

OCCUPATIONAL HEALTH AND METABOLIC RISK FACTORS: A PILOT INTERVENTION FOR TRANSPORT WORKERS

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Abstract

Objectives: Heavy vehicle transport workers have a high risk of obesity and obesity-related disorders including cardiovascular disease and diabetes. Sedentary nature of their work makes a healthy work and lifestyle balance difficult to achieve. Educational interventions that promote behavioral changes have been shown to be effective in various group settings. The aims of this study were to determine the prevalence of metabolic risk factors among a population of urban bus drivers; to deliver a 3-month educational intervention specifically tailored for the workplace environment of transport workers; and to evaluate the efficacy of the intervention through quantitative measurements and qualitative feedback. **Material and Methods:** Thirty-three bus drivers from depots in south Queensland were recruited for the study. Baseline metabolic data were collected through anthropometric measurements, blood collection and diet/lifestyle questionnaires. Metabolic risk factors that were analyzed included: waist circumference, blood pressure, fasting glucose, blood triglycerides and high density lipoprotein cholesterol (HDL-C). Three interactive seminars were delivered over a 3-month period. At the end of the period, data collection was repeated. **Results:** At the commencement of the study, 35% of the participants exhibited ≥ 3 of the metabolic risk factors that characterize metabolic syndrome. This is higher than the reported prevalence in the general Australian population (22.1%). A total 21 of the 33 participants remained committed to the intervention and provided pre and post intervention data. Of these, 28% (N = 6) showed a decrease in one or more of the risk factors associated with metabolic syndrome. There was a significant increase in the average HDL-C after the intervention. Qualitative feedback indicated that the workers benefited from the program, especially regarding their awareness of the risks associated with their profession. **Conclusions:** This pilot study demonstrates that lifestyle education seminars specifically tailored for the workplace can have an impact on the health behaviors of transport workers.

Key words:

Obesity, Transport workers, Lifestyle education, Education interventions, Sedentary behavior, Metabolic risk

INTRODUCTION

Heavy vehicle transport drivers have a high incidence of obesity related diseases [1,2]. Sedentary nature of their work and pressure to cover long distances, and to meet deadlines makes a work and healthy lifestyle balance difficult to achieve. The health of a driver has implications that extend beyond the individual's own well-being. An

unhealthy driver raises health and safety concerns for all road travelers, and the reduced driver efficiency impacts financially upon industry employers.

Analysis of the Australian Health Survey has shown that male (> 35 years) transport and production workers have a high risk of overweight/obesity. The data show that 43% of transport workers are overweight

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and 23% obese (N = 867) [3]. It is inferred that the high incidence of obesity is due to sedentary nature of their work, i.e., driving seated for several hours per day. Occupations with a low physical activity and energy expenditure, i.e., occupations that require several hours of sitting, are classified as sedentary occupations (for the review see [4]).

Overweight and obesity (body mass index (BMI) > 25) often signify underlying metabolic conditions, but not always. In order to understand how sedentary occupations influence human physiology, there is a need to observe metabolic risk factors among workers in high risk occupations, such as transport workers, and not only overweight and obese candidates.

Recent epidemiological studies have shown a correlation between chronic diseases (diabetes, coronary vascular disease, and dyslipidaemia), mortality and physical inactivity or “sitting time” [5]. Metabolic risk factors include: increased waist circumference (≥ 102 cm (men), ≥ 88 cm (women)); increased resting blood pressure (> 130 mm Hg systolic / > 85 mm Hg diastolic); dyslipidaemia (blood triglyceride levels ≥ 1.7 mmol/l), reduced high density lipoprotein cholesterol (< 1.3 mmol/l); and increased fasting blood glucose (≥ 5.5 mmol/l). A combination of these risk factors outside of the normal range satisfies the criteria for clinical diagnosis of metabolic syndrome [6].

Transport workers have a high incidence of occupational sitting time and associated metabolic disorders [7,8]. A comparison between bus drivers who sit for 5.5 h without standing and bus conductors who work in the same environment but spend less time sitting, revealed a distinct and alarming increase in the relative risk of myocardial infarction among the more sedentary bus drivers [5]. More recent evidence has indicated that breaking up prolonged sitting time with intermittent moderate exercise, or even standing breaks, can improve glucose metabolism and high density lipoprotein cholesterol (HDL-C) levels [9,10]. Embedding such simple interventions and awareness into

the workplace may make a large impact on the health and well-being of sedentary workers, such as bus drivers and long distance truck drivers.

A study by Mummery et al. 2005 [11], indicated that leisure time physical activity has not changed enough over the years to explain the overweight/obesity epidemic of the present time. It is, however, the increasing sedentary time during non-leisure (occupational/work) activity, which, they believe, accounts for the increases in BMI. Higher “sitting hours” is associated with 68% increase in the chances of having a BMI > 25 [11].

Data collected in a large Finnish study conducted over a 30-year period, have shown a small association between strenuous activity in the workplace and a reduced BMI among males [12]. While the investigators of the Finnish study estimate that a decline in strenuous activity at work accounts for only a small percentage of the increase in obesity. They also allude to the possible increase in exercise outside of work time by individuals in sedentary occupations, in more recent years, which may have an influence on their findings. In Australia, as in other developed countries, adoption of healthy lifestyle behavior is associated with the level of education and a socio-economic status of an individual [13]. Transport workers generally represent lower levels of education and hence, lower levels of health literacy. The sedentary nature of their occupation, in addition to the low levels of health literacy, makes this population an important target for reform. While obesity alone is an important indicator of underlying disorders, it is important to view all risk factors of chronic metabolic disease. Based on our observations, we hypothesized that the inactivity during working hours impacts on the physiological parameters that lead to an increased risk of metabolic syndrome among transport workers. In addition, we questioned whether transport workers were fully aware of the health risks associated with the long hours of physical inactivity or “sitting time” necessary for their occupation.

The success of lifestyle intervention programs focused on reducing the incidence of obesity related disorders such as diabetes, has been well documented [14,15]. Lifestyle interventions that include face to face contact with small groups, focusing on behavioral changes in a diet and physical activity, are considered most successful [16,17]. In addition, adopting positive health behaviors requires an individual to acquire a perceived self-efficacy, which is enhanced by a supportive social network [18]. An occupational group or community of workers can become a powerful support as the situational barriers to health behaviors are identified and discussed. Self-efficacy of individual drivers can improve when the opportunities and challenges for health behaviors in the workplace are realistic and authentic [19].

In the light of the current health behavior research, we postulated that an interdisciplinary, educational group lifestyle intervention program that translates prevention research to the “real world” of the transport workers, would be an essential and achievable task that would impact on individual workers’ health and well-being.

The fact that transport drivers are considered “lone” workers means that a strong community-focused intervention is required in order to encourage a change in the cultural environment of the workers in these occupations. This forms the basis of our approach: to implement small behavioral changes that make a large impact on chronic disease risk modification.

There is a distinct paucity in the literature on interventions targeted at workers in the transport industry. While there are several “sedentary” occupations, transport workers have a unique situation of being constrained in their seat without the opportunity for standing breaks. The present exploratory study aims at initiating awareness and an informative policy regarding workplace Health and Safety for the transport industry. To our knowledge, it is the first report of an interdisciplinary educational intervention targeting transport workers in Australia.

A survey of the current literature indicates that interventions that have a positive impact on weight management and improved fitness include:

1. Dietary monitoring and guidance [20].
2. Increased physical activity (greatest effects evidenced by a combination of 1 and 2) [21].
3. Motivational interviews and group fitness activities [22].
4. Group educational sessions [17].

The present intervention combines aspects of the above interventions but is targeted at passenger transport drivers with the ultimate aim to provide a simple but comprehensive intervention that can assist transport workers to manage their weight, lessen the incidence of obesity and physical inactivity, and, as a consequence, reduce the incidence of related metabolic disorders.

This study broadens the current literature of occupational health of transport workers. It demonstrates importance of an interdisciplinary approach in raising awareness and empowering individual workers towards better health. This intervention uses a well-established tenet of adult education: relevance. It opens up possibilities of a new approach to occupational health that is highly specialized and tailored for specific workplace environments.

MATERIAL AND METHODS

In the planning stage of the intervention program, employers of the local bus companies were contacted. Next, meetings were arranged in order to develop a rapport with the employers and drivers, and to highlight that the education process of the study was intended to be bilateral. That is, the research team was educated by the drivers and industry employers with respect to their lifestyle demands and needs. The research team subsequently developed relevant, innovative strategies to meet the needs of the employers and in turn, educate and empower individual drivers. In the initial dialogue or bilateral education process, specific barriers to drivers’ health became clear, thus, providing an educational platform upon which to build the themes of the interventions.

Stage 1: Recruitment and collection of the baseline data

Ethical clearance

Griffith University ethical clearance was granted (MSC2012/HREC). Drivers were invited to an information presentation and were given an information package. Individual drivers gave a written consent to participate in the study. Recruitment took place in 2 bus depots in the region of the Gold Coast, south east Queensland.

Baseline data collection

At the commencement of early morning shifts, the research team collected resting blood pressure, fasting blood samples and anthropometric measurements including: weight, height and waist circumference. Body mass index (BMI) was calculated and recorded. Dietary and lifestyle information was collected by trained interviewers. Dietary information was collected by 24-h recall and a fruit and vegetable food frequency questionnaire using the Australian Dietary Guidelines for

serving sizes (National Health and Medical Research Council – NHMRC, 2013) [23].

Blood measurements included a full blood examination (FBE), total cholesterol, high density lipoprotein-cholesterol (HDL-C), triglycerides, fasting glucose and high sensitivity C-reactive protein (hs-CRP). All the samples were analyzed by the COBAS Integra 400, a fully automated blood chemistry analyzer capable of high throughput analysis of clinical samples.

Any participants determined to be at risk of diabetes or other metabolic disease were referred to seek a full professional screen from their clinician. Description of the stages of the intervention and the approximate timeline are shown in Table 1.

Stage 2: Intervention

Group education sessions

The group education intervention was based on “Life! – Taking action on diabetes” [24]. This style of intervention

Table 1. Education intervention timeline and workshop session topics

Session	Month	Venue
Session 1		
Introduction and recruitment followed by blood collection and analysis	February	university lecture hall
Initial measurements, questionnaire and blood collection	early March	depot
Session 2	end March	depot seminar room
The inactive body and barriers to exercise		
First blood analysis feedback to the participants		
Distribution and use of pedometers		
Session 3	early April	depot seminar room
The inactive body		
Understanding insulin resistance and diabetes		
Session 4		
Food choices and guidance	late April	depot seminar room
Final measurements, questionnaire and blood collection	early June	depot
Session 5	mid June	depot seminar room
Reflection and lifestyle changes		
Second blood analysis feedback to the participants		

program was chosen as it is based on health psychology theories focused on behavioral change through self-regulation. The intervention sessions of the study were developed specifically for the transport workers, and followed 3 main interdisciplinary themes: Education, Physical Activity and Nutrition. The sessions were developed and delivered by 2 of the authors (Naug and Colson), who have demonstrated expertise in adult education, human physiology and nutrition.

The sessions were designed to educate and empower the drivers. For example, session 1 comprised of a slide show presentation depicting physiological difference between a working muscle and non-working muscle. It also highlighted which muscles were active or inactive while seated. From this session, drivers gained awareness of physiological effects of a sedentary behavior. The nutrition education session was based on the Australian Dietary Guidelines [25] and included education on nutrition label reading and overcoming barriers to healthy eating due to their unique occupational situation. The sessions were designed to be interactive and fun, finishing with a pop-quiz game.

The sessions were held at the depot training rooms. The participants who attended the training sessions were provided with pedometers and asked to record their steps each day for the duration of the study. The participants were reminded of the session times the previous day by a telephone text. Sessions would typically take an hour and would encourage an open discussion with the facilitators of the sessions.

Timeline for intervention

The program took the form of 3 education sessions delivered fortnightly for 6 weeks. A final follow up session was delivered after another 6-week period. The drivers were requested to record their pedometer activity and nutritional changes during the 6-week period prior to the last session.

Stage 3: Follow up measures and evaluation

Final data collection

Final blood collection, questionnaire and statistical analysis of data. The final sessions took place 3 months (approx. 12 weeks) after the initial session, and this was when final blood collection and anthropometric measurements were scheduled, and dietary and lifestyle information was obtained. Along with the 24-h dietary recall and fruit and vegetable food frequency questionnaires, the participants were also asked if, in their opinion, they had improved their dietary habits since the education sessions, and if so, to provide examples. We also asked how motivated they were to continue with the changes (1 – very unmotivated, 10 – very motivated). In addition, the participants were asked to record their pedometer steps in their workbook. In the final session, the study individuals were asked to volunteer their pedometer readings with the group, and indicate whether they had increased their physical activity at work or outside of work.

Evaluation of intervention

Evaluation of the intervention was based on changes in anthropometric measurements and risk factors of metabolic syndrome, increases in fruit and vegetable consumption, improved dietary habits and physical activity, as well as motivation to continue with positive habits. Qualitative feedback from the participants was also used as an evaluation tool.

Statistical analysis

Descriptive analysis was conducted using the paired t-tests (before and after the intervention) to determine statistical significance ($p \leq 0.05$) of any changes in blood parameters (Table 2). Dietary and physical activity data were analyzed by the use of simple correlation procedures and a direct observation of the pre and post intervention questionnaires.

Table 2. Blood parameters for the heavy vehicle transport drivers before and after the educational intervention

Parameter	Result			p
	initial (N = 21)	final (N = 21)	difference	
Total cholesterol [mmol/l]	5.03	5.27	0.24	0.190
HDL-C [mmol/l]	1.42	1.61	0.19	0.003*
Glucose [mmol/l]	5.34	5.45	0.11	0.580
Triglycerides [mmol/l]	1.09	1.16	0.06	0.280
Hs-CRP [mg/l]	2.43	2.68	0.24	0.260

HDL-C – high density lipoprotein cholesterol; Hs-CRP – high sensitivity C-reactive protein.

* p < 0.05 significant increase in HDL-cholesterol.

RESULTS

Demographic and metabolic risk profile of the participants

All the participants were white Caucasians; 12 women and 21 men. The average age was 57 years, with 80% of the participants being 50–68 years. Body mass index (BMI) measurements indicated the incidence of overweight or obesity of 74% (N = 24) of the participant drivers, which was higher than the reported national average for Australian adults (63.4% in 2012) [24]. In addition, 45% (N = 14) of the participants were recorded as having a waist circumference value associated with a high risk of metabolic syndrome (> 102 cm for men and > 88 cm for women). Most alarming, 35% (N = 11) of the participants were recorded as having ≥ 3 risk factors that constitute metabolic syndrome, higher than the 22.1% reported national average for adults [26].

Post intervention metabolic risk profile of the participants

Twenty-one participants completed the intervention program and supplied some post-intervention data. Of all the participants who completed the program, 28% (N = 6) improved their risk status. That is, these participants had recorded improvements in blood pressure (BP), HDL-C, waist circumference or fasting glucose from the high risk to the normal range.

Of the 11 participants who were initially recorded as having ≥ 3 risk factors for metabolic syndrome, 6 completed the program. Three remained in the high risk zone, with ≥ 3 risk factors, while the other 3 participants improved their status to either 1 or 2 risk factors. We attribute their improved status of 50% of the high risk participants to the intervention program as those drivers recorded positive behavioral changes (diet and exercise) in the final questionnaire.

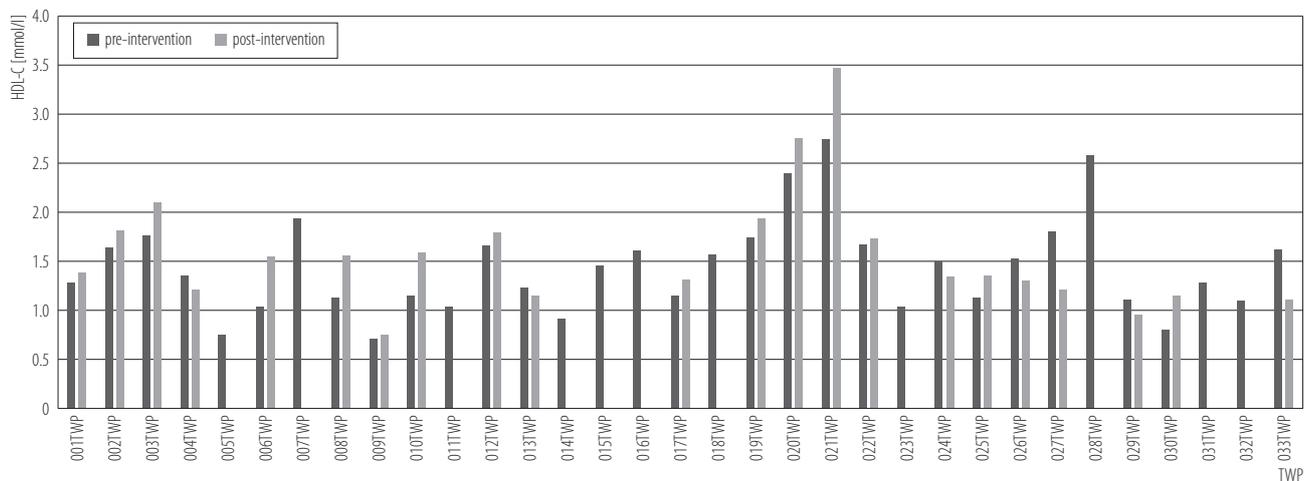
Blood analysis

Blood samples from each participant were analyzed for indicators of metabolic risk, pre and post the education intervention. The average values of the specific blood components for the population are displayed in Table 2.

Figure 1 depicts the HDL-C levels for the participants, pre and post the intervention. A significant increase in the HDL-C reflects a significant reduction of cardiovascular risk and an improvement in blood lipid profile of the drivers. This finding correlates with the increase in physical activity reported by the drivers.

Sedentary behavior

The drivers in this study reported a range of driving shifts as 20–48 h per week with an average of 37 h per week driving time (sitting in the driver's seat). The drivers also reported that they sat in the bus during lunch breaks. While



TWP – transport worker participant.

Normal healthy range is > 1.3 mmol/l as indicated by the line. This is an exemplar of the graph used in education sessions as group feedback to the drivers.

Fig. 1. High density lipoprotein cholesterol (HDL-C) levels pre- and post-intervention in the heavy vehicle transport workers

other professions report similar times “sitting,” drivers are constrained in their seat with inability to take standing breaks. As expected, we found that the drivers working > 30 h per week recorded a higher fasting glucose than the drivers on shorter shifts ($p = 0.044$).

On the pre-intervention questionnaire, the study participants reported exercise levels outside of work, which were classified as none, moderate (e.g., walking (30–40 min) 2× per week or tennis 1× week) or intense (e.g., gymnasium 4–7 times per week or cycling 4–5 times per week). Of the 32 respondents, 47% ($N = 15$) reported no physical exercise outside of work; 37.5% ($N = 12$) reported moderate exercise and 15.5% ($N = 5$) reported regular intense exercise regimes.

Of the 16 respondents who completed the post intervention questionnaire, all reported an increase in their exercise levels. These 16 participants reported that the pedometer helped to motivate them to walk more often and increase their exercise. Most importantly, those drivers who reported no physical exercise at the commencement of the intervention in the post intervention questionnaire had reported an increase in exercise outside of work.

Qualitative data from the post intervention questionnaire, and anecdotal reports from the intervention sessions indicated that the drivers had developed awareness of the sedentary nature of their work and had commenced walking up and down or around the bus when they were in between shifts or during a lunch break. Driver 1: “I go to the back of the bus and try to do some triceps push-ups on the back seat.” Driver 2: “I make an effort to get up out of the seat as often as I can.” Driver 3: “Now I park my car further away from the depot so I can walk more.”

Eating habits

As only 7% of Australians consume adequate fruit and vegetables in their diet [25], we were particularly interested in habitual consumption of fruit and vegetables in this particular group. We considered consumption adequate based on the Australian Dietary Guidelines of 2 serves of fruit per day for males and females; 6 serves of vegetables per day for males and 5 serves for females [23]. Prior to the intervention, the participants reported consuming on average 1.4 serves of fruit and 1.5 serves of vegetables per day. For fruit, 8 of the 17 (47%) participants who

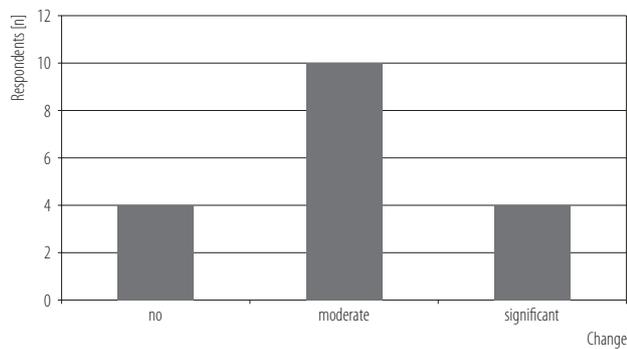


Fig. 2. Positive changes to dietary habits after the education intervention reported by the heavy transport drivers

completed both the pre- and post-surveys reported consuming adequate quantities (2 serves per day) while for vegetables, none of the participants reported consuming adequate quantities.

Data from the post-intervention survey showed a small but significant improvement in fruit consumption at an average of 1.8 serves daily, with 10 of the 17 (60%) participants reporting consumption of adequate quantities ($p = 0.03$). There was no statistically significant improvement in vegetable consumption ($p = 0.09$); however, the average daily serves increased to 2 per day. Nevertheless, this remains far below the recommended intake guidelines.

We also asked the participants whether they believed that they had improved their dietary habits since the education sessions, and if so, we asked them to give examples of improvements and how motivated they were to continue with the improvements. As illustrated in Figure 2, only 4 participants reported no positive change to their dietary habits, 10 reported a moderate change and 4 reported a significant change. Of those who reported positive change, 8 reported specific dietary changes such as reducing fried foods, 5 reported greater awareness of nutrition, and 2 reported reading nutrition labels. Regarding motivation to continue with changes, 8 participants reported 10/10, 1 participant reported 9/10 and 2 reported 8/10.

Qualitative observations

Education sessions attendance and participation

Average attendance at the education sessions was 12 participants per session. A core group of 8 participants attended all the sessions. In the first session, the participants received their individual blood analysis report, which stimulated a discussion and sparked motivation for improvements in health behavior among the drivers in the sessions.

The participants in one depot reported a change in the atmosphere of the depot based on ongoing conversations regarding the health intervention that took place in the tea room. Driver 1: "It has definitely given me awareness of blood fitness, it has also started colleagues talking, which I think is important... people have become aware of each others routines through talking, and discussing what individuals consider to be healthy." Driver 2: "I've noticed how we talk amongst ourselves and encourage each other. Attitudes of other drivers seem to change when hearing the participants talk." Driver 3: "People talk about it at work. They ask about changes and the impact."

The drivers also reported that gymnasium equipment and shower facilities at the depot would encourage improvements in health behavior. Additionally, the drivers reported that automatic food dispensers with healthy choice products would help encourage positive health behaviors.

DISCUSSION

Metabolic risk

This pilot study explored the prevalence of metabolic risk factors among a small population of urban bus drivers. Our observations support previous studies results indicating that transport workers fall into a high risk category for obesity and its related disorders including metabolic syndrome [3]. Our observations indicate that this is most likely related to the unique nature of their occupation, which is obligatorily sedentary and presents restrictions for making healthy food choices.

Sedentary behavior or “sitting time” is correlated to the incidence of type 2 diabetes in humans [27]. In addition, there is evidence suggesting that sedentary behavior affects pathogenesis of type 2 diabetes in animals and humans. Glucose transporter (GLUT) proteins have been shown to be decreased in skeletal muscle of inactive rats and in humans with spinal cord injury, leading to compromised glucose uptake and possibly insulin resistance (for the review see [28]).

Other research has demonstrated that unloading of hind limb muscles of rats (an experimental model thought to mimic sedentary behavior) resulted in a decreased lipoprotein lipase activity and a subsequent decrease in triglyceride uptake by the hind limb muscles, resulting in elevated circulating triglycerides, a characteristic feature of diabetes [29], and an established cardiovascular risk factor.

More recent evidence in humans has indicated that breaking up prolonged sitting time with intermittent moderate exercise may improve glucose metabolism [9]. Embedding such simple interventions and awareness into the workplace can make a large impact on health and well-being of sedentary workers, such as bus drivers and other heavy vehicle drivers.

This small educational intervention helped to improve the metabolic risk profile of 28% of the participants, i.e., 6/21 participants had recorded improvements in BP, HDL-C, waist circumference or fasting glucose from the high risk to the normal range. Yet, we believe the substantial benefit of this intervention is that of raised awareness in the workplace of the dangers of a sedentary occupation, the barriers to healthy behavior within the work environment and opportunities to overcome these barriers. This study was intended to be exploratory, and the educational process bilateral. It satisfied these aims in that we identified an occupation at risk, and we ourselves were educated in the constraints, both perceived and real, faced by the workers in the transport industry.

High density lipoprotein cholesterol (HDL-C)

Of the blood parameters measured, the average HDL-C was the only significant positive change for the 12-week period. Increasing HDL-C reduces cardiovascular risk by mediating “reverse cholesterol transport” from the peripheral circulation back to the liver for processing and excretion. High density lipoprotein cholesterol levels are known to increase along with the increase in physical activity and a subsequent increase in lipoprotein lipase activity (for the review see [30]).

This significant finding affirms the approach of this intervention, which was aimed at encouraging small behavioral changes for a significant improvement in metabolic health and health awareness. The small changes in physical activity initiated by the education session followed by the distribution and use of pedometers made a profound difference to the HDL-C levels among the bus drivers. Similar increases in HDL-C have been reported in another recent workplace intervention, where a group of office workers reduced sitting time by having access to sit-stand work stations [10].

Dietary awareness

There is strong scientific evidence for the protective effects of sufficient fruit and vegetable intake against chronic diseases [23] and thus, the small increases in the reported consumption post-intervention were promising. Nevertheless, none of the participants met the recommended daily intake of vegetables at any stage and, we believe, that this warrants future investigation. A 2008 review of the published workplace interventions noted that the most successful interventions with regard to nutrition involved comprehensive workplace approaches that involved education, employee and peer support, and the availability of nutritious foods at home and in the workplace [31]. Both our observations and quantitative feedback from some of the participants suggested that the food vending machines currently provided in the workplace did not supply nutritious foods, limiting their choices.

The self-reported positive changes to dietary habits with 76% of the participants reporting change and all reporting strong motivation to continue were the most promising.

Driver awareness and motivation

It is interesting to note from the final questionnaire, that the drivers of depot 1 reported changes in attitudes in the workplace, whereas the participants in depot 2 did not report such changes in their workplace. A noticeable difference between the workplaces is that depot 1 has a central hub or “tea room,” which is absent from depot 2. It is tempting to hypothesize that the structure of the workplace had an effect on the attitudinal changes towards health behavior for the duration of the intervention. Indeed, healthy workplaces require physical, psychological and social contributing factors [32]. Our observations indicate that a physical space, which can act as a social “hub,” is beneficial for disseminating health-conscious behavior among “lone” workers of the transport industry. This aspect of our study requires further examination to help inform policy on future developments for the transport industry.

Furthermore, our observations revealed some perceived barriers to physical activity that could be overcome with a combined management/worker/community approach. At the end of each shift, or during breaks, drivers could be encouraged to stand up and take a few steps. An accompanying advertising campaign to help educate the public who use the bus would assist and encourage these small changes in health behavior among the drivers. This is the future scope of the present study, which will be targeted at a larger population of urban drivers.

Qualitative feedback demonstrated that the educational intervention piloted here, which was specifically targeted at the workplace environment, has the potential to be efficacious in creating awareness and behavioral changes among the workers. The fact that the intervention program was tailored for the occupational environment means that situational barriers are identified and communicated to

the drivers from the outset, which encourages a perceived self-efficacy among the drivers.

For any movement to gain momentum it must start with a small action. We hope that this pilot study raises awareness and will initiate a further investigation into the health challenges of heavy vehicle transport workers. Future interventions may be shaped by the approach documented in this study: interdisciplinary and highly relevant to the occupational environment.

Limitations

The study was conducted for a 12-week period, which is a short time to realize any significant changes in weight loss and biomarkers. In addition, this study was not a randomized trial, and as such, the small number of volunteers acted as their own controls with regard to the educational intervention. In addition, the volunteers that remained committed to the intervention were probably more highly motivated individuals, creating an upward bias for the estimated effects of the intervention. Nevertheless, an intervention of this nature requires motivated individuals to act as mentors for the less motivated drivers, creating momentum for a cultural change in the workplace. In face of the current limitations, this pilot study has merit, in that it is applicable to the unique workplace of transport drivers and raises concerns for the transport industry, and makes one small step forward in improving the occupational health status of the industry.

CONCLUSIONS

Transport drivers have a unique, sedentary occupation, which requires them to be seated for several hours. This pilot investigation confirmed that they are a population at risk of obesity and its attendant metabolic disorders. This pilot intervention demonstrated that small behavioural changes can lessen some of the metabolic risks associated with a sedentary occupation. Moreover, an interdisciplinary intervention that includes face to face workshops can

change culture of the workplace, and raise awareness of improved health outcomes for transport workers.

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