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Long haul truck drivers' views on the barriers and facilitators to healthy eating and physical activity: A qualitative study

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A qualitative study

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Abstract

Purpose – The purpose of this paper is to explore truck drivers' views toward diet, physical activity, and health care access to inform the development of a weight loss intervention.

Design/methodology/approach – The authors conducted four focus groups via teleconference (one) or in person (three). Each focus group included eight to ten truck drivers. Sessions were digitally recorded and transcribed. The authors used thematic analysis of the participant responses to develop themes and subthemes.

Findings – Truck drivers desired good health, however, many knowledge gaps were identified. Drivers were aware of some healthy foods, but lacked knowledge of appropriate energy intake and healthy weight. Drivers expressed many barriers to eating healthy food and engaging in physical activity on the road. Participants suggested strategies and resources to improve their diet and increase physical activity.

Research limitations/implications – This qualitative study included a convenience sample of 30 long-haul truck drivers. Consensus of themes and subthemes was achieved by four sessions. Issues facing long-haul truck drivers may be different than other truck drivers. Additional qualitative research should be conducted along with interventions focussed on healthy behaviors that can be implemented in the mobile working environment.

Originality/value – This is the first focus group study of truck drivers that targets eating and physical activity. Future weight loss intervention designs should address the lack of knowledge and skills. To succeed, interventions should implement strategies to address perceived barriers: access, time limitations, and high cost of healthy lifestyle habits.

Keywords Obesity, Health, Diet, Commercial truck driving, Occupational hazard, Physical activity

Paper type Research paper

Introduction

Long-haul truck drivers comprise about 4 percent of the US workforce, or roughly 3.2 million (United States Department of Labor, Bureau of Labor Statistics). Long work

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hours, swing shifts, and pressure to meet delivery schedules characterize long-haul trucking. These occupational demands result in a sedentary lifestyle and irregular sleeping patterns and contribute to higher body mass index (BMI) and fatigue (Caruso, 2006). These demands of the long-haul trucking industry fosters an unhealthy work environment that may contribute to a lower than average lifespan (Saltzman and Belzer, 2003).

Occupational risks and morbidities for drivers, including those related to sedentary lifestyle and unhealthful diet, have been recently reviewed and include overweight and obesity, dyslipideimia, hypertension, and diabetes (Apostolopoulos *et al.*, 2010). Furthermore, obese truck drivers have an increased incidence of accidents (Stoohs *et al.*, 1994) and hospitalizations due to obesity and diabetes-related complications (Dahl *et al.*, 2009). Nevertheless, little is known about specific food intake or physical activity habits of truck drivers in the USA let alone their relationship with occupational risk. In Sweden in the early 1990s, professional drivers (truck, bus, and taxi) consumed more coffee, French fries, sausages and milk fat, and less fish, fruits and vegetables than the general population (Hedberg *et al.*, 1993). In the USA, the prevalence of overweight and obesity among truck drivers is sufficient evidence that energy balance is not achieved and lifestyle modifications need to be addressed.

Previous interventions to address obesity in truck drivers have yielded mostly disappointing results. Early wellness interventions resulted in a modest (Holmes *et al.*, 1996) or non-significant weight reduction (Roberts and York, 1999) and no significant improvement in lipid, blood pressure, or glucose measurements (Holmes *et al.*, 1996; Roberts and York, 1999). A tobacco cessation and weight management program for truck drivers resulted in declines in tobacco use, but did not result in significant calorie reduction or weight loss (Sorrensen *et al.*, 2010). Interventions based at a transportation company headquarters have not been successful at improving BMI (Linde *et al.*, 2012). To date, the most successful pilot study used team competition and motivational interviewing to achieve a 3.5 kg weight loss (Wipfli *et al.*, 2013). Perhaps the key ingredient was the interactions with the health coach, to direct behavior change that the individual agreed to in their work environment.

Therefore, we chose the Precede-Proceed Planning Model to guide this study (Green and Kreuter, 2005). According to this model, health behavior is influenced by both individual and environmental factors, Figure 1. This model was chosen because the work environment of long-haul truck drivers is unique, but not quickly or easily changeable. Accordingly, driver behaviors in this environment are voluntary. Further it recognizes that health is not confined to physical well-being but includes factors at a variety of levels (economical, social, political, and physical) that combine to high quality lives. Members of the target population should take an active part in defining their own problems, establishing their goals, and identifying their solutions. Using this theory we developed a series of questions utilized in four focus groups of long-haul truck drivers to solicit individual views about healthy lifestyles and potential modes for intervention.

Methods

The Institutional Review Board granted approval. Participants were recruited from the study. Inclusion criteria included actively employed long-haul truck drivers with a current Commercial Driver License of any age over 18 years, gender, or ethnicity. In-person focus group participants were approached on the day of their participation in the parent study about taking part in the planned focus group.

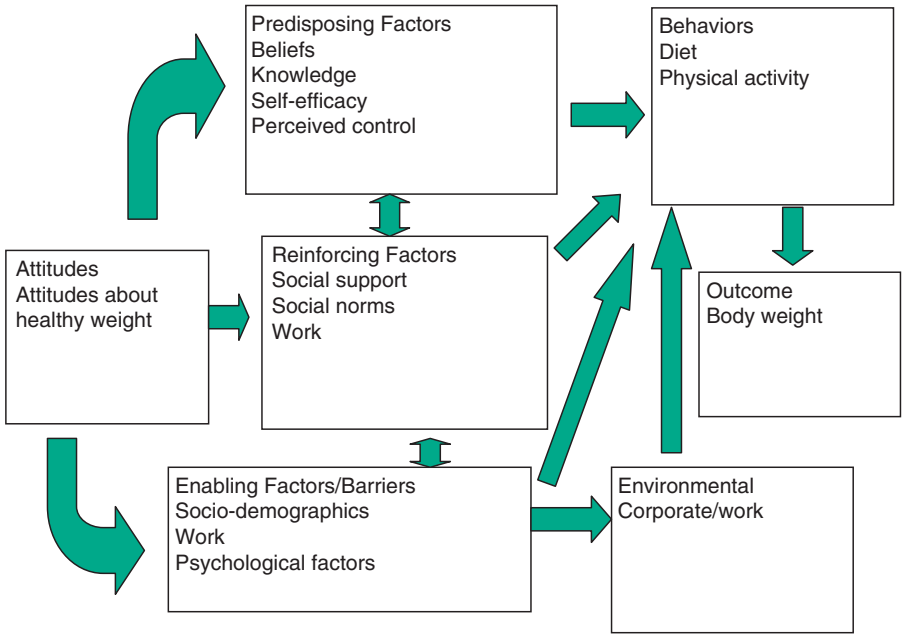

Figure 1.
Pecede-Proceed Model used to create the focus group moderator guide

The teleconference focus group participants were recruited from the parent study as well. We offered a $20 incentive in the form of a gift card to partially compensate for their time. Demographic, anthropometric, and cardiovascular risk factors were assessed in the parent study. This information was missing for two of the 30 focus group participants.

The four focus groups (one teleconference and three in-person) were conducted in August of 2010 to inform the development of a weight loss intervention. An experienced moderator conducted all focus groups. The three in-person focus groups were held at a local truck stop. Two of the focus groups included one or more female drivers. Each lasted approximately one-and-a-half hours. The moderator used a guide (Appendix) developed using the Precede-Proceed theory (Figure 1). Focus group questions began with general health and access to health care. Next, we asked questions about food, sources of nutrition information, and challenges in eating a healthy diet. We asked about activities that drivers routinely perform and the obstacles to getting enough physical activity. Lastly, drivers were given the chance to express ideas about how they could improve their diet or increase physical activity. We also asked about their need for information and what delivery methods would be most useful to improve health.

All focus group sessions were digitally recorded and transcribed verbatim by a professional transcription service. Two coders independently used Atlas.ti (Berlin, DE) to facilitate data management. Atlas.ti is a program that enables researchers to code each response from these transcripts into categories individually. The general themes were developed based on researchers interest in the perceptions of diet, physical activity, and access to health care using the Precede-Procede Theory: barriers to health, barriers to healthy eating, and barriers to physical activity. Subthemes were developed from the transcripts of the focus group responses within each general theme.

After initial coding, the three researchers met to reach consensus regarding the subthemes created that emerged during the coding process. Final organization of the data into these themes, subthemes, and identifying exemplar quotes ensued.

A comparison of focus group and parent study participant characteristics was conducted using SAS software (Version 9.3; SAS Institute, Cary, NC). *t*-tests were used to compare means of continuous variables. Significance was set at $p < 0.05$.

Results

Long haul truck drivers

Table I summarizes the parent study population and focus group participants' demographics. In all, 30 truck drivers (27 male, three female) of the 817 in the parent study participated in the focus groups. The majority of participants were male in the focus group sub-study and the parent study. The focus group participants reported truck-driving duration of between one and 47 years.

Mean BMI was between 32 and 33 kg/m^2 for both the focus group and parent study group; most drivers were overweight or obese. Mean waist circumference exceeded the level associated with health risk 40 inches in both the focus group and parent study group ($\geq$40 inches for males, $>$35 inches for females (National Heart, Lung and Blood Institute, 1998). The mean level of high-density lipoprotein (HDL) was in the high-risk range ($<$40 mg/dL) in both groups (Lenfant *et al.*, 2003). Mean blood pressure levels fell below the threshold for hypertension ($<$140/90 mmHg) in both groups. Physical activity was more variable among the focus group participants, but was not significantly different than the larger parent study population.

Variables	Focus group $n = 30$	Parent study population $n = 819$[a]	p-value
Age (yrs)	45.7 ± 11.4	47.2 ± 10.5	$p = 0.42$
Gender	Male: $n = 27$ Female: $n = 3$[b]	Male: $n = 705$ Female: $n = 112$	
BMI kg/m^2	Mean: 32.6 ± 6.5	Mean: 32.8 ± 7.4	$p = 0.84$
Underweight: $<$18.5	$n = 0$	$n = 2$	
Normal: 18.5-24.9	$n = 3$	$n = 83$	
Overweight: 25-29.9	$n = 9$	$n = 225$	
Obese: 30-34.9	$n = 10$	$n = 393$	
Morbidly obese: $>$35	$n = 6$	$n = 114$	
Missing	$n = 2$	$n = 3$	
Total cholesterol (mg/dL)	202.8 ± 32.7	191.6 ± 41.2	$p = 0.15$
HDL (mg/dL)	36 ± 11	36.46 ± 14	$p = 0.86$
LDL (mg/dL)	122 ± 24	112.98 ± 34	$p = 0.22$
Hemoglobin A1C (%)	5.22 ± 1.7	5 ± 1.22	$p = 0.34$
Waist circumference (inches)	43.5 ± 5.7	44.5 ± 6.7	$p = 0.39$
Systolic blood pressure	131.2 ± 16.7	131.9 ± 17.3	$p = 0.83$
Diastolic blood pressure	87.7 ± 10.9	84.2 ± 10.7	$p = 0.08$
Total physical activity (mins/week)	346 ± 452	283 ± 365	$p = 0.75$
Average days sleeping on the road (per month)	22.67 ± 7.5	18.22 ± 14.6	$p = 0.09$
Metabolic syndrome (3 or more risk factors)	$n = 15$ (50%)	$n = 428$ (52.39%)	$p = 0.89$

Table I.
Participant demographics

Notes: [a]From the parent study, preventing work injuries and chronic illness in truckers; [b]missing anthropometric data from two female participants

Themes and subthemes

Themes and subthemes evolved from the questions regarding predisposing factors and enabling factors/barriers in the Precede-Proceed Model (Figure 1). The three broad themes identified were barriers to health, barriers to healthy eating, and barriers to physical activity Table II. The subthemes emerged from the specific comments made from truckers.

Views toward health

Truck drivers cited longevity, family, and feeling good as the most important reasons to be healthy. Participants felt they engaged in healthier behaviors when they were not on the road. Long-haul drivers reported spending as many as 25 days a month on the road, which made routines and schedules for health care difficult to manage. Despite aspirations for good health, many participants indicated they were not able or willing to commit money, time, or effort toward a healthier lifestyle. Drivers expressed fears of job loss related to poor health, but most drivers felt that it was not their responsibility to improve their health or receive preventive care.

The list below summarizes participant responses to the importance of health as well as responses to the timing of their last physical examination, indicating gaps between desiring health and being willing to take responsibility for one's own health. One offered "Living a better life is when you're healthy. You can live a much better life and you have an opportunity to do more things that you like. Being sick is a drag so if you can be healthy, it's important. The few things on the truck that can make you unhealthy is not walking." Most participants attributed stress and heredity as risk factors for poor health and underscored the stresses associated with long-haul truck driving. "Stress is the number one thing." In addition, several participants did not like "the doctor" or did not feel it necessary to see a doctor for preventive care if they felt "good" and could do their job.

What are some reasons for being healthier?:

- Male, group 1: "Feel better. Have more energy."
- Male, group 2: "For me and my family. I don't want to be in pain later in life or you can't move or can't do anything."
- Male, group 3: "Well, for your loved ones. I would like to see my little boy graduate, he's 12 or 14."
- Female, telephone group: "To increase your energy and being healthier means you can stay in your job longer."

Barriers to health	Barriers to healthy eating	Barriers to physical activity
Cost of insurance	Cost of health food	Cost, gym fees
Personal responsibility/attitudes towards health	Knowledge of calories and weight management	Knowledge of exercise
Access to healthcare and information	Access to grocery stores, availability on road	Access to showers and gym facilities
Fear or dislike of doctors	Taste, satiety	Fear of injury
Time for healthcare appointments, irregular schedules	Time to cook or prepare healthy food	Time, irregular sleep schedules

Table II.
The three broad themes and subthemes identified from coding responses

When was your last physical exam or appointment with a physician or health care provider?:

- Male, group 1: I don't like going to the doctor" (barriers to health; fear or dislike of doctors).
- Male, group 2: "If something ain't broke – why get it checked. I mean, I feel good – I'm not having any problems […] why should I go pay a doctor $75-$80 to say yeah you are in good shape (barriers to health; fear or dislike of doctors).
- Male, group 3: "Close to 30 years. I'm healthy, well I thought I was" (barriers to health; attitudes towards health).

How often do you weigh yourself?:

- Male, group 1: "Every time I'm home about every two weeks."
- Male, group 2: "Every three months."
- Male, group 3: "I used to all the time but I got tired of losing my quarters in the slots. They're wrong, not accurate. I weighed myself a couple of months ago."
- Female, telephone group: "Probably not too often because the scales around here are not too accurate at all."

Access to healthcare and health information

The common barriers to seeking health care identified in all four groups included: time, cost, knowledge/education, and access. "A lot of people don't have health insurance." Few reported seeking regular health care or preventive care, and medications. Primarily for small trucking firms, health insurance was also a factor. Some drivers, especially independent truck owners, said they did not have access or the means to pay for either preventive or episodic health care.

Irregular schedules contributed to the inability to have regular physician visits. Some truck drivers had not visited a physician for more than ten years, except when federally required for the commercial driver exams.

Participant sources of health information varied with responses including WebMD, Wal-Mart pharmacies, Walgreens, radio, magazines, and books. Most participants had internet and computer access while on the road. A number of drivers used blood pressure cuffs at local pharmacies and consulted pharmacists for vitamin and supplement information. Most agreed that Wal-Mart offered the most health information while on the road and was a convenient place to stop because the availability of truck parking. One driver thought truck stops should have health information: "Well here's what they do have at truck stops that they could exchange for healthier things, they have chapels, but all the information about the lord, don't get me wrong its not a problem, but if they can have a chapel at so many truck stops, then all the information about the lord, they can have the information about health too. That's all I'm saying."

Participants across all focus groups had access to a cell phone and/or radio. Radio and cell phone were popular sources of information and communication, including talking to other drivers and family members. Most participants agreed that cell phones and radio were the best way to contact them regarding health information. However, one driver offered that his access is not always reliable "Here's another thing out there, you talk about whether he's computer literate or whatever, even if he was or wasn't, there's a lot of areas that we can't pick up signals because my broad band won't pick

up???? They wires are like Verizon and everybody else, but Verizon got some bad areas too and what I'm saying is you can't pick up a signal so you can't get on the internet. That's not too often, but it does happen."

Knowledge of healthful foods

The most commonly identified healthy foods were dark leafy greens, fruits, whole grains, and lean meats. Although participants could identify healthy foods, some admitted they did not enjoy the taste of healthy foods such as whole grain bread or certain fruits and vegetables; one driver put it: "I don't like eating healthy – I'm sorry." Processed foods and high sodium were identified as being unhealthy. Most participants were more concerned about the sodium content of food than the fat, calories, or cholesterol. Participants commented that truck stops and fast food places on the road usually do not carry high-quality food; rather, they carry products that will sell.

Access to grocery stores and food availability on road

Most participants felt that healthy food was difficult to store in their truck unless they had a refrigerator. "You can find anything you want on the road, some drivers don't have microwave, and some don't have coolers. You can go anywhere you want it's just the storage." Some participants complained that cab vibrations often bruised or damaged fresh fruits and vegetables. Prepared salad was the most common healthy food available on the road, but many felt it mundane and unsatisfying.

Despite the desire for healthier food, participants also complained that healthy foods usually cost more and did not offer the satiety of less healthy choices, especially after a long day of driving. Most had never tried the items designated as healthy on menus at truck stops. "You get less for more money and I like to fill up. So whatever fills me for a good price, that is what I get". Most participants did not understand caloric intake, caloric expenditure, or weight management. The list below lists participant responses to availability of healthy food on the road and the healthy foods truck drivers cannot find on the road.

What "healthy" foods are available to you on road?:

- Male, group 1: "You have to make a conscious effort to get healthy stuff because it ain't easy" (barriers to healthy eating; availability on the road).
- Male, group 1: "It's more fast foods in these truck stops. Burger King and McDonalds and so on" (barriers to healthy eating; availability on the road).
- Male, group 2: "At the truck stops, the choices are limited, so if you're going to specifically look for healthy food, then you have to get yourself into a grocery store that you know has healthy choices" (barriers to healthy eating; availability on the road).
- Female, telephone group: "Sometimes it is unavoidable, no matter how much food you have in your refrigerator, you will run out of it – like we did today, so we stopped at Hardees" (barriers to healthy eating; time to cook or prepare food).

What healthy foods would you like to have, but don't get/have or keep on the road?:

- Male, group 1: "Well that's what we can't get when we stop, grilled vegetables. You can never get that stuff" (barriers to healthy eating; availability on road).

- Male, group 1: "Vegetables. Carrots, celery, anything you can eat while you're driving. A lot of us run long hours and you eat while you're driving" (barriers to healthy eating; time to cook or prepare food).
- Male, group 2: "That is another problem with eating healthy and cooking on the truck- you can't always get the groceries unless there is a Wal-Mart. You can't get everything" (barriers to healthy eating; time to cook or prepare food).
- Male, group 3: "If the food was healthier, then we'd be eating healthier. These restaurants, if they would cooker healthier, then we would be more healthy" (barriers to healthy eating; availability on road).

Frustration about food choices on the road and limited time for food shopping and preparation were cited as major barriers to healthy eating. Many drivers felt they only had time to eat, sleep, and drive. They cited federal truck regulations for breaks and weekly work hours as leaving little time for pursuit of health (Federal Motor Carrier Safety Administration regulation 395.3: maximum driving hours is 11 hours during a consecutive 14 h workday, which must follow a break of ten consecutive hours; the maximum driving time is 60 hours per week). Since the total time to drive a route is unchanged, changed driving regulations paradoxically lengthen the work week in many cases. Drivers perceive these regulations leave little time for preparation or seeking healthier food or restaurant options. "You just drive and sleep, and drive and sleep and eat."

Among other concerns, truck drivers consistently identified parking as a major barrier to obtaining healthy food. "[…] The other thing is the parking and storage. Parking is a big thing." Their perception is that little healthy food is available at truck stops. When they find a grocery store, space to park their truck may not be available. "A lot of supermarket parking lots are not truck friendly." Most participants agreed that truck stops should provide more healthy choices and grocery markets should provide truck parking. Overall participants agreed that Wal-Mart was a good choice because it provided parking for trucks, healthier food choices and access to a pharmacy.

Physical activity on the road

Walking was the most common form of exercise identified among participants due to convenience and ability to fit it in with their schedules. "I got a dog just to take him out for a walk." Some reported carrying dumbbells and bicycles in their trucks. Few also drove with dogs that they walked regularly. Most participants agreed that they engaged in more physical activity when at home, however, long-haul drivers spend up to 25 days on the road per month.

Barriers to physical activity on the road

Time was cited as a major barrier to being physically active on the road. Between deliveries, loading and unloading duties, and driving schedules (See the list below), most participants said they did not have the time or energy or motivation to engage in regular structured exercises. Additionally, the cost of gym memberships and parking at most national gym chains were barriers. Having a place to park the truck near a gym or other location to exercise was another major barrier to physical activity on the road. Participants felt there was not enough space in their truck cab to exercise, "You can't do them in the truck, there's not enough room." Drivers felt that truck stop parking lots

were often unsafe or too dirty for engaging in physical activities. Numerous participants felt they could not engage in regular physical activity because of poor access to showers. However, drivers voiced the sentiment that accessible, inexpensive workout and shower facilities should be available to them at truck stops, "[…] if you can pull into the truck stop and go work out in the gym for an hour and get back on the road, that would be great."

What benefits do you think you would get from being more active?:

- Male, group 2: "Feeling better – more energy. Just feeling good."
- Male, telephone group: "Yes if I don't exercise, I don't sleep well – guilty conscience.
- Female, group 3: "You feel better about yourself."

Tell me about your own exercise in the past two weeks?:

- Male, group 1: "The most exercise I've had is tarping my load once a week."
- Female, telephone group: "I walk quite often- I also have one of those big balls on my truck."
- Male, group 2: "I carry dumb bells with me- other than that. I do that every other night."

What makes it hard for you to be active and stay active?:

- Male, group 1: "They don't make a truck big enough to exercise […] We are limited – even if you have the back of your trailer" (barriers to physical activity; access to gym facilities).
- Female, telephone group: "One of the frustrating things is that you can't make time every day at the same time to do something [physical activity]. Sometimes I can work out 7 days a week then there are other weeks when I can't even get one walk in" (barriers to physical activity; time).
- Male, group 3: "Odd schedule- Sometimes you deliver at 4 in the morning, get up and take off again. And by that time, you're dead tired" (barriers to physical activity; time, irregular sleep schedule).
- Male, group 1: "You know we're a long way from home. If you injure your back doing a pushup out here, I'm 700 miles from home. Who is going to drive that truck home?" (barriers to physical activity; fear of injury)
- Male, group 1: "[H] ow am I going to get to a shower when I'm finished to where I can be comfortable and go to sleep" (barriers to physical activity; access to showers).

Opinions about health information delivery

In general, truck drivers thought that radio, CDs, and podcasts were the best way to deliver information to them. Numerous participants stated that phone calls from health coaches would also be useful, "You can answer and say hey I'm driving let me get somewhere when I can stop, can I call you back, then call them back and go through the exercises" There were many suggestions from participants about what type of information they wanted. The list below lists some of the most common suggestions as well as participants' feedback concerning health coaches.

What health information do you need or want?:

- Male, group 1: "What I need is discipline […] sometimes a cheeseburger looks awfully good and I know that chicken salad would be better. I also have a difficulty with portion sizes. I almost feel that if you could help us with our discipline and portion sizes that would help me a lot."
- Male, group 1: "I guess I would like to know what to eat – check the blood pressure – if I breathe too heavily is my pressure going up? I don't know how it all works."
- Male, telephone group: "What about injury prevention? I know a lot of people have taken up running now – but then they get runners knee – injury avoidance would be good. Motivational things are always important."
- Male, group 3: "Information on ways to work it into your day, your schedule […] if you can pull into the truck stop and go work out in the gym for an hour and get back on the road, that would be great."
- Female, telephone group: "More of the nutrients – like what is an acceptable level of sodium? What is an acceptable level of fat content?"

Do you think a health coach would be useful for truck drivers? Someone to call and talk to about diet, exercise, and health?:

- Male, group 1: "Because a lot of us get tired, like we said before, we're tired and I'm going to bed, I'm tired. But if somebody just happened to at 5 o'clock, 6 o'clock, hey but you gonna do your exercise, man I forgot all about it, I also get so tired, you know okay."
- Male, group 2: "They could ask did you take your vitamins this morning, did you do this or do that."
- Male, telephone group: "Yes I do think that would help – somebody else who cares about you besides yourself and your wife – it would be kind of pressure to say yes I did my two miles today or I did ride my bike. So yes I think it would help but is it cost effective?"

Discussion

Principal findings

Truck drivers conveyed a desire for good health. However, many issues surfaced in the focus groups suggesting that health and healthy behavior challenges could be classified in our conceptual model based on Precede-Proceed Theory as predisposing factors, reinforcing factors and enabling factors/barriers. Their comments suggested considerable knowledge gaps regarding healthy eating, energy balance, and healthy weight. Barriers to healthy behavior included poor knowledge (predisposing factor), time, cost, access (enabling factors/barriers and environment) and for some, fear of getting hurt while exercising (reinforcing factors). Some truck drivers had not visited a physician for more than ten years, except when federally required to complete the commercial driver exams (enabling factors/barriers).

Most drivers were not aware of how to maintain a healthy weight (predisposing factors). Viewpoints on healthy foods were variable. Drivers recognized that healthy diet is important, but felt restricted in their choices on the road, a finding that is born

out in prior work (Apostolopoulos *et al.*, 2011; Whitfield Jacobsen *et al.*, 2007). The voiced barriers to physical activity on the road (e.g. time, space, facilities) were similar to responses to those captured by questionnaire from 300 commercial drivers in the USA (Turner and Reed, 2011). A sense of futility and lack of personal responsibility was reflected in their comments. This frustration is consistent with the characterization of trucking worksites as being active-living deserts, or environments devoid of active-living resources (Apostolopoulos *et al.*, 2012), but drivers believed that truck stop owners or company owners should bear the costs for improving availability and access to gyms, showers, and healthy food (enabling factors/barriers and environment).

These results provide some insight into why early efforts using small samples (Centers for Disease Control and Prevention, 2010) or single group design, including the FMCSA Getting' in Gear program (Roberts and York, 1999) were not successful at producing significant weight loss. An intervention focussed on the bus terminal environment was apparently not enough to effect significant weight changes (French *et al.*, 2007). In light of our findings this outcome is not surprising and suggest that successful interventions among commercial long-haul truck drivers should address the barriers (real and perceived) that drivers experience on the road. The successful of a pilot study can be understood as health coaches help individuals address barriers and promote facilitators at an individual level (Wipfli *et al.*, 2013).

Strengths and weaknesses

Strengths of this study include a moderator guide developed using Precede-Proceed Theory and focus groups conducted by an experienced moderator. Our study population is similar to other studies regarding overweight or obesity (Whitfield Jacobsen *et al.*, 2007; Bigert *et al.*, 2003; Hakkanen and Summala, 2001; Apostolopolous *et al.*, 2013; Wipfli *et al.*, 2013).

Limitations include that there is no way to know if the level of interest in health biased their participation in the focus group. The study was also limited by the nonprobability sampling approach and a sample too small to tabulate results. Expressing small numbers as percent can be misleading as one observation contributes several percent. Furthermore, The experienced moderator assessed agreement with statement by nonverbal indications such as head nodding, and the failure of opposing views to be offered. Therefore, specific numbers of individuals holding any one belief is difficult to pin down. Other behavioral models could have been utilized and might yield different findings. Nonetheless, strengths of this study include the use of a behavioral framework, the Precede-Proceed Theory to develop the questions for the moderator guide. An experienced moderator conducted all of the focus group sessions. Each session was digitally recorded. Recordings were transcribed in duplicate and data were organized using software designed for qualitative data. Consensus among researchers was used to develop subthemes from the responses. Our study population is similar to other studies regarding overweight or obesity among truck drivers (Apostolopolous *et al.*, 2013; Whitfield Jacobsen *et al.*, 2007; Wipfli *et al.*, 2013). Finally, focus groups were conducted until the moderator and other investigators agreed focus group questions were not generating new responses.

Meaning of the study

Successful weight loss programs for long-haul truck drivers should have broad applicability, with focus on changing truck drivers' responses to their environment and improved health indicators. This study adds to the growing body of evidence that

many truck drivers are in poor health and lack the tools needed to make positive health changes within their given work environments. Obesity prevalence estimates among truckers hover around 50-55 percent (Wiegand *et al.*, 2009; Martin *et al.*, 2009) This rate is approximately twice the self-reported rate of obesity (27.5 percent overall) from the 2010 "Behavioral risk factor surveillance system" survey (Centers for Disease Control and Prevention, 2010). Within both groups of truck drivers' blood lipids blood pressure was elevated, and waist circumference were commonly indicative of risk for metabolic syndrome, which increases risk of heart disease and diabetes (Ford *et al.*, 2002). Therefore, lifestyle intervention to address these risks is needed.

Unanswered questions and future research

The correct recipe for sustained weight loss success for truck drivers is unknown. Given that we cannot change the truck drivers' work environment quickly, an intervention using the Theory of Planned Behavior will not only address gaps in knowledge, but help the driver counter the predisposing factors, reinforcing factors, and barriers identified with behaviors that are possible within their working environment. Research is needed to understand whether implementing self-monitoring (e.g. weighing) enhances weight loss and weight loss maintenance in truck drivers. At the environmental level, research is needed to understand if truck stops offering healthy food can turn a profit and whether truck stop based fitness or health care can be successful.

Conclusions

These findings suggest the need for drivers take personal responsibility for health and healthy behaviors. Interventions to address knowledge gaps and enable positive individual decision making to replace futility are needed. The time and delivery method must be flexible and mobile, due to the nature of the commercial truck driving industry.

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Appendix. University of Utah

WHEEL FOCUS GROUP

Hello everybody and thanks so much for coming today. We're excited to have you here. This focus group aims to get your feedback about the WHEEL weight loss program that you have been participating in. My name is XXXXX and I am a XXXX.

Thanks so much for talking to us today about how we can help long haul truck drivers eat well and be physically active to achieve health. I know that you're all busy and have demanding jobs and lives, so I appreciate that you're taking the time to talk with us. We know that overweight contributes to many of the health problems that truck drivers face including some that limit a truck driver's ability to do their job, which is diabetes, sleep apnea and heart disease and a bunch of other health problems.

Our approach today will be that we will ask you a few open-ended questions and we would like you to respond. We may ask you to clarify or further explain your answers so that we can understand what you are saying. There are no right or wrong answers, so feel free to say anything and anything about your opinions. We respect that there are individual differences in each of the opinions and ask that you respect the opinions of others as well. We are going to

record our session today in addition to taking notes and the recorders are there on the table. All of the information that you share will be kept strictly confidential and your names will not be attached to any of the data other than your first names. We will not share the recordings with anyone or the transcripts from the tapes. Because we are taping the session, it is important that you only speak one person at a time. We are interested in knowing what you think and we want to make sure that everyone has a chance to present their opinions, so no wallflowers. I teach as well, so I may call on you if I see that you might have an answer. Remember that when you were in school you got called on sometimes. So we also want to be sure that we get the questions and get all the questions to the end of our list. We have about two hours to complete our discussion today. So please don't feel bad if we have to move the discussion forward. So sometimes you may be saying something really interesting but we have a time clock and xxx, is the bad cop for me, so she's going to let me know when we need to move on to the next session. We've already introduced ourselves so what we'd like you to do is just tell us your name.

(1) What is your general impression of the WHEEL weight loss program?

(2) What component of the program do you like best and why?

(3) What component of the program do you like least and why?

(4) Are you making progress towards meeting your goal for weight loss and why or why not?

(5) Which of the information that you have received is the most useful and why?

(6) What information that you have received is the least useful and why?

(7) Have you used the 500, 600 or 700-calorie meal cards, and if so what do you like about them. If not, why?

(8) Have you used the exercise information cards we provided? If so, what do you like about them, if not what don't you like about them.

(9) Have you used the cookbook, the oven, and the exercise equipment we gave you?

- What do you use the most, the least and what do you like/not like about them? What else could we provide instead?

(10) What form of contact has worked best for you?

(11) In your opinion, how often should we be contacting you in order to support you and help you to achieve your goal?

(12) What information do you need that you have not received?

(13) What changes should we make to the program?

(14) What are the changes that you have made that you think have contributed to your progress in reaching your goals?

(15) What changes would you like to make that you have been unable to make, and why have you been unable to make them? What do you need in order to make them?

(16) Did you have difficulty getting to the study visit? If so, why?

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