offered in the past (Table 2). There were fewer programs currently offered in comparison. There was a strong interest among trucking companies' leadership and staff in implementing health promotion programs, mainly for those focused on diet/nutrition or physical activity/exercise, followed by mental health, sleep, and smoking cessation (Table 2).

Based on responses to survey questions following the TDF constructs (see Supplement III), there were several shared facilitators identified among Louisiana trucking companies' leadership and staff regarding the implementation of health promotion programs for drivers. For example, most believed they had a duty to offer health promotion programs and believed they understood their implementation role (*Social/Professional Role and Identity*). Most also felt confident in their ability to facilitate implementation of health promotion programs (*Emotion* and *Action Planning*) or indicated awareness of current health promotion guidelines (*Knowledge*). In addition, Louisiana trucking companies' leadership and staff believed their position duties would not interfere with implementing health promotion programs (*Motivation and Goals*) and indicated the importance of these programs for drivers (*Beliefs about Consequences*). No TDF constructs were noted as barriers given mixed results among respondents.

3.2. Qualitative results

Five of the participants responded to a general open-ended survey question at the end of the survey. Responses to this question and the two interviews yielded 72 meaning units that were coded using the CFIR ($n = 69$ meaning units) and TDF ($n = 3$ meaning units). Frameworks, domains, constructs, and sub-constructs are presented in Table 3 along with example quotes/meaning units (20). The CFIR codes were divided into *Outer Setting* ($n = 37$), *Inner Setting* ($n = 23$), and *Intervention Characteristics* ($n = 9$). The most mentioned *Outer Setting* construct was *Patient Needs and Resources*, regarding the perception that

Table 3
Louisiana trucking companies' leadership and staff perspectives on implementing health promotion programs using the Consolidated Framework for Implementation Research (CFIR) and the Transtheoretical Domains Framework (TDF)[1]

Framework (n = meaning units)	Domain (n = meaning units)	Construct and sub-constructs (n = meaning units)	Supporting quote
CFIR ($n = 69$)	Outer setting ($n = 37$)	Patient needs and resources ($n = 25$) – Incentives ($n = 16$) – Health issues ($n = 5$) – Wellness checks ($n = 4$) – Education ($n = 7$)	"*Or even have a good incentive for them. But uh it'd just be hard to get them . . . Well of course money. That's always an incentive. Um but um other than money, I think um maybe a discount on their insurance. I know -I think it would you know, really really you know gain their attention.*"
		Cosmopolitan ($n = 3$)	"*Well um, the benefit team would come and they would help you know just organize everything. But as far as the staff . . . they would contact the local hospital or you know, and they would give people from there like um our company ended up getting a team from* [local medical organization] *to come in.*"
		External policy and incentives ($n = 2$)	"*Um one good way I think, especially with them being truckers, I feel like um they should have to participate in these type of things or get you know or have a fine or something like that. But other than that uh.*"
	Inner setting ($n = 23$)	Readiness for implementation ($n = 14$) – Available resources ($n = 11$) – Leadership engagement ($n = 3$)	"*If I had more resources, more people to help me. Absolutely* [I could ensure wellness programs are offered]. *But right now I'm up to my nose. I'm overwhelmed.*"
		Implementation climate ($n = 7$) – Relative priority ($n = 4$) – Organizational incentives and rewards ($n = 3$)	"*Programs that are being prioritized? Right now, they're more focused on safety in the workplace, like an OSHA* [Occupational Saftey and Health Administration] *type. So preventing injuries and accidents. That's really what their focus is right now. I think that's a lot of people.*"
		Culture ($n = 2$)	"*So the company specializes in transportation, and they want you know a good healthy team you know. So, I think that's a company that does a lot, and they do well with aligning with our goals*."
	Intervention characteristics ($n = 9$)	Complexity ($n = 6$)	"*Um, with trucking number one, to get them all in one place to have a health you know fair or wellness check is really, really hard. That's number one*."
		Cost ($n = 3$)	"*Um well, currently right now, with all the different taxes that are being imposed on businesses, you have a lot more money going out to the federal government and state governments. So that caused a lot of issues with hiring more people. That causes an issue with wages. So you would have to assess, okay, how much is it going to cost to do this program?*"
TDF ($n = 3$)	Social/professional role and identity ($n = 3$)	Professional role ($n = 3$)	"*Um my role is just to make sure that they are taking advantage of what they have, and know what they have. Um so, I'm the person that's gonna communicate to the team you know what all we have to offer. Which I'd rather do a good job at that because you know a lot of guys don't know everything that we can offer*."

incentives were needed to encourage participation among truck drivers ("... *It would need for them to have self initiative and some type of incentive to participate*"), and the belief that drivers' current health issues were a barrier to offering workplace health promotion programs ("... *the only ones I think they will oppose is um like the blood pressure checks and the you know the sugar level. They will oppose those because that will keep them out of the truck* ... ") (Table 3).

Regarding the *Inner Setting*, implementation readiness was considered important, as trucking companies' leadership and staff shared lacking the necessary resources to implement workplace health promotion programs ("*It's just time. As far as the wellness things, some of this stuff is good and then some of it, it's time, it takes a lot of time to do* ... ") (Table 3). The higher relative priority of other initiatives was also shared often, "*Are there higher priorities? Well, I can tell you with all companies. Again, the first thing is they want to make sales. That's the first thing. And then they worry about their benefits. So that's where, what's the cost of benefits?*"

Regarding *Intervention Characteristics*, the complexity of workplace health promotion programming was mentioned, especially related to the trucking context and the challenge of getting truckers to participate in the same place and at the same time ("*They work all crazy hours. And so some of them might come to work at two in the morning and be done at two in the afternoon and they've already got something else planned...*") (Table 3). Finally, some meaning units were coded as *Social/Professional Role and Identity* (TDF; $n = 3$), with respondents mentioning their role in and the importance of offering workplace health promotion programs (*Okay. So my role would be to work with our OSHA* [Occupational Safety and Health Administration] *director and while they work to prevent injuries at work, it's a matter of ensuring that our drivers are healthy to drive, whether it's not, not just at work...*") (Table 3).

4. Discussion

Quantitative and qualitative methods were used in this explanatory sequential mixed method case study to understand barriers and facilitators to the implementation of health promotion programs from the perspective of Louisiana trucking companies' leadership and staff. This approach was informed by a lack of information both locally [12] and more broadly [5–7]. Results of both quantitative and qualitative portions of this study indicated Louisiana trucking companies' leadership and staff hold health promotion programming in high value to meet the needs of trucking populations who struggle with disparate health outcomes relative to general U.S. populations [1–4]. However, companies' available resources (e.g., time, personnel, money) were perceived as a key barrier to health promotion program implementation.

Though many of the trucking companies' leadership and staff believed health promotion programs could save the company money overall, selected workplace health promotion interventions would need to demonstrate a return on investment to be considered acceptable. However, demonstrating a financial return can be difficult [21]. Future efforts should seek to identify the financial impacts for Louisiana trucking companies to offer health promotion programs for company drivers. Lemke & Apostolopoulos (2015) found that trucking companies offering health and wellness programs most commonly measured cost savings through fewer hospital claims and disability issues [7]; these metrics may help justify the financial investment. At the same time, strategies to improve the use of company resources to support these programs are likely needed. Lemke & Apostolopoulos (2015) also found that the primary costs of offering wellness programs were managements' time, employee costs to conduct programming, and completing health assessments [7]. Interestingly, most of the trucking companies implementing health and wellness programs had designed their own programs in-house rather than adopting existing programs. Packaging and offering free, open-access health and wellness programs designed for the trucking sector may be one way to minimize costs in terms of employees' time. As well, these programs could include valid measures of primary outcomes (e.g., nutrition and physical activity patterns and practices) to be completed as a low-cost alternative to health assessments. Overall, these cost, resources, and programming strategies should be the focus of future studies.

Previous interventions designed to reach truck drivers have primarily focused on health education, and long-term improvements in health outcomes have been limited [6, 7]. For example, Lemke & Apostolopoulos found that trucking companies' wellness programs primarily focused on behavior change, awareness, and education, and less commonly on changing the environment [7]. Yet, environmental interventions that change the context to make individ-

uals' default decisions healthier have greater potential for population-level impact compared to counseling and education [22]. In this research, the complexity of health promotion programming to benefit company truck drivers was noted, given the trucking environment structure (e.g., travel routes, time, etc.). Effective company-led interventions would ideally be paired with environmental changes that improve opportunities for healthy eating and active living while on the road [23]. Formative evaluations are warranted that explore opportunities for integrated trucking company and trucking environment (e.g., truck stop management) partnerships to support truck drivers' needs with respect to health and wellness. Of course, truck drivers' perspectives on such approaches are also needed [23].

This study adds to a scant literature base on trucking companies' perspectives of health and wellness for truck drivers and provides an example for applying implementation science frameworks to this area of inquiry. However, there are several limitations. The sample size is small and results cannot be generalized. Recruitment for this study occurred during the early years of the ongoing COVID-19 pandemic and the trucking sector has experienced severe impacts [24], which may have influenced study engagement. It may also be that sampling and recruitment strategies need rely on established partnerships with trucking companies to improve engagement, rather than the convenience sampling and the recruitment approach used in this research. The impacts of the COVID-19 pandemic over the prior three years may have further influenced perspectives among trucking companies' leadership and staff regarding the value of implementing workplace health promotion programs and warrants more investigation.

The approach used regarding the explanatory mixed method design helped to provide in-depth insight despite a small participant group. However, responses were from leadership or staff employed by different trucking companies. While there were shared perspectives about the value of and believed role in supporting health promotion programs, barriers to implementation based on the TDF were less clear (although illuminated from the interviews). Future work might consider applying the TDF survey among all levels of leadership and staff in one company to suggest staff-level interventions to improve the likelihood for successful health promotion program implementation at specific sites. Further, while we used an adapted version of a survey that was readily available, future work may need to validate the tool for trucking companies' leadership and staff. Given there were very few "not applicable" responses, we make the assumption the measure was appropriate for the topic of inquiry.

5. Conclusion

Results suggest leadership and staff of Louisiana trucking companies value workplace health promotion programs, although are challenged by limited resources and the broader trucking environment. Future research and partnership strategies are required to explore opportunities for impactful health promotion program at multiple levels that protect limited resources and demonstrate a return on investment. Finally, our approach to applying implementation science frameworks to a mixed methods case study can serve as a guide to build on this exploratory work and inform strategies to overcome barriers to trucking companies' implementation of workplace health promotion programs.

Ethical approval

The study was approved by the Louisiana State University Agricultural Center Institutional Review Board (IRBAG-21-0044 and IRBAG-21-0122).

Informed consent

All research participants provided informed consent prior to engaging in this study.

Conflict of interest

The authors have no conflicts of interest to report.

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Author contributions

BH and PK were involved in the research conception and design. PK and NP recruited survey participants and PK completed the interviews. BH and LB analyzed the data and wrote the manuscript with edits from co-authors. All authors approved the final version.

Supplementary materials

The supplementary files are available from https://dx.doi.org/10.3233/WOR-220337.

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