

RESEARCH ARTICLE

Work organization, health, and obesity in urban transit operators: A qualitative study

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Background: Urban transit operators have high rates of obesity, hypertension, and other cardiovascular risk-factors compared to other occupations. There have been few qualitative studies exploring the interrelationships between the organization of transit work, stress, and health including obesity, from the perspective of operators.

Methods: Five focus groups were conducted at five Divisions in a transit authority in Southern California and included 65 bus and rail operators.

Results: Operators reported a great deal of stress related to their work, including 1) time pressures and lack of recovery time; 2) long work shifts and overtime; 3) feeling unsafe when dealing with the public; 4) lack of respect from supervisors and management. Operators believed stressful working conditions negatively impacted their health and weight.

Conclusion: This qualitative study yielded new as well as confirmatory data about stress and transit work organization, health, and weight in operators. This study will add to future survey research and interventions in this population.

KEYWORDS

obesity, qualitative research, transit operators, work stress

1 | INTRODUCTION

Professional motor vehicle operators have the highest rates of obesity and hypertension prevalence compared to any other occupational group.^{1,2} Urban bus drivers, in particular, are more likely to be obese and experience heart attacks and cardiovascular disease.³⁻¹⁰ Operators are also more likely to report mental tension, fatigue, problems sleeping, musculoskeletal and digestive disorders, and have higher absenteeism and disability rates than in other occupations.^{7,11,12}

A large number of research studies show that work stressors such as shift work, long work hours, high work demands, and lack of job control (ie, job strain), effort-reward imbalance and low social support are linked to chronic illnesses including depression,^{13,14} high blood pressure,¹⁵⁻¹⁷ and cardiovascular diseases¹⁸⁻²² in general working populations. These stressors have also been linked to CVD risk factors such as low physical activity,^{23,24} stress-related eating,^{25,26} and obesity.^{27,28} Pandala et al²⁹ proposed a model describing how

occupational factors, including shift work, sedentary work, and job stress, might contribute to the obesity epidemic in the general population—beyond the constant of aging and the U.S. food and health culture. This model suggests work factors are an important site, beyond the individual, whereby “interventions” could lead to prevention.

Over 30 years of research has documented the particular work stressors confronting urban transit operators, including inflexible running times, rotating shifts, traffic congestion, and violence from passengers.¹² Ragland et al⁷ proposed a general policy framework on work and health in transit operators which recommended not to focus solely on individuals to address the problems, but to acknowledge the relationship between the transit system and the health of employees. They concluded this must include redesigning the transit system and organizational change within transit companies.

Qualitative studies offer the benefit of rich contextual detail^{30,31} and provide the means to more fully explore the organizational context

of work stressors, the various multi-level mechanisms influencing work and health, and the ability to incorporate the unique perspectives of transit operators. While there have been many quantitative studies on work and health in transit operators, there have been far fewer qualitative studies on work and health in general and only one, to our knowledge, with transit operators. The one qualitative study with Australian transit operators found that drivers perceived shift work and irregular driving times as a constraint on their participation in physical activity opportunities provided at work (eg, walking clubs, gym memberships),³² but this study did not examine these factors relative to weight gain or other health issues.

One cross-sectional survey study examined the associations of work hours with BMI, food intake, and physical activity in a group of Minneapolis urban transit operators who were mostly non-Hispanic whites (called the Route H study).³³ BMI was significantly higher among those drivers working 50 or more hours per week (compared to <40 h/week and 40-49 h), and male transit operators were also more likely to use vending machines at the transit division buildings than females. There was no significant association between work hours and BMI in female transit operators. Since work hours was the only occupational risk factor measured in the study,³³ little is known about the impact of other occupational risk factors on obesity in urban transit operators in the United States.

The purpose of this qualitative research study is to 1) identify the stressful elements of the work organization of transit operators in a diverse urban region; and 2) to understand from the perspective of workers themselves, how stressful transit work factors may impact their health and, in particular, weight gain and the development of obesity. In the long term, we expect that the information gained from our qualitative study, when coupled with a review of the existing literature and supplemented by a future cross-sectional survey (the design of which will be informed by our qualitative data) will generate a convergence of data. It will serve as a starting point for a collaboration with stakeholders to develop sustainable and feasible interventions to reduce weight and prevent illness.

2 | METHODS

2.1 | Background

In June 2014, we began a collaboration with a major metropolitan transit authority, the union representing transit operators, and the joint labor-management trust fund wellness program. Stakeholders attended several meetings and offered their support and ideas about this project, including representatives from management (eg, Chief Operating Officer, Risk Management, and Labor Relations), the joint labor-management trust fund and wellness program (eg, health insurance provider rep, Trust Fund Manager, and Wellness Program Coordinator), union representatives including the Local President and other officers, and several Wellness Ambassadors who are also current transit operators. CVD risk factors such as diabetes, hypertension, and obesity were of major concern for this transit authority and for operators, in terms of well-being, sickness

absences, and health care costs. The joint labor-management wellness program was addressing these health problems through wellness activities such as training peer operators as “Wellness Ambassadors,” and encouraging use of Division gym equipment, involving families in after-hours sporting events, and with the support of management, conducting “Wellness Wednesdays”—on company time—to educate and raise awareness about healthy eating and exercise. The ultimate goal of this collaboration is to develop an intervention study that could focus on work organization change as well as these ongoing worksite health promotion efforts.

The first step, based on a participatory research approach^{34,35} was to start with the everyday knowledge of operators themselves, to identify specific, stressful working conditions, and then discuss the effect of those working conditions on health and health-related behaviors, particularly weight-gain or obesity. Focus groups were conducted with 65 operators between November 2014 and April 2015 at five divisions, four bus terminals and one rail division.

2.2 | Focus group recruitment

Divisions were selected to participate in focus groups after discussions with transit operator stakeholders who decided based on the representation of different geographic regions and sizes (eg, suburban, downtown, urban; large or medium). Focus groups were conducted during “Wellness Wednesdays,” coordinated by each Division’s paid Wellness Ambassador. An IRB-approved recruitment flyer was sent via the Wellness Program Coordinator to the Wellness Ambassadors who provided this flyer to fellow operators to encourage participation in the focus groups. Operators participated during their own time (during a split shift) around noon on a Wednesday and we provided a free lunch to encourage participation. The project was approved by the authors’ institution Human Subjects Institutional Review Board (IRB) and each participant received an approved study information sheet regarding the voluntary nature of participation and confidentiality. Verbal consent to participate was received.

2.3 | Focus group participants

There were 12-14 participants in each of the five focus groups, with a total of $n = 65$ operators. Sociodemographic and health characteristics were collected from most of the participants ($n = 53/65$) using an anonymous survey form (see Table 1). Fifty-three percent of participants could be categorized as obese with a self-reported BMI >30 , while an additional 35% had a BMI in the overweight category (>25). This was very similar to the aggregated data from the main health care plan subscribers which showed 58.5% obese and 31% overweight. The subscriber data also showed similarities to the focus group participants with the average age of operators being 47 years and 34% were female. There were somewhat more Hispanic operators in the focus groups than in the population of operators (55% vs 40%) and slightly fewer African Americans (36% vs 44.8%).

TABLE 1 Operator Focus Groups—sociodemographic characteristics

		Focus group participants (n = 53)	Health plan subscribers, 2013 (n = 3756)
Age	Average age of operators	46.5 (24-62 yrs)	47
Gender	% male	59%	66%
Bus/rail	% rail operators	15%	-
	% bus operators	85%	-
Work hours	Average hours/day (range 8-13)	10.0	9.25 ^a
	Average days/week (range 5-7)	5.4	-
	Average hours last week	56.5	-
	Average years at MTA	12.0	-
Weight	Average weight (lbs.)	205.7	-
	Average BMI	31.7	-
Obesity	Normal	12%	11%
	Overweight >25	35%	31%
	Obese >30	53%	58.50%
Race/ethnicity	Black	36%	44.80%
	Hispanic	55%	40%
	White	0	6%
	Asian	5.60%	5%
	Native American	0	1%
	Other	3.77%	6%
Education	<High school	0.0%	-
	Some high school	1.8%	
	High School Diploma/GED	37.7%	
	Some college/AA	50.9%	
	Bachelors	9.4%	
	Graduate degree	0.0%	
Household income	<\$24 999	3.8%	-
	\$25 000-\$39 999	11.3%	
	\$40 000-54 999	26.4%	
	\$55 000-69 999	26.4%	
	\$70 000-\$84 999	18.9%	
	\$85 000-\$99 999	5.7%	
	\$100 000-\$149 999	3.8%	
	\$150 000+	3.8%	
Marital status	Married/living with partner	52.83%	-
	Divorced or separated	16.98%	
	Widowed	0.00%	
	Never married/single	30.19%	
Children at home	Yes	54%	-

^aFrom de-identified, aggregate administrative records.

2.4 | Conducting focus groups

Division Managers allowed the use of conference meeting rooms in the Divisions for the focus groups, but they and union representatives

were not present during the discussion. To protect operators' confidentiality, only first names were used and were not included in the transcripts. Quotations are anonymous in this paper. The first author moderated the focus groups and was accompanied by at least

one other member of the research team at each focus group. The focus groups were semi-structured with the moderator guiding the discussion by using the following question prompts but following up with other questions when necessary:

- What are the main occupational factors/stressors that impact your health and safety?
- Why do you think weight gain and obesity are an issue for urban transit operators?
- What are the barriers, constraints to healthy lifestyle behaviors (eg, healthy diets, exercise etc.)?

Focus groups were audio-recorded and transcribed and were analyzed in NVivo, a qualitative data analysis software program. Focus group discussions were analyzed by the moderator (MD), using grounded theory methodology, a heuristic, inductive approach which provides a road-map for organizing the most frequently discussed ideas into thematic content.^{36,37} Two co-authors present at various focus groups reviewed the transcripts and the NVivo documents, to verify the accuracy of the analysis (see appendix A for further discussion of qualitative research methodology).

3 | RESULTS

There were *four main themes* regarding “stressful work organization” that were the most consistently raised by operators: 1) time pressures and lack of recovery time; 2) long work shifts and overtime; 3) feeling unsafe when dealing with the public; 4) lack of respect from supervisors and management. These are discussed below. There were additional issues raised less frequently such as: incidents with poor equipment, ergonomics, and the physical environment, which are not discussed in detail in this article.

Operators believed the stress from their working conditions negatively impacted their overall health. Specifically, operators identified three interrelated “sub-themes” related to “work organization, obesity and health behaviors”: 1) sedentary nature of driving; 2) eating behaviors and lack of exercise; and 3) inadequate sleep and fatigue. They described how work affected their health, particularly weight, directly or by affecting their ability to practice a healthier lifestyle. There were some disagreements at this level from some individuals who did find ways to eat healthily and exercise regularly, but these operators tended to be the exception rather than the norm.

3.1 | Stressful work organization

3.1.1 | Time pressures and lack of recovery time

“Schedules stress you out more than anything. Trying to make that little three minutes, or four minutes they give you to get to the next stop.” (Female Bus Operator)

At every focus group, the primary work-related factors that operators agreed impacted their health and safety were time pressures and schedules. Operators clearly knew their job was to leave on time, to keep to the timetable, and to serve the public ridership who depended on the timeliness of public transit to get to work. However, the main problems they identified as causing time pressures and delays were that a) timetables did not always match up to the reality of traffic conditions; b) there was equipment failure; and c) higher than anticipated passenger loads, which often slowed them down and were beyond their control:

“Ideally, somebody wrote down these times and there was no traffic. There was nobody with walkers. There were no wheelchairs – There was nobody under the age of 45 that could easily get in and out of the bus. And everybody had [TAP] cards and they all worked. [laughter]” (Female Bus Operator)

According to operators, there are many factors, apparently unaccounted for when developing the timetables, that slow down a run and make it frequently impossible for drivers to make it within the allocated minutes to the next stop. A typical work run can last from an hour and a half to over 2 h and given delays, the 15-20 min recovery time provided for in the collective bargaining contract can get whittled down to much less than that.

Most operators described how the limited recovery time between runs was not enough to get something to eat or sometimes even to use a restroom.

“This is me at every layover – “Whoa, I’m already late because I got somebody in front of me ain’t driving right. Go to the bathroom, use it, “Damn, time for me to go back.” Look at the stress – I’m going back – just from sitting on the toilet. I’m looking at the floor, it’s nasty. The wall is nasty. I’m washing my hands, it’s nasty. I’m stressed out.” (Female Bus Operator)

Having to hold one’s bladder can cause stress and distraction, particularly dangerous when one is an urban transit operator. Limiting fluid intake can also have long term detrimental effects on one’s health. Those operators on diuretics for hypertension control may be even further affected or physicians may prescribe more expensive anti-hypertensives which will increase the health care costs for the transit authority and for operators.

Repeatedly, operators explained that they were told by management that the recovery time is not for the operator but for the vehicle. Recovery time allows time to turn vehicles that are running late around to start on time for the next run.

“... because the main thing, like they said the recovery time at the end of the line is not for the operator. It’s for the vehicle, okay? That’s what they tell you. The recovery time

is not for the operator. It's for the vehicle to make sure you leave on time okay? (Male Rail Operator)

"When I picked up my daughter from the babysitter she was sleeping. When I dropped her off she was sleeping. So you know, that messes a lot with your family time." (Female Rail Operator)

3.1.2 | Long work shifts and overtime

The second major work factor that a majority of the operators discussed as impacting their health and weight were long work shifts, rotating hours, and being on the "extra board." A regular shift is 8 h of driving time, with a 2-3 h unpaid "split" which can break any shift into two periods, making most days around 10 or 11 h in length or even more if there is overtime. "Extra board" operators do not have a regular schedule but are guaranteed 8 h and usually have a 3-h (or more) unpaid split. Add commute times, which can commonly be up to 2 h a day or more, and operators can be away from home for a minimum of 12 h/day up to 16 h. Operators are required by transportation regulations to have a minimum of 8 h in-between finishing one shift and beginning another. Many operators stated this was not enough time to eat, be with family and sleep.

"Our sleep time, our recovery time, is bad because they give us eight hours. Sometimes we get off, then we've got to drive home, we have to go home, take a shower, eat. That goes like an hour and a half, two. Then you get another four hours of sleep, then you wake up another hour and a half early. You've got to drive back over here again." (Male Bus Operator)

Overtime and bidding on the "extra board" are not mandatory, operators can "bid" or "choose" to do overtime, but the transit authority also depends on overtime to cover shifts. Overtime hours (over an 8-h shift in a day and 40 h in a week) are paid at time and a half; a strong incentive to work additional hours when the top hourly wage for a "Tier 2" (hired after 1997) employee is only \$23.94/h.

"Work kills you, but that's the only way you can get hours and make more money, especially if you don't have enough seniority – so you have to work to get extra hours." (Male Bus Operator)

While the extra money is motivation for working more hours, most operators recognized there were consequences to working long hours; they did not get enough sleep and were fatigued most of the time:

"You know some of the times operators just breakdown from fatigue, you're tired. You know, we've had situations where operators have had accidents because of fatigue you know..." (Female Rail Operator)

In addition to the effects of long work hours, operators talked about how the minimum 8-h recovery time negatively affected their family life:

Work-family conflict or imbalance is a well-known stressor that negatively impacts physical and mental health.³⁸ Managing family life and a job as an operator was cited mostly as a problem by female operators who are still more likely to be responsible for child care and domestic duties than men are.

3.1.3 | Feeling unsafe when dealing with the public

Bus operators, rather than rail operators, consistently discussed the stress involved in dealing with the public who often blamed them for the buses running late:

"Another thing that makes stress – is that when you're late and you're picking up people or if you're not late, people complaining about everything..." (Female Bus Operator)

In every focus group involving bus drivers, nearly all had experienced verbal abuse and insults on a daily basis. One operator said he felt they were treated "worse than waiters without tips." Many bus operators had experienced some kind of physical assault or were anticipating the possibility of physical assault on a daily basis. There were also several descriptions by operators' of having to deal with passengers who were being beaten up by other passengers, who used drugs on the bus, or who were mentally ill and acting out of control:

"It's hard to concentrate on the bus when you're picking up schizophrenics who are off their meds. And they run up and down your bus – stomping their feet, ranting and raving. And it takes your focus away from driving because you don't know what this person's capable of. I'm too busy – she's going to come up here and slice my throat when I'm at a light, or while I'm driving. You know, or put a bullet in my head 'cause some little voice told her to do it. That is my biggest concern." (Female Bus Operator)

The County Sheriff's department patrols the metro system, however operators said that while it really did make a difference to have Sherriffs riding on the bus, they were spread too far and were too few.

Managing fare evasion, a frequent occurrence according to most operators, was also a major stressor:

"Right. If they don't want to pay the fare – I believe that a lot of people – they're already embarrassed about that so then they get on the bus – and especially if it's a guy and you're a female driver, they want to intimidate you" (Female Bus Operator)

Most operators said they were told by management to “quote the fare” but not to “push it” with passengers who refused to pay in order to avoid conflict.

Dealing with passengers, as described in section 3.1.3, while at the same time driving a bus in varying and difficult traffic conditions and being responsible for the safety of those passengers creates a situation that Belkic et al³⁹ have called “threat avoidant vigilance” (TAV). TAV is an inherent and stressful part of the job of a transit operator and is linked to cardiovascular risk factors including high blood pressure.^{40,41}

“... They cut us off [other motorists], they don't respect the bus. We have people on board. We have to make a decision. We have three seconds at most to either hit the car, slam on our brakes or throw somebody over, make a decision in three seconds and then we come back to a, we call it an accident review board. They're going to charge us and say, “You should have done this and you should have done that, you should have leaned over.” I could sit in this chair and I could come out with a million things that you should have done, but the reality is, we all have about – I think maybe three seconds is overdoing it. We have a second to react in our defense. There's a lot of stress factors for us operators, challenges.” (Male Bus Operator)

Threat avoidant vigilance and other kinds of emotional demands associated with dealing with hostile encounters with the public could lead to fatigue and burnout and other health problems.

3.1.4 | Lack of respect from supervisors and management

Another issue that arose repeatedly for operators in every focus group was stress arising from a lack of respect from supervisors and a general lack of support from management.

“They want you to respect them but they don't want to respect you.” (Male Bus Operator)

“And it's like they talk down to you instead of talking to you at an equal level, it's like “Okay I'm a controller, I'm better than you” and they'll just talk – degrade you and when they degrade you they're doing it over the radio in front of everybody. So it makes you feel less of a person ” (Female Bus Operator)

During several focus groups, operators stated that the controllers did not understand the realities of being on the bus or train lines. This was also a source of frustration and stress when they were being told to hurry up.

“Some of them don't do it respectful but I'm saying to understand where we come from as operators, you see what I'm saying? You're saying you're only sitting there at that

little board in that little screen, you're not out there with all these people on the train and now you sweating bullets going back and forth, you got people sitting in and looking at you and they [the controller is saying] “Have you moved the train yet? Can you move the train yet? You need another troubleshooter?” No. I don't need another troubleshooter, not that's in a hurry.” (Female Rail Operator)

In addition to the day-to-day hassles and disrespect many experienced from immediate supervisors, many operators also discussed problems with Division management. They noted some variation in the leadership skills of managers, with some managers having better “people skills” than others:

“If you had managers that would just sit back and like try to – you know help solve some of the operator's problems or whatever or work with us, whatever, then the morale and everything would be a little bit different. But then when you have a manager you come in and you pass one in the hallway they don't even say good morning, then you don't even want to come here either” (Female Bus Operator)

Given “shake-ups,” which occur every 6 months, Division Managers and operators can change quite often. This could be beneficial for those who have a manager who is not working well with the operators, but some operators who are pleased with their manager may feel disappointed when they are moved in the reshuffle.

Repeatedly operators said they felt that the organization did not care about the operators:

“... It's like the company is against us, that's what I feel.” (Male Bus Operator)

“If the company thought and cared about the operators; which we are the backbone of the company, if there are no bus operators, if there's no train operators, it's no CEO, it's no manager, it's no TOS, it's no operations okay? So why not take care of the ones that's making the money for you?” (Female Rail Operator)

Working for an organization that is considered fair and just with support from supervisors has been shown to reduce the risk of cardiovascular and psychiatric illness.^{42,43} Behavioral factors and sleeping problems may also explain some of the underlying health problems linked to organizational injustice.⁴⁴

3.2 | Work organization, obesity, and health behaviors

“...29 years ago. I was a waist 34 and now I'm no 34 no more. I think it's just we work long hours which – by our choice, it's our choice.” (Male Rail Operator)

Given the high rates of obesity among transit operators, we specifically asked each focus group to discuss obesity and weight gain. Like the operator quoted above, most believed that operators did not necessarily start out obese, but gained weight because of the nature of the job. Operators generally believed that their work was very stressful and that there were “pressures of the job” that affected their health and the ability to participate in healthy lifestyle practices. Operators discussed how specific aspects of the organization of their work affected weight gain directly because of the: 1) sedentary nature of driving, and also how it affected their health behaviors; 2) eating behavior and lack of exercise; and 3) inadequate sleep and fatigue.

3.2.1 | Sedentary nature of driving

One significant cause of operator weight gain as many operators agreed, is the sedentary nature of transit work:

“We’re sitting down 80% of that time and like I said I think that’s what kills us. We’re sitting down. When we eat, we eat in 15 minutes or less.” (Male Rail Operator)

The sedentary nature of driving was acknowledged as a major concern for operators and, most operators said they did not have sufficient time during work to stretch or move around enough. However, several operators did say they used their split time to exercise, including playing tennis, running, or walking, or using the gym equipment provided in the Division, suggesting there may be some variability in sedentariness among operators.

3.2.2 | Eating behavior and lack of exercise

“Even if I would have time, I wouldn’t pack my lunch and stuff. I think the shortness of time makes you make bad decisions because you gotta get something quick, you got something that’s gonna fill you and you don’t have the time.” (Male Bus Operator)

The effects of work schedules, including time pressures, long hours, and overtime, on eating and exercise played a substantial role in why operators believed there were weight problems among them. The operator quoted above also emphasized how the lack of recovery time after a run, beyond the long hours of sitting, led to “fast eating.” The following operator reflected how food choices were also limited because of a tight work schedule:

“I think it has to do with what a lot of the operators were saying pretty much our work schedule takes up a lot of our time, which causes us lack of sleep, lack of nutrition. Our layover times, eight minutes, we just pick up something on the way, “to go,” McDonald’s, something small, snacks. We’re limited in our resources of nutrition that we can eat.

Pretty much it has to be in a box, some type of fruit but you can only go to so much with fruit. So a lot of it has to do with our work schedule ...” (Male Bus Operator)

Many operators pointed out that the long hours and 8-h recovery time led many to caffeinate heavily or use high calorie energy drinks rather than come to work fatigued:

“... this company don’t realize they’re giving these operators eight hours rest time and then when they come back to work, they’re downing Red Bulls, Monsters” (Male Rail Operator)

As another bus operator explained, having a family to take care of, on top of long work shifts, can also affect the time available to exercise:

“And realistically, if I had her energy, or her time, then I’d be riding a bike too, to see my co-workers. But I have children, so the time that I’m not here or asleep – I’m at home trying to take care of them. Make sure they go to school. Make sure they have their stuff in hand. Make sure their clothes are washed at 12 at night when I’m coming home so they can be ready at 7:00 in the morning, but I got to leave my house at 3:00 in the morning to get here at 5:00.” (Female Bus Operator)

3.2.3 | Inadequate sleep and fatigue

Another concern with the long work shifts and insufficient recovery time between shifts, was the resulting limited sleep and fatigue. Many operators said that they were just too tired to work out or that sleep had to take priority over regular exercise:

“I’m a little bit older now and I’m tired when I get off that bus. I mean, I just want to go home and sleep. And on my days off – I’m sleeping. I mean, I have an exercise bike at home too. But when I was at home [off work], I was on that bike and I lost weight and I gained it all back before I came back here, I did, gained it all back.” (Female Bus Operator)

“Yeah, there’s no motivation [to work out]. When you get home, you’re tired.” (Male Bus Operator)

In addition to the dangers of fatigue while driving, operators’ were clear that the level of stress-related fatigue due to their jobs was a significant factor in affecting their motivation to exercise. This is not an uncommon situation as work hours increase in many occupations in the United States,⁴⁵ and it should not be surprising that working people may not meet recommended weekly exercise goals. While the union and operators organized to include exercise equipment in most divisions, operators may only use the gyms when not on duty. Some of

the gym equipment was broken or inadequate for more than just a few people at a time according to the operators and our own observations.

4 | DISCUSSION

To our knowledge, this is one of the first qualitative studies to explore occupational risk factors and health, including obesity in urban transit operators. The qualitative findings offer some rich contextual details for how work organizational factors in this transit agency might affect the health of transit operators, from their perspective. The occupational stressors described by operators in this qualitative study are consistent with, and therefore reinforce the observations about stressful work organization factors documented in quantitative studies of urban transit operators: including such factors as tight timetables, high passenger loads, traffic congestion, turn-around time. The operators' observations may also reflect exposure to workplace psychosocial stressors such as the demand-resource model.^{12,46} In addition to "high job demands," operators in this study identified that feeling unsafe when dealing with difficult passengers, and experiencing a lack of respect from management and their organization were chronic stressors that also affected their health and well-being.

However, the unique contribution made by this qualitative study, that has not been reported in prior literature is *how* certain occupational factors may be influencing the health and weight of transit operators. Time pressures (related to tight timetables and short rest breaks) were indicated by operators to be affecting their physical activity levels, and encouraging the use of fast food, snacking, and eating fast due to a lack of time. The minimum 8-h recovery time (between ending and starting a shift) resulted in long hours including long unpaid split times, and was considered by many operators to be too short to allow them to commute home, eat healthy meals, spend time with family, and to get sufficient sleep, let alone incorporate leisure-time physical activity. Fatigue linked to inadequate recovery time and long hours, was a chronic problem reported by operators' in these focus groups. Operators disclosed that caffeinated and high-calorie energy drinks were commonly used to stay awake, an evident safety concern and a likely contributor to weight problems. There appear to be a cascade of effects resulting from the schedule and its production of inadequate rest and recovery time.

In the qualitative study of Australian urban transit operators, the authors reported that irregular driving times constrained participation in physical activity among drivers, consistent with our findings.³² The Route H survey study of Minnesota transit operators,³³ also reported that long hours were associated with BMI in male operators. However, there was no such association in female operators in that study where hours of un-paid household work and work-family conflict were not examined. In our study, women operators discussed the conflicts between long and irregular work schedules and caring for children and other domestic responsibilities. Work-family imbalance is another work stressor that is also associated with burnout, anxiety and depression and has been shown to be related to increases in blood pressure and weight in some studies.⁴⁷ It was also suggested by transit

operators that these conflicting responsibilities could further constrain women with children from exercising compared to women without children or partners; potentially increasing the risk for cardiovascular illnesses and weight gain among women operators.

It seems clear that assessing transit operator exposure to high demands such as, tight timetables, insufficient recovery time between runs, and long work shifts in association with eating, exercise, and sleep will be an important next step in a future cross-sectional survey. Gender differences in physical activity and exercise levels both at work and at home, hours committed to domestic duties, and schedules, would also be of importance to investigate further.

4.1 | Work organization interventions to reduce chronic illness and obesity in transit operators

4.1.1 | Time pressures and rest breaks

Time pressures and insufficient rest breaks (eg, tight timetables, higher passenger loads, more traffic, turn-around time) have been linked in several bus driver studies to cardiovascular reactivity and other indicators of biological arousal (eg, increased noradrenaline) associated with stress.^{48,49} Operators discussed the possibility of an adjustment of timetable schedules to allow for adequate recovery time between runs so that operators could use the restroom and have time to eat. However, the general consensus was that despite management having mechanisms for changing timetables, this was not occurring and in fact passenger loads were increasing, suggesting higher work demands.

Some progress is underway nationally on the operator restroom access issue. ATU and TWU began a campaign in the United States and Canada to enforce the OSHA Sanitation Standard (29 CFR 1910.141). The standard requires that employers provide access to an adequate number of sanitary and fully equipped restroom facilities in places of employment. Employers of mobile crews (such as bus operators) are exempt from the requirement if employees can leave their work locations (buses) "immediately" for a "nearby" toilet. OSHA says that "restrictions on access must be reasonable, and may not cause extended delays."^a

4.1.2 | Long work hours and 8-h recovery time

Focus group participants reported working 10+ hours per day on average and over 5 days per week (Table 1) and many chose to work on the "extra board" which gives the potential for much longer shifts as well as overtime pay; a financial incentive. Long work hours at a sedentary job can lead to low caloric expenditure and weight gain and has been associated with obesity.^{26,28} Long work hours and rotating shift work are also known risk factors for cardiovascular diseases.^{21,50,51} Operators suggested that extending the minimum "recovery time" of 8 h could give more adequate time for family (eg, improved work-family balance), sleep and healthier behaviors such as exercise and healthier eating choices. Rail operators in one focus group explained that a longer recovery time had been implemented briefly at

their division, but they were unsure of why it reverted after just a few weeks.

4.1.3 | Dealing with the public

The issue of fare evasion and the possible threat of violence or abuse from passengers, while at the same time needing to maintain constant vigilance amid traffic congestion, were common themes among focus group participants. Managing the potential threat from mentally ill passengers, or abuse both physical and verbal, is a hidden part of transit work. “Emotional labor” is the requirement to manage one’s own emotional display in order to manage the content of an encounter with the public. It is also a work stressor related to burnout and depression.⁵² Threat avoidant vigilance—the term used by researchers to describe the necessity in some jobs to maintain a high degree of alertness to avoid catastrophes—is also common among transit operators and many described this stressor in managing the conflicting demands of traffic and unruly passengers. Threat avoidant vigilance, particularly in bus drivers, has been linked to hypertension and cardiovascular disease.⁶

Some operators mentioned that Public Service Announcements (PSA’s) aimed at the ridership and use of the Metro system had been produced in the past. However, PSAs did not explicitly deal with civility towards the driver or what to do if someone was becoming abusive or violent toward the driver. Beginning in March 2015, the transit authority launched a safety campaign including new engineering features (123 buses fitted with safety barriers and Closed Circuit TV monitors in 166 buses). The transit authority reported a decrease in crime, including driver assaults where CCTV monitors were installed. There were mixed reports from these operators about the CCTVs, however, and about the amount of policing available. Operators said the cameras were often broken or ended up being used predominantly to monitor their performance or infringements. Some women operators did say that when Sheriffs were on their buses regularly, they felt safer.

4.1.4 | Lack of support from managers, supervisors, and the organization

Operators’ in these focus groups suggested that supervisors and managers needed more and better training to limit disrespectful treatment of operators. Some operators said they had suggested to management the need for cross-training whereby controllers and managers might spend time riding along with an operator to understand the realities of traffic conditions and passenger loads. However, they were told there were insufficient resources; they “couldn’t afford it.” Operators were reportedly consulted by management during “rap sessions” at the Divisions. However, several operators said when they had raised concerns, these had not been addressed or were not addressing the specific conditions of the area they were serving. Repeatedly, operators complained that upper management did not really care about operators and they believed that their health and welfare were not a priority. This could reflect a lack of

organizational support and fairness, also called “organizational injustice,” which has been found in a growing research literature to contribute to poor mental health, sleep problems, cardiovascular disease, and sickness absence.⁴⁴

4.1.5 | Wellness program

Operators also had suggestions on elements of the Wellness Program that may encourage healthier lifestyle practices. Several operators suggested an overhaul to the “quiet rooms,” which often doubled as TV rooms, so that during the split time they might be able to rest and even take a nap to recover from the long hours and insufficient sleep. Operators were provided access to gym equipment at each Division, which were mostly bought by the operators’ themselves; however, the equipment was often in ill-repair and was limited in quantity. It was not clear how many operators actually used the gym equipment; and it appeared that the main users tended to be male operators.

The joint-labor management Wellness Program is having some successes in training and paying Wellness Ambassadors to work at Divisions to encourage healthy behaviors. A key success was making exercise and wellness activities for employees and their families available on weekends. However, it was acknowledged that participation rates could be improved. Several operators suggested that incentivizing participation in Wellness Program activities might boost participation and that offering incentives such as gym memberships in the neighborhood would be helpful.

“I know like when I am on a treadmill, I can put my movie on but sometimes all three treadmills are taken. Yeah but if they can’t bring in more equipment due to space, I understand that. Give us a membership to a gym that’s close by. If I have a three-hour split, I could work out for an hour, shower, get something to eat and come back ...”
(Female Bus Operator)

4.1.6 | Intervention studies

Two intervention studies targeting BMI as well as other CVD risk factors in drivers focused mainly on worksite health promotion efforts to increase exercise and encourage healthier eating.^{53,54} The Route H study targeted changes to vending machines and improvements in the exercise environment, but did not find significant intervention effects on BMI.⁵⁴ Both studies concluded that work hours and other work environment factors (time spent in the workplace vs driving) were significant constraints on driver’s participation in the intervention programs, corroborating what operators told us in this study. There have been a few successful European-based intervention studies that have shown that improvements in the bus driver work environment (bus only lanes, reducing curves on the route, and improving information service for the public) resulted in lowered psychosocial stressors and, in some cases, lower cardiovascular risk factors, and

other illnesses.^{55–57} Unfortunately, intervention studies focused on the work organization of transit operators (schedules, hours, recovery time, or rest breaks) have not yet been repeated in the United States.

4.2 | Strengths and limitations

Qualitative research, by definition, is knowledge derived by a consensus of language evoked by people talking about their everyday world. It answers why and how questions, rather than quantitative questions about frequency or “how many” and therefore what is learned is not necessarily as generalizable as a randomly-selected population survey (see appendix A). However, the focus group participants in this study were generally comparable to the larger transit operator population in this transit authority, in terms of sociodemographic and work-related characteristics (Table 1). Transit stakeholders confirmed the representativeness of the selected Divisions from different regions of the transit authority. A limitation of these focus groups is that we could not address any race/ethnicity differences in exposure to occupational risk factors or on perception of body weight and obesity which have been reported in the literature previously in non-transit populations.⁵⁸

4.3 | Future research

Given the convergence with the existing epidemiological literature of the contextual information provided by this qualitative study, we have developed a theoretical framework⁴⁶ that can be utilized to inform the design of a future cross-sectional survey study. This new survey will be based on a broader, representative population of urban transit operators working for the same transit authority and will be conducted in collaboration with the transit stakeholders involved in the current study. The goals of this future research are as follows: 1) to utilize the survey to confirm the focus group results in a larger population whereby correlations between measurable work stressors and self-reported or clinically measured health outcomes can be tested and confirmed; 2) address still unanswered questions about gender and race/ethnicity differences or inequalities in occupational exposures and perceptions of body weight and health; and 3) enhance and supplement the existing workplace health promotion program(s) by utilizing findings from the focus groups and the proposed survey. Future findings will be discussed with stakeholders and we plan to develop, by consensus, specific targeted interventions involving work organizational changes.

5 | AUTHORS' CONTRIBUTIONS

Marnie Dobson participated in all aspects of the work including the conception of the work; acquisition, analysis, and interpretation of the data, drafting and revising it for intellectual content, and final approval. She is fully accountable for all aspects of the

work in ensuring that questions related to the work are appropriately investigated and resolved. BongKyo Choi and Peter Schnall each participated in the conception of the work, were partially involved in the acquisition and provided oversight regarding the analysis and interpretation of the data; they helped revise it for intellectual content and were involved in the approval of the final version.

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ETHICS APPROVAL AND INFORMED CONSENT

The University of California, Irvine, Human Subjects Institutional Review Board approved this research. Participants were given written study information and verbal consent to participate was obtained.

DISCLOSURE (AUTHORS)

The authors report no conflicts of interest.

DISCLOSURE BY AJIM EDITOR OF RECORD

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

DISCLAIMER

None.

ENDNOTE

^a http://www.atu.org/atu-pdfs/STRAT_BathroomBreakHandout.pdf

REFERENCES

1. Caban AJ, Lee DJ, Fleming LE, Gomez-Marin O, LeBlanc W, Pitman T. Obesity in US workers: the national health interview survey, 1986 to 2002. *Am J Public Health*. 2005;95:1614–1622.
2. Davila EP, Kuklina EV, Valderrama AL, Yoon PW, Rolle I, Nsubuga P. Prevalence, management, and control of hypertension among US

- workers: does occupation matter. *J Occup Environ Med*. 2012;54:1150–1156.
3. Netterstrom B, Laursen P. Incidence and prevalence of ischaemic heart disease among urban bus drivers in Copenhagen. *Scand J Soc Med*. 1981;9:75–79.
 4. Rosengren A, Anderson K, Wilhelmsen L. Risk of coronary heart disease in middle-aged male bus and tram drivers compared to men in other occupations: a prospective study. *Int J Epidemiol*. 1991;20:82–87.
 5. Tuchsén F. Stroke morbidity in professional drivers in Denmark 1981–1990. *Int J Epidemiol*. 1997;26:989–994.
 6. Belkic K, Emdad R, Theorell T. Occupational profile and cardiac risk: possible mechanisms and implications for professional drivers. *Int J Occup Med Environ Health*. 1998;11:37–57.
 7. Ragland DR, Krause N, Greiner BA, Fisher JM. Studies of health outcomes in transit operators: policy implications of the current scientific database. *J Occup Health Psychol*. 1998;3:172–187.
 8. Evans GW. Working on the hot seat: Urban bus operators. *Accid Anal Prev*. 1994;26:181–193.
 9. Wang PD, Lin RS. Coronary heart disease risk factors in urban bus drivers. *Public Health*. 2001;46:149–155.
 10. Bigert C, Gustavsson P, Hallqvist J, et al. Myocardial infarction among professional drivers. *Epidemiology*. 2003;14:333–339.
 11. Gillespie R, Wang X. Developing best-practice guidelines for improving bus operator health and retention. Part I: a transit workplace health protection and promotion practitioner's guide, Part II: final research report Transportation Research Board Business Office. Available from: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_169.pdf
 12. Tse JLM, Flin R, Mearns K. Bus driver well-being review: 50 years of research. *Transportation Res*. 2006;F9:89–114.
 13. Siegrist J. Chronic psychosocial stress at work and risk of depression: evidence from prospective studies. *Eur Arch Psychiatry Clin Neurosci*. 2008;258:115–119.
 14. Theorell T, Aronsson G. A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health*. 2015;15:738.
 15. Landsbergis P, Dobson M, Koutsouras G, Schnall P. Job strain and ambulatory blood pressure: a meta-analysis and systematic review. *Am J Public Health*. 2013;103:e61–e71.
 16. Gilbert-Ouimet M, Trudel X, Brisson C, Milot A, Vezina M. Adverse effects of psychosocial work factors on blood pressure: systematic review of studies on demand-control-support and effort-reward imbalance models. *Scand J Work Environ Health*. 2014;40:109–132.
 17. Trudel X, Brisson C, Milot A, Masse B, Vezina M. Adverse psychosocial work factors, blood pressure and hypertension incidence: repeated exposure in a 5-year prospective cohort study. *J Epidemiol Community Health*. 2015;70:402–408.
 18. Kivimäki M, Nyberg ST, Batty GD, et al. Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data. *Lancet*. 2012;380:1491–1497.
 19. Vyas M, Garg A, Iansavichus A, et al. Shift work and vascular events: systematic review and meta-analysis. *Br Med J*. 2012;345:e4800.
 20. Fransson EI, Nyberg ST, Heikkilä K, et al. Job strain and the risk of stroke: an individual-participant data meta-analysis. *Stroke*. 2015;46:1–3.
 21. Kivimäki M, Jokela M, Nyberg ST, et al. Long working hours and risk of coronary heart disease and stroke: a systematic review and meta-analysis of published and unpublished data for 603 838 individuals. *Lancet*. 2015;386:1739–1746.
 22. Schnall PL, Dobson M, Landsbergis P. Globalization, work, and cardiovascular disease. *Int J Health Serv*. 2016;46:656–692.
 23. Fransson EI, Heikkilä K, Nyberg ST, et al. Job strain as a risk factor for leisure-time physical inactivity: an individual-participant meta-analysis of up to 170,000 men and women: the IPD-Work Consortium. *Am J Epidemiol*. 2012;176:1078–1089.
 24. Nyberg ST, Fransson EI, Heikkilä K, et al. Job strain and cardiovascular disease risk factors: meta-analysis of individual-participant data from 47,000 men and women. *PLoS ONE*. 2013;8:e67323.
 25. Choi B, Schnall PL, Yang H, et al. Psychosocial working conditions and active leisure-time physical activity in middle-aged US workers. *Int J Occup Med Environ Health*. 2010;23:239–253.
 26. Choi B, Dobson M, Schnall P, Garcia-Rivas J. 24-hour work shifts, sedentary work, and obesity in male firefighters. *Am J Ind Med*. 2016;59:486–500.
 27. Nyberg ST, Heikkilä K, Fransson EI, et al. Job strain in relation to body mass index: pooled analysis of 160 000 adults from 13 cohort studies. *J Intern Med*. 2012;272:65–73.
 28. Solovieva S, Lallukka T, Virtanen M, Viikari-Juntura E. Psychosocial factors at work, long work hours, and obesity: a systematic review. *Scand J Work Environ Health*. 2013;39:241–258.
 29. Pandalai S, Schulte P, Miller D. Conceptual heuristic models of the interrelationships between obesity and the occupational environment. *Scand J Work Environ Health*. 2013;39:221–232.
 30. National Institutes of Health and Office of Behavioral and Social Sciences Research. *Qualitative Methods in Health Research. Opportunities and Considerations in Application and Review*. Washington, DC: National Institutes of Health; 1999.
 31. Gordon DR, Ames GM, Yen IH. Integrating qualitative research into occupational health: a case study among hospital workers. *J Occup Environ Med*. 2004;4:399–409.
 32. Wong JYL, Gilson ND, Bush RA, Brown WJ. Patterns and perceptions of physical activity and sedentary time in male transport drivers working in regional Australia. *Aust NZJ Public Health*. 2014;38:314–320.
 33. Escoto KH, French SA, Harnack LJ, Toomey TL, Hannan PJ, Mitchell NR. Work hours, weight status, and weight-related behaviors: a study of metro transit workers. *Int J Behav Nutr Phys Act*. 2010;7:91.
 34. De Koning K, Martin Me. *Participatory Research in Health: Issues and Experiences*. London: Zed Books; 1996.
 35. Deutsch S. The contributions and challenge of participatory action research. *New Solut*. 2005;15:29–35.
 36. Corbin J, Strauss A. Grounded theory research: procedures, canons, and evaluative criteria. *Qual Sociol*. 1990;13:3–21.
 37. Strauss A, Corbin J. *Basics of Qualitative Research*. Beverly Hills: Sage Publisher; 1990.
 38. Amstad FT, Meier LL, Fasel U, Elfering A, Semmer NK. A meta-analysis of work–family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *J Occup Health Psychol*. 2011;16:151–169.
 39. Belkic K, Savic C, Theorell T, Rakic L, Ercegovic D, Djordjevic M. Mechanisms of cardiac risk among professional drivers. *Scand J Work Environ Health*. 1994;20:73–86.
 40. Emdad R, Belkic K, Theorell T. Cardiovascular dysfunction related to threat, avoidance, and vigilant work: application of event-related potential and critique. *Integr Physiol Behav Sci*. 1997;32:202–219.
 41. Schnall PL, Belkic' K, Landsbergis P, Baker D. The workplace and cardiovascular disease. *Occup Med*. 2000;15:1–322.
 42. Kivimäki M, Ferrie J, Brunner E, et al. Justice at work and reduced risk of coronary heart disease among employees: the Whitehall II Study. *Arch Intern Med*. 2005;165:2245–2251.
 43. Ferrie JE, Head J, Shipley M, Vahtera J, Marmot MG, Kivimäki M. Injustice at work and health: causation, correlation, or cause for action? *Occup Environ Med*. 2007;64:428.
 44. Elovainio M, Heponiemi T, Sinervo T, Magnavita N. Organizational justice and health; review of evidence. *G Ital Med Lav Erg*. 2010;32: B5–B9.
 45. Saad L. The "40-Hour" workweek is actually longer – by seven hours. Gallup Annual Work and Education Survey. 2014; Available from: <http://www.gallup.com/poll/175286/hour-workweek-actually-longer-seven-hours.aspx>[4/28/2015 2:42:32 PM]

46. Choi B, Dobson M, Schnall P, Yang H, Baker D, Seo Y. A socioecological framework for research on work and obesity in diverse urban transit operators based on gender, race, and ethnicity. *Ann Occup Environ Med.* 2017;29:1–13.
47. Hammer LB, Demsky CA. Chapter 5. Introduction to Work Life Balance. In: Arla Day, E. Kevin Kelloway, Joseph J. Hurrell, Jr., eds. *Workplace Well-being: How to Build Psychologically Healthy Workplaces.* 1st ed. John Wiley & Sons, Ltd., 2014.
48. Evans GW, Carrere S. Traffic congestion, perceived control and psychophysiological stress among urban bus drivers. *Appl Psychology.* 1991;76:658–663.
49. Johansson G, Evans GW, Rydstedt LW, Carrere S. Job hassles and cardiovascular reaction patterns among urban bus drivers. *Int J Behav Med.* 1998;5:267–280.
50. Bannai A, Tamakoshi A. The association between long working hours and health: a systematic review of epidemiological evidence. *Scand J Public Health.* 2014;40:5–18.
51. Kivimäki M, Virtanen M, Kawachi I, et al. Long working hours, socioeconomic status, and the risk of incident type 2 diabetes: a meta-analysis of published and unpublished data from 222 120 individuals. *Lancet Diabetes Endocrinol.* 2015;3:27–34.
52. Brotheridge CM, Grandey AA. Emotional labor and burnout: comparing two perspectives of “People work”. *J Vocat Behav.* 2002;60:17–39.
53. Hedberg GE, Wikström-Frisén L, Janlert U. Comparison between two programmes for reducing the levels of risk indicators of heart diseases among male professional drivers. *Occup Environ Med.* 1998;55:554–561.
54. French SA, Harnack LJ, Hannan PJ, Mitchell NR, Gerlach AF, Toomey TL. Worksite environment intervention to prevent obesity among metropolitan transit workers. *Prev Med.* 2010;50:180–185.
55. Rydstedt LW, Johansson G, Evans GW. The human side of the road: improving the working conditions of urban bus drivers. *J Occup Health Psychol.* 1998;3:161–171.
56. Kompier MAJ, Aust B, van den Berg A-M, Siegrist J. Stress prevention in bus drivers: evaluation of 13 natural experiments. *J Occup Health Psychol.* 2000;5:11–31.
57. Poulsen K, Jensen S, Bach E, Schostak J. Using action research to improve health and the work environment for 3500 municipal bus drivers. *Educational Act Res.* 2007;15:75–106.
58. Fitzgibbon M, Blackman L, Avellone M. The relationship between body image discrepancy and body mass index across ethnic groups. *Obes Res.* 2000;8:582–589.

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APPENDIX A: QUALITATIVE RESEARCH METHODOLOGY

Qualitative research is a scientific method of discovery that is non-mathematical, it can be “used to uncover and understand what lies behind a phenomenon about which little is known. It can be used to

gain novel and fresh slants on things about which quite a bit is known” (Strauss and Corbin³⁷; p. 19). It has a distinct epistemological basis from quantitative or positivist methods, meaning it derives knowledge from the idea that knowledge is constructed in the everyday world of subjects experiencing a phenomenon; whether a community, a category or group. It embraces subjectivity and complexity in the representation of the meaning of a phenomenon. There are several approaches to qualitative methods (eg, naturalism, ethnomethodology, emotionalism) but each seek to derive a story about various social worlds that represents “reality.” This requires close scrutiny, “being with people,” and faithful or accurate representation of subjects’ worlds.

In this research, we start with the everyday work world of bus and rail operators and asked the questions “what concerns bus operators about their work and how do they think it might affect their health?” or “why do operators think there are so many health problems among them?” One limitation might be that we did not ask questions, or nor may it be possible, to ask questions about gender or race differences in the interpretation of those questions. Could social identity influence how one thinks about “work” and “health” is an interesting research question but not one that this research grappled over.

Since the aim of qualitative methods is not to isolate pre-existing categories and make predictions about causal relationships, but to represent the meaning produced in certain social worlds, quantitative or positivist notion of “validity” and “generalizability” are difficult constructs to apply. The “talk” of operators participating in this focus group, was organized in an analytical process by the researchers. It is not certain that the “talk” about work and health would be different if we had conducted another 10 focus groups. However, the talk represents talk by people who are all operators about work that does not ostensibly differ except between rail and bus operators as noted.

On another level the core “nodes” or concepts derived, reflect the level or density of common language that was evident in the interpretation of transcripts. Deductive interpretations by the researcher are influenced by his/her research or disciplinary language and reflect a distinction between the “meaning” or language used by the “researched” and the external categories and “theory” brought to interpret that common language from the researcher’s world, for example, “threat avoidant vigilance” can be used to describe portions of operator “talk” about the stress in their job.

Social action or workplace policy changes based on research knowledge derived from the everyday knowledge of working people is no more or less impossible than that derived from quantitative methods with its generalizability and construct validity limitations. It is recommended that if an organization wishes to know the “quantity” or “frequency” of the work-related factors identified in this qualitative research, or whether these ideas differ by particular social categories, that quantitative survey research supplement this project.