

Lifestyle risk behaviour of Emergency Medical Care workers in Nelson Mandela Bay, South Africa



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ARTICLE INFORMATION

Received: 18 July 2019
Revision received: 2 November 2019
Accepted: 29 January 2020

Keywords:
lifestyle
risk behaviour
Emergency Medical Services
dietary intake



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ABSTRACT

Background: There are few pre-hospital emergency medical care (PEMC) workers in South Africa and the work environment is demanding, with irregular and long hours. The situation can result in elevated stress levels (especially among younger people) and risky lifestyle behaviour, which can lead to non-communicable diseases. This article reports on a pilot study that explored factors that influence lifestyle risk behaviour among PEMC workers, with a specific focus on dietary habits that may, in turn, have an influence on work performance.

Methods: An explorative, cross-sectional mixed-method pilot study was conducted. Focus groups, a lifestyle risk behaviour questionnaire and three 24-hour recalls for each participant were used as a convenience sample of 20 PEMC workers in a large South African city.

Results: Irregular shifts, financial constraints, smoking and the unavailability of healthy food emerged as important factors that contributed to lifestyle risk behaviour. In this group, the incidence of smoking was higher than in the general South African population, but binge drinking was the same. The study found that participants seldom met their energy, dietary fibre, vitamin and mineral requirements, and the intake of fat, saturated fat and refined carbohydrates was high.

Conclusion: Dietary interventions should be available for all PEMC workers, and the availability of a counsellor to assist workers in dealing with risky lifestyle behaviour could improve PEMC workers' ability to perform their work. Further research is necessary in order to confirm these results and determine the need for specific interventions.

Gresse A, Winfield C, Slabbert E, Bölke P, Aucamp R, Jaga R. Lifestyle risk behaviour of Emergency Medical Care workers in Nelson Mandela Bay, South Africa. *South African Journal of Pre-hospital Emergency Care*. 2020; 1(1):26-34. doi:10.24213/1-1-3626

BACKGROUND

The environment in which pre-hospital emergency medical care (PEMC) practitioners work causes significant stress, difficulty in following a healthy, balanced diet, reduced physical activity

and sport.^{1,2} Depression, anger, loneliness and interpersonal difficulties, as well as a disturbance in sleep patterns have also been reported to be prevalent among this category of health workers.³ These circumstances can lead to poor balance between

work and non-work life and unhealthy behaviour, such as smoking,^{1,4} excessive drinking^{4,5} and drug abuse.⁶ The subsequent lifestyle is risky and high in factors that globally contribute to unhealthy eating patterns and weight problems⁵ among this population.^{3,7} For instance, in a sample of Polish helicopter emergency medical care workers, 22% had a normal weight, 44% were overweight, and 33% were obese.⁸ In the long term, PEMC workers not only have a higher risk of being overweight and obese, but cardiovascular disease, type 2 diabetes mellitus, hypertension and high cholesterol levels were also found to be prevalent.^{1,7}

South African PEMC workers have a duty to help and treat people who are experiencing a medical emergency and, as in all professions where people work long hours, it is an advantage to be fit and active. These workers have irregular work schedules³ as they cannot always go home when their shift ends; they have to finish the call they are on, which can sometimes mean many additional hours. In order to ensure availability 24-hours a day, seven days a week, every day of the year, workers also alternate between day and night shifts to make the distribution of shifts fair to all. Such erratic schedules can play a significant role in poor eating behaviour,⁵ which often includes eating fast foods, high-energy snacks, skipping meals,¹ and a high intake of caffeine and sugar.⁹

PEMC workers are a scarce resource in South Africa and there is a paucity of literature on their lifestyle behaviour. A study in 2008 found that 1 631 registered advanced life support paramedics provided emergency care services to a population of more than 50 million.¹⁰ The potential loss of staff due to non-communicable diseases as a result of an unhealthy lifestyle should therefore be prevented.¹¹ Interdisciplinary research on the factors that influence PEMC workers' lifestyle behaviours can contribute to the development of intervention strategies and programmes to support workers in this important profession more effectively.

This article will report on the results of a pilot study conducted in Nelson Mandela Bay, South Africa. The study investigated the factors that influence the lifestyle risk behaviour of PEMC workers. The focus of this article will specifically be on dietary habits and behaviours, which may have an influence on the performance of PEMC workers.

DESIGN AND METHODS

A cross-sectional study with a convergent parallel design, with the purpose of developing a better understanding of the lifestyle behaviour among first responder prehospital PEMC workers, was con-

ducted in two private PEMC companies in Nelson Mandela Bay during April 2018. Qualitative focus group discussions were held to support the data obtained from a quantitative survey and 24-hour dietary recalls. At the time it was not possible to obtain permission from the Eastern Cape Department of Health to include the public PEMC workers due to time constraints, and this was only a pilot study to determine the direction for further research. Private PEMC companies are those that do not receive public funds but charge clients or medical aid schemes for the services that they deliver.

Due to the work environment of PEMC workers, convenience sampling was used by asking workers who were on duty and waiting for emergency calls to volunteer for the study. At each company, at the beginning of two night and day shifts, five days apart to ensure that all PEMCs were included, a brief meeting was convened to explain the study to all PEMC's and to request participation. During a period of one month, 20 participants completed all or most sections of the study. Since not all participants completed more than one 24-hour dietary recall for each day shift, night shift and off day, only one 24-hour dietary recall was used for each participant for each of the three time periods.

For the participants to be included in the study, they had to be PEMC workers registered with the Health Professions Council of South Africa. They also had to work as first responders for one of two private PEMC companies. The project was undertaken by fourth-year undergraduate students with limited resources and time, who could not use a population other than in the direct vicinity of the university. As a result, the sample size was small. Given the many components on which information was gathered, data collection took place over a relatively long period and required extensive involvement from participants. Consequently, only a pilot study was conducted, with the intention to determine the need to follow it up later with anthropometrical and biochemical results to confirm the findings and plan interventions.

Three data collection methods were used, namely focus group discussions, followed by a lifestyle risk behaviour questionnaire and finally, three 24-hour dietary recalls from each participant were collected.

Participants were split into three groups of six to eight participants per group, based on the shifts that they worked in the specific week so that participants who worked together were in the same group for focus group discussions. A semi-structured questionnaire was used to determine the perceived barriers to a healthy lifestyle. The

questions were based on the problems that were identified in a preceding literature study.^{3,5,9,10} The interviews were recorded with participants' consent and were afterwards transcribed verbatim, coded, and thematically analysed¹² by the researchers. Moreover, an experienced independent coder was used to verify the codes and themes. By the third focus group, data saturation was reached and no new themes were forthcoming.

A structured, standardised lifestyle risk behaviour questionnaire was given to participants to complete on their own on two separate occasions but with researchers present to assist. The questionnaire was based on the Youth Risk Behaviour Surveillance System (YRBSS) that was tested for reliability in previous studies.¹³ Adaptations were made in previous studies in 2013 and 2015 to allow for local food products, and these adaptations were tested in order to ensure suitability for a South African context.¹⁴ Questions from the short version of the standardised International Physical Activity Questionnaire (IPAQ),¹⁵ that measures activity in the last seven days, were also adapted for use in South Africa¹⁴ and included in the questionnaire. In addition, the Health and Safety Stress Questionnaire, which was developed and standardised by the Union of Shop, Distributive, and Allied Workers,¹⁶ was added to the questionnaire.

Three standard 24-hour dietary recalls were captured to determine food and beverage intake during the previous day.¹⁷ The data were collected using open-ended questions focusing on food consumption, with prompts regarding specific times of the day (before breakfast, breakfast, lunch, supper and snacks). The details of household measures, ingredients and amounts were asked to ensure an accurate description of food intake. Each participant reported their food intake based on a day shift, night shift and day off. The data from the recalls were captured and the nutrient content was analysed with the Foodfinder3 programme¹⁸ to determine protein, carbohydrate, fat, saturated fat, mono-unsaturated (MUFA) fat, poly-unsaturated fat (PUFA) and alcohol content, as well as the percentage energy contribution of these components to the participant's total energy intake. From the results, the average nutrient intake was compared against the South African Food Based Dietary Guidelines,¹⁹ the Recommended Dietary Allowances and the Daily Recommended Intake reference tables¹¹ to determine and discuss the adequacy of the individual and collective meals. Table 1 indicates the values that were used for the categorisation of participants' nutrient intake, as discussed in the results section under the heading 24-hour dietary recalls.

Table 1: Values Used to Categorise Participant Nutrient Intake

<i>Nutrient Analysed</i>	Recommendations	Inadequate Intake	Exceeding Recommendation
Protein	15-20%	< 15%	> 20%
Carbohydrates	50-60%	< 50%	> 60%
Fat	25-35%	< 25%	> 35%
Saturated Fat	< 7%	-	> 7%
Mono-unsaturated Fat	< 20%	-	> 20%
Poly-unsaturated Fat	< 10%	-	> 10%
Cholesterol	< 200 mg/day	-	> 5%
Alcohol	< 5%	-	> 5%
Total Dietary Fibre	25-30 g/day	-	-
Sodium	< 2 300 mg/day	-	> 2 300 mg/day

Approval for the research (H18-HEA-DIET-001) was obtained from the Nelson Mandela University Research Ethics Committee: Human (REC: H). Written informed consent was obtained from all participants and they were ensured that the data would be treated confidentially, that they would stay anonymous in all reports or publications emanating from the research, and that they could withdraw from the study at any time without any consequences. No participant withdrew from the study, and researchers repeatedly went back to the

participants to fit in with the participants' schedules.

The data obtained from the questionnaire were statistically analysed with the Statistical Package for Social Sciences (SPSS) Version 22, by means of basic descriptive statistics such as mean, median and mode, as well as cross-tabulations.

RESULTS

Demographics

A total of 20 PEMC workers participated in the study with a male to female ratio of 3:1. The demographic data are given in Table 2. As all participants were between the age of 19 and 37, age was grouped in categories of 5 years (20-25, etc.). For this study, the participants in the two lower age categories were classified as the younger participants compared to the older participants in the higher age categories. Participants' years of experience was not determined.

Table 2: Participant Demographics (n=20)

Gender	n (%)
Male	15 (75)
Female	5 (25)
Age	n (%)
<= 30 years	13 (65)
> 30 years	7 (35)
Race	n (%)
Coloured	7 (35)
White	13 (65)

Focus Group Discussions

The focus group discussions focused on barriers to a healthy lifestyle and the themes that emerged from these discussions are depicted in Figure 1. Food played a significant role in the discussions. Although the participants knew what a healthy lifestyle included, it was clear from their answers to questions on this topic that the perceived barriers they experienced were often too severe to put their knowledge into practice. For example, one participant said that the shift irregularity is a problem "... cause you never know how your day is going to look like". Shift work was consistently mentioned in all focus groups as an influence on the PEMC workers' diets. Their shifts were long, started early and ended late, included much travel and were unpredictable in nature; this resulted in an irregular eating pattern. One participant, for example, said: "... the shift is long, it's like twelve hours, ... if you don't eat before shift like five or six, around about half past six you are here, then you eat ... late like if you come home ...". After long emergency calls, workers were exhausted and the easiest, most accessible and fastest food options, such as food from fast food outlets and vending machines, were the most appealing. Various comments were received on this topic, for example "... in the context of EMS I mean there's not enough time for ourselves, so we buy 'fast food' ...".

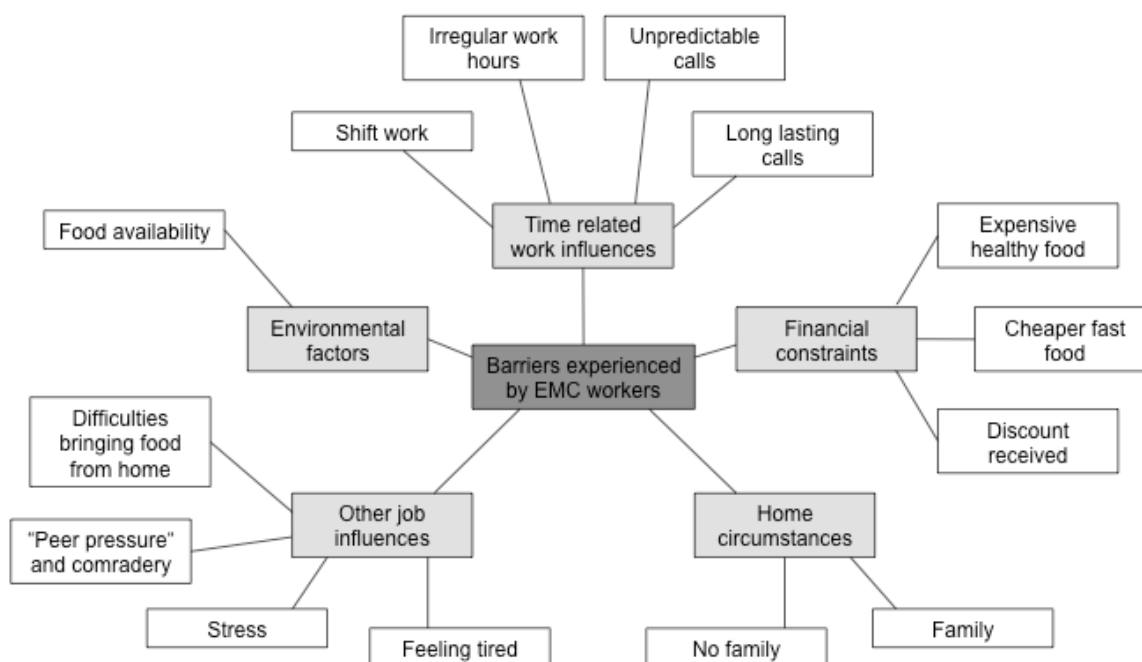


Figure 1: Themes Emerging From Focus Group Discussions

Finances also played a large role in unhealthy lifestyle behaviour. As first responders, the participants were not in management levels in the companies and their salaries as PEMC workers were, according to the participants, relatively low (participants were not asked to share how much they were remunerated) and value for money was important, especially for workers who had families to support. Several participants mentioned that healthy food was more expensive. One participant, for example, said: "... we have a big family, the financial thing is a big thing for us, we can't afford to be buying healthy food for six people all the time so it's just financially easier to buy things like bread or potatoes or pasta or whatever and making a big dish". Several fast food outlets provided discount to PEMC workers, which made the choice for fast food even more appealing. One participant felt that it was the fast food outlet's fault: "I blame them because you get discount, we do get discount."

Some participants noted that physical and emotional stress had an influence on their eating behaviour, especially if a call was particularly stressful. Peer pressure or comradery was also mentioned; activities experienced together, such as eating out, was seen as a bonding experience that could relieve stress, but it also meant that participants ate high fat, high sugar foods instead of healthier alternatives. For example, a comment that was made by one of the participants was: "peer pressure though, ... maybe you wanna try to bring your salad to work ... and then at work they say, let's just go get 'fast food'".

Some participants noted that they experienced difficulties in planning and bringing healthier food items from home. They often did not have time during the day to eat it and lacked the facilities to store their food appropriately. Hence, buying food from the abundant fast food outlets or vending machines was the easiest and most convenient option.

Lifestyle Questionnaire

Dietary Intake

The information obtained from the focus groups regarding the availability and popularity of specific types of food was corroborated by the information from the lifestyle questionnaire. The participants' perceptions regarding easy food options are presented in Table 3. As in other studies,^{1,5,7} all participants mentioned that they buy fast food; only three mentioned that they did not do so regularly. Energy drinks were consumed by eight of the participants three or more times per week, but the other participants consumed energy drinks seldom or never. Such consumption is higher than

the general intake of 0.591 and 0.445 drinks per week for South African males and females, respectively.²⁰ Sugar-sweetened carbonated drinks were consumed at a rate of one or more per day by nine of the participants. The recommended amount of fruit and vegetables (five portions per day) was consumed by only one participant. These results indicate that the participants' food choices may be limited, with little diversity in their diet.

Table 3: Easiest Food to Access in the Workplace

<i>Food Type</i>	n (%)
Fruit	8 (40)
Vegetables	0 (-)
Fast Foods	19 (95)
Sweets/Chocolates	7 (35)
Chips	7 (35)
Cool Drinks	11 (55)

Other Aspects of Risk Behaviour

Only three participants indicated that they sometimes binge drink, which was in line with the reported 14% of South Africa's adult population that participate in binge drinking.²¹ Half of the participants indicated that they smoke, compared to the current prevalence of tobacco smoking in South Africa at 17.6%.²² Sixteen of the participants did not use illegal substances, but 13 indicated that they had used illegal substances before.

Regarding physical activity levels, four participants participated in at least 150 minutes of moderate activity per week, and 10 participated in at least 75 minutes of vigorous activity per week.

Despite being involved in the type of work that is seen as highly stressful,^{6,23} nine participants indicated that they do not experience stress in their work situation and 11 of the participants stated they were (according to the way that the questions were stated) 'sometimes dissatisfied with their job, but generally enjoy it' and nine stated they were 'happy and enjoy their job'. It was noted that the younger participants experienced more stress than the older participants who may have adapted better to the work circumstances. The main sources of stress or burnout that were identified corroborate the discussions of the focus groups.

The various side-effects of stress or burnout,⁶ and the number of PEMC workers who indicated that they experience these symptoms, are listed in Table 4.

Table 4: Reported Burnout Syndrome Symptoms⁶

BOS ^a Symptom	n (%)
Headache	14 (70)
Anxiety	8 (40)
Gastro-intestinal Disorders	9 (43)
Indigestion/Nausea	8 (40)
Sleeplessness	12 (60)
Irritability	13 (65)

a = Burnout Syndrome

24-hour Dietary Recalls

Not all participants met the recommended energy intake during the various shifts that they worked (11 during day shift, 12 during night shift, and 14 during off days). Protein intake was reported to be better; nine day shift workers exceeded the recommended protein intake, compared to eight during the night shift, and three during off days. The majority of participants exceeded the recommended fat intake, with 10 exceeding intake during day shifts, eight during night shifts and 11 during their days off. On all days more than 17 of the participants exceeded the recommendation for the intake of saturated fat. Most participants (12 during day shift, 13 during night shift and 11 during off days) did not consume more cholesterol than recommended, even though their fat and saturated fat intake was relatively high. Although it has been

reported that people in high stress shift work often consume high amounts of energy drinks, sweets and chocolates to compensate for the stress,⁹ most participants did not exceed the limit on carbohydrate intake (14 on day shift, 13 on night shift and 11 on days off). Only one participant indicated that more than 7% of their energy intake (this is the upper limit recommended) was from alcohol, and only after a day shift.

The 24-hour dietary recalls indicated that results were different for the energy intake for dietary fibre, vitamins and minerals. The results corroborated those from the lifestyle questionnaire, which reflected that the participants do not consume enough whole grains, fruit and vegetables, as also found by Monaghan, Dinour, Liou and Schefchik.²⁴ The majority (17) of the participants did not meet the recommended dietary fibre intake in any of the three days that dietary recalls were done; their carbohydrate intake mainly came from refined sources such as sweets, chocolates, sugar-sweetened beverages and refined starch. Table 5 indicates how the recommended dietary allowances (RDA) for the various vitamins and minerals were met. Approximately half of the participants consumed less than 2 300 mg of sodium per day, in line with the recommendations,¹¹ while the rest of the participants exceeded the recommended amounts.

Table 5: Participant Vitamin and Mineral Intake

Vit./Min. ^a	RDA ^b	Day			Night			Off		
		Did Meet (n)	Did Not Meet (n)	Exceeded (n)	Did Meet (n)	Did Not Meet (n)	Exceeded (n)	Did Meet (n)	Did Not Meet (n)	Exceeded (n)
Vit. A	700-900 mcg	2	2	2	16	17	14	2	1	4
Vit. B1	1.1-1.2 mg	5	2	6	11	12	8	4	6	6
Vit. C	75-90 mg	5	3	2	13	12	11	2	5	7
Vit. D	600 IU	3	2	1	14	15	15	3	3	4
Iron	8-18 mg	5	8	7	9	7	6	6	5	7
Zinc	8-11 mg	5	5	4	13	13	13	2	2	3
Calcium	1 000 mg	4	0	2	12	13	15	4	7	3

a = Vitamin/Mineral, b = Recommended Daily Allowance, per day¹¹

DISCUSSION

This study aimed to explore the factors that influence PEMC workers' lifestyle risk behaviour in order to identify areas in which interventions can be planned. It was clear from the focus group discussions that there were many factors that influence the participants' lifestyle behaviour, including high workload, the irregular, long and stressful shifts that they work, their financial situation, limited availability of healthy food items and peer

pressure that limited the decision to select healthy food items, even when available.

The findings emanating from the focus group discussions corroborate those of Anstey et al.,³ especially regarding shift work and the unpredictable nature of the work of PEMC workers that play a significant role in eating patterns. The high cost of healthy food was also mentioned by various other researchers.^{25,26} Dobson et al.²⁷ alerted to the fact that fatigue among shift workers, such as firemen,

resulted in the consumption of large amounts of energy drinks, sweets and high-energy foods in an effort to stay awake and alert. This was also mentioned in the focus groups in this study. The lack of food outlets that sell healthy food at reasonable prices was commented on, which supported the results from the study by Dobson et al.²⁷

From the lifestyle questionnaire and focus group discussions, it was clear that it was difficult for PEMC workers to consistently follow a healthy lifestyle. The higher intake of sugar-sweetened beverages and energy drinks (higher than the average South African²⁰), supported the results of the study of Gupta et al.,⁷ who found a high sugar intake, including sugar-sweetened beverages, and that of Dobson et al.²⁷ which also reported a high consumption of energy drinks among emergency care personnel. The participants' fruit and vegetable consumption were in line with an American study that indicated individuals who spend significant time at work in an environment where stress levels are high, often eat unhealthy food with little diversity in their diet.²⁵

More of the participants smoked than the general population in South Africa,²² but binge drinking of alcoholic beverages was similar to the practices of the average South African.²¹ Although there were some participants who did make use of illegal substances, 16 reported not using these substances currently, even if they had done so before.

Results from the lifestyle questionnaire supported evidence from other studies that stressors (finances, long working hours, erratic shifts and inadequate time for tasks) not only contribute to poor food choices and habits,²⁵ but can also affect overall well-being and may lead to burnout syndrome.²³ Participants younger than 31 years of age particularly indicated that they find their job stressful and experienced adverse side-effects from the stress. As the years of experience were not obtained in this study, it is not clear whether it is the years of experience, or the age of the participants that may have resulted in older participants' better adjustment to stressful circumstances. It is, however, important that those who cannot cope with the stress should get assistance.²³

Half of the participants did take part in strenuous physical activity and another four in moderate activity, although one would expect that all PEMC workers should take part due to the requirements of their occupation, and such activities can also reduce stress. The availability of a counsellor that can assist PEMC workers in reducing their lifestyle risk behaviour may benefit not only the workers but also those they treat, as risky behaviour may

have an influence on their performance;^{1,8} for example, they may not have the stamina to work long hours when they are unfit.

In contrast with the results from a few other studies^{1,4} that indicated the type of work could lead to high total energy intake, it did not seem to be a problem in this study. In contrast with the study of Leka et al.,⁶ it also did not seem as if most of the participants had problems with alcohol intake and drug abuse. Their consumption of convenience and fast foods were high, but more than half of the participants did not meet the recommended energy intake, especially during their days off. The reported intake of fat was high, especially saturated fat, and the consumption of refined carbohydrates, sweets, sugar-sweetened beverages and energy drinks was high, resulting in a low dietary fibre, vitamin and mineral intake. This was also found by Bonnell et al.⁹ In the long term, such a diet may lead to health complications that may increase other lifestyle risk behaviours. Dietary interventions may therefore benefit all the participants, as was also confirmed by other studies.^{1,7,9}

Limitations

As this was an exploratory pilot study, the number of participants was small (20). Unpredictable work schedules did not allow for more planned interviews and enough time for in-depth focus group discussions with more participants. It was also only possible to get one set of 24-hour dietary recalls (one day shift, one night shift and one for off-duty days) and not three for each as is the norm for research.¹⁷ In addition, only PEMC workers employed in the private healthcare sector were included in the pilot study. It is therefore not possible to generalise the results to all PEMC workers. The study focused on the perceptions of the participants and self-reported behaviour.

CONCLUSION

It is recommended that interventions to reduce and prevent PEMC workers' lifestyle risk behaviour should be planned on an individual basis rather than for the whole group. More general interventions can focus on nutrition and can include a compulsory basic nutrition module as part of the training programme of PEMC workers. Moreover, healthy food options should be provided in the workplace.

It is recommended that further research on more participants and also in other areas of the country should be conducted, including objective anthropometric measurements, biochemical measurement of health markers such as blood chole-

terol, iron and calcium levels, clinical assessment of health status (including blood pressure), fitness tests and more in-depth dietary assessments. However, from this pilot study there are already indications that intervention programmes to assist PEMC workers in following a healthy diet may be beneficial and contribute to improved overall health, prevent future non-communicable lifestyle diseases, and keep this important and scarce skills workforce healthy in South Africa. Further research is required, though, to confirm the need for relevant intervention programmes.

ACKNOWLEDGMENTS

The researchers would like to thank the PEMC employer companies where the research was conducted for allowing the researchers to collect the data and the participants who were prepared to spend time with the researchers to complete the data collection with three different instruments. The researchers also thank the Head of Department of Emergency Medical Care of the University for logistical assistance.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

AUTHOR CONTRIBUTIONS

All listed authors made an equal contribution to the planning, execution and analysis of the data of the research project and in writing a report. The corresponding author wrote the manuscript for this article which emanates from the latter full report.

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