

Wellness Programs with a View to Improvement in Operational Performance at a South African Food Manufacturer

Makhala Mpho Motebele, Charles Mbohwa

Abstract—This study better understanding and provides an outline of the negative effects that shift work has on employee health and wellness in food manufacturing company in South Africa. Given the realities of the modern day employee rights and well-being there is need to consider how these can be achieved whilst concurrently improving organisational effectiveness and performance. It is imperative that we understand the health effects at the work place and more importantly determine what can be done to reduce the negative health impact that shift work has on employee's wellness. To this end, the objectives of this paper is to: Highlight the negative effects that night shift or irregular shift patterns have on employee health and wellness; Establish what programs can be developed by the employer to reduce the above negative effects; Establish if improved employee health and wellness for shift workers could lead to improved business performance. The paper establishes the relationship between shift work and the negative health effects on employees in a South African Food Manufacturing Company, and determines if programs can be implemented to counteract or limit these negative effects, thereby resulting in an improvement in operational performance.

Keywords— Employees, Family life, Flexible working, Hours of work, Wellness programs.

I. INTRODUCTION

SOUTH AFRICA, factory work leans towards a large percentage of employees working alternative shifts or irregular hours. This is characterized by the manufacturing and mining industries, both of which tend to have night shift work entrenched as part of daily operations. Recent surveys indicate that 80% of South Africa manufacturing & mining companies utilize a shift system [1]. It is clear that night shift work, working irregular shift patterns or hours will be the norm in South Africa for a long time to come. There is scope based on experiences elsewhere to change the working conditions dramatically. Primarily driven by Legislation and Labour Unions, workplace conditions have improved substantially. The use of technology has assisted to find alternative solutions. What still remains uncertain are the long term effects that shift work or irregular working schedules has on health and wellness of employees. These affects range from sleep disorders, gastrointestinal complications; social problems (home and personal life) withdrawal from society and in extreme cases, suicide. On the other hand the

consequential effect on the employer is also well documented. This ranges from low productivity, increase in waste and quality defects and an increase in workplace accidents or incidents. All of the above costing companies a lot of money.

II. LITERATURE REVIEW

Literature in this study focused on: Negative health effects that shift work has on employees; Family Impact; Impact on Employer; Productivity Losses; Ways to Overcome Negative Impact; and Wellness Programs.

A. Health Effects of Shift Work on Employees

Sleep deprivation is defined as a condition of not having adequate sleep, which could be acute or chronic. It further states that continued lack of sleep is known to cause fatigue, drowsiness, weight loss or weight gain and also has adverse effects on the brain and cognitive functioning. The average adult needs about 8 hours per night in order to be fully refreshed. Working night shift is very difficult because a person needs to sleep during the day, but is sometimes distracted by daily functions at home, like attending to the children and household chores. According to the Centre for Disease Control (CDC) night shift workers get the least amount of sleep when compared to day and evening shift workers. This is because they are forced to sleep during the day, when their circadian rhythm makes them feel more awake [2]. Sleep is considered a primary and primal human function that is disrupted by shift work. Many bodily processes are at their lowest ebb and this is in anticipation of the rest period that the body is anticipating based on practice over a long time. Shift workers who are forced to sleep during the day and work at night have reported that they cannot do either very well. Their sleep duration is generally substantially shorter than normal. This is because they are attempting to fight against the body's natural clock as it dances to the tune of the circadian cycle. It has been estimated that 10% of all shift workers suffer from a condition called shift work sleep disorder [3]. Objective measures of fatigue are usually based on the assumption that fatigue reduces the speed and accuracy of work. It is also been said that fatigue and its cumulative effects is partially or wholly responsible for the high absenteeism rate of shift workers [4].

Some subjective measures of fatigue obtained by questioning men on their feelings of fatigue found that 8.7% felt most tired on day shift and 83.3% on the night shift.

Makhala Mpho Motebele; phone: 0828455113; email:makhalamotebele@gmail.com).

Charles Mbohwa is the professor of the University of Johannesburg, P. O. Box 524; Johannesburg 2006; Tel: 011 5591202; Fax: +27-11-5591347; email: cmbohwa@uj.ac.).

Increased general fatigue was associated with long work hours. This has detrimental effects to the endocrine system, immune system and overall body metabolism. As a result, sleep deprivation resulting from shift work and associated long hours, could have long reaching negative effects on human functioning and health. Prevalence of sleep deprivation and night time light exposure appears to be on the rise. It is estimated that between 15 and 30% of the workforce in industrialized countries operates outside standard daytime hours. Sleep deprivation has significant consequences for public health, safety, and quality of life. Commonly reported problems during periods of sleep deprivation are excessive daytime sleepiness, fatigue, and difficulty in concentrating. Recent epidemiological studies have indicated that workers who experience sleep deprivation, circadian disruption, and exposure to light at night are at increased risk of cardiovascular disease, diabetes, and certain cancers. Envelopment of cancer in circumstances when circadian rhythms are disrupted is thought to be affected by circadian clock genes [5].

Night shift workers exhibit shortened subsequent daytime sleep, poor sleeping lasting for several days following the night shift, and are prone to falling asleep during the shift, particularly towards the early morning hours posing a danger to causing accidents. Morning shift workers experience curtailed sleep due to early rise times and subsequent daytime sleepiness. Taken together, reduced sleep and excessive sleepiness in shift workers have been implicated as mediators of impaired safety, productivity, performance and health [6]. Changes in the timing of sleep and wake periods create circadian de-synchronization. Shift workers on night or rotating shifts are required to remain awake during periods of increased sleep propensity; and the timing of their sleep phase is shifted to the daytime hours, when rhythms of performance, alertness and core body temperature are on the rise. Such chronic exposure to circadian de-synchronization entails serious consequences, by compromising safety, productivity and health. Some of the immediate consequences of shift work include increased risks for human error, accidents and injuries.

Shift Work Sleep Disorder (SWSD) is the presence of insomnia and/or daytime sleepiness associated with shift work. In a study on its prevalence and characteristics, the true prevalence of SWSD was 14% in night shift workers and 8% in rotating shift workers, after removing the percentage of insomnia and excessive sleepiness found in day workers. Those with SWSD had higher rates of ulcers and depression, missed more work days and more family/social events, and had higher scores of neuroticism and more sleepiness-related accidents, than their shift work counterparts who did not have SWSD. For most of these outcomes, workers with SWSD had increased morbidity in comparison to their day work counterparts with the same symptoms (i.e. insomnia and daytime sleepiness without shift work). These findings demonstrate the additive effects of symptoms of poor sleep (insomnia, excessive sleepiness) and work schedule (circadian de-synchrony) on serious health and functional outcomes.

Cross sectional and longitudinal investigations indicate that shift workers are at an increased risk for developing health problems, including gastrointestinal and cardiovascular diseases, diabetes and metabolic disorders, breast and colon cancers. Investigations on the mechanisms underlying these relationships suggest that sleep deprivation and circadian de-synchrony are involved in changes in neuro-endocrine function, reduced capacity of the immune system, metabolic disturbances and tumour growth. Exposure to light at night, leading to melatonin suppression, has also been implicated as an underlying mechanism [6].

Digestive complications and poor diets are some of the complications of shift work and over work. Due to the irregular shift patterns and subsequent working hours, the eating habits of shift workers are affected. Night shift work causes a conflict between the socially determined meal schedules and the circadian biological rhythms for hunger, satiety and metabolism. Nocturnal eating causes disturbances of intestinal motility, affecting digestion, absorption and utilization of essential vitamins, minerals and nutrients. Shift workers report greater incidents of gastrointestinal problems, like Irritable Bowel Syndrome (IBS), upper gastrointestinal dyspepsia and peptic ulcers. The higher rate of the above disorders found among night shift workers may be due to changes in the processes of digestion, absorption and storage of food that is caused by varying work schedules, hence the absorptive system seems to be less willing to handle food at inordinate hours. Gastric problems may also be linked to frequent snacking during night shift work. This has a corresponding negative effect on the intake of sugar, caffeine and sodium, which in abundance at anytime of the day, also has a detrimental impact on people [7].

Shift working is also associated with metabolic disorders, particularly in relation to lipid and glucose intolerance. In a study in Sweden, a cross sectional survey of 27 485 people found that obesity, high triglycerides and a low concentration of High Density Lipids (HDL) cholesterol, clustered more amongst shift workers than day workers. Further evidence of the link between shift work and metabolic disorders come from a limited number of studies that have identified positive associations between shift work and diabetes [8]. There is an association between shift work and the development or aggravation of obesity [9]. Eating at night and sleeping during the day is abnormal from a chrono-biological perspective, causing disruption of the regulation systems and thereby affecting the individual's appetite and metabolism. Humans are predisposed to the promotion of glucose metabolism and fat storage in the daytime when individual normally eat and glucose sparing the fat metabolism at night, when individuals normally fast. As a result of this predisposition, shift workers show a lower glucose and lipid tolerance following the change from day to night shift work [10]. People that have a late evening meal exhibit elevated postprandial glucose and insulin responses. It has been found out that nocturnal eating and the length of time since waking were both positively associated with triglyceride concentrations [11].

Levels of obesity and overweight have dramatically risen, reaching pandemic proportions. In the United States in 2004, 17% of the child and adolescent population were overweight and one third of the adult population was obese. The public health impacts of obesity are type 2 diabetes, cancers, cardiovascular diseases, musculoskeletal disorders, respiratory disorders including sleep apnea, and all-cause mortality. Most weight gain is caused by changes in dietary habits (i.e., high fat, energy dense diets) reduced physical activities corresponding to increased sedentary activities, television exposure, as well as decreased duration of sleep [12], [13], [14].

There are **other health effects** that can result from shift work and over work. Diabetes Mellitus and Epilepsy are health problems that can be exacerbated by shift work since both have been found to be rhythmic in nature [14]. These rhythms may affect the timing of insulin administration. In diabetic persons, the timing of the food intake and subsequent medication are highly important and cannot always be achieved correctly under shift conditions [10]. Epileptic seizures have been found to follow a rhythmic pattern in terms of the time and day when they occur. One study concluded that night shift workers suffering from epilepsy tend to have seizures in their normal sleep time [15]. There is a strong relationship between shift work and coronary heart diseases. The disruption of the circadian rhythms seems to be linked with metabolic disease like abnormal cholesterol levels and obesity [13].

B. Family Impact

Long work hours and shift work often lead to delayed marriages and even further delays when having children. In addition, there was a correlation between shift work and conflict within the family. Long hours of work for mothers increase the probability that children will be obese [2], [16]. A shift workers' relationship with close family (parents / grandparents) is neglected. The shift workers do not find the time to visit or take care of their ageing family members [17].

C. Increased Absenteeism

Shift work contributes to absenteeism. Changes in shifts affect sleep patterns, mood patterns and productivity. This ultimately leads to a number of chronic illnesses [18], [19],[20]. Absence from work reflects, among other things, the effects of working conditions; it should provide some indication of the effects of night work and shift changes [21].

D. Productivity Losses

Employee absence and disability associated with certain health and disease conditions constitute a substantial portion of the health- and productivity- related expenditures [8], [22]. Approximately \$260 billion in output is lost each year in the United States because of health-related problems. Productivity loss attributable to common pain conditions has been estimated at \$61.2 billion annually. Findings suggest that the cost of lost productivity may be several times greater than the direct medical costs; furthermore, presenteeism (being present at work but working at a reduced capacity) may account for a

larger proportion of losses than absenteeism (being absent from work) [9], [23].

III. WAYS TO OVERCOME NEGATIVE IMPACTS OF SHIFT AND OVER WORK

There several ways to improve circadian adaptation and daytime performance in shift workers. Behavioural changes sleep hygiene and planned napping, may help to improve the quantity and quality of sleep [23], [24]. Bright light exposure at night can reset the innate sleep/wake cycle. For shift workers, steps can be taken to improve wakefulness, performance, mood, and daytime sleep [25]. Night shift workers can avoid exposure to light during the early morning commute home by wearing dark sunglasses to improve sleep later [26]. Late bedtime combined with a fixed wake-up time and fixed bedtime combined with a late wake-up time improve adaptation to shift work and over work. The workers should be exposed to bright light immediately upon awakening [27].

Employee wellness programs strive to promote a healthy lifestyle for employees, maintain or improve health and wellbeing, and prevent or delay the onset of disease. These programs assess participants' health risks and deliver tailored educational and lifestyle management interventions designed to lower risks and improve outcomes. Programs typically provide preventive services as well, and use coaching or other incentives to encourage program participation. These programs can change employees' behaviour, improve their risk profile and work productivity, reduce use of and spending for health care services, and achieve a positive return on investment [4], [28], [29]. Worksite wellness is health promotion related initiatives in the workplace. These initiatives may include employer programs, policies, and activities that are aimed to improve health and overall wellbeing of employees. These include changing policies such that healthy snacks are available in vending machines, promoting healthy eating by providing healthy foods at meetings, promoting physical activity by making stairwells more accessible and attractive, and providing smoking cessation programs or resources [30].

Workplace health services prevent chronic diseases and enable early detection and management [31]. They take advantage of a captive audience, existing facilities at work, experiences from peers, reduce costs, offer good return on investment and reduce treatment/ consultation times. This also allows preventive interventions which are much better than curing activities. This can effectively improve productivity and organization performance [12], [22], [32]. The programmes can provide highly trained exercise physiologists and nutritionists. Incentive awards, designed to improve employee participation and engagement in wellness program activities can be introduced with good results [33]. Incentive rewards of various types are increasingly being offered in all parts of the world [17].

Wellness programs are designed to act as preventative health measures by providing resources to address health issues early on before they become costly diseases. By reducing behavioral risk factors, wellness programs aim to not

only reduce disease and improve worker quality of life, but also to control health care spending [30].

III. METHODOLOGY

A comprehensive **questionnaire** was developed based on the information gained from the literature study and from other similar questionnaires to determine from relevant stakeholders the impact of employee wellness and wellness programmes on performance at a South African food manufacturer. Formal and informal discussions (**interviews**) were carried out with various interested stakeholders. They provided the researcher with the benefit of probing and solving problems through interactive measures and also provided very elaborate answers in an attempt to figure out the purpose of the study. Data were obtained through written questionnaires, where multiple informants within each department, ranging from top management and to low level workers. The use of multiple informants assisted to remove the possible effects of common response bias. The data was later, after initial screening and data cleaning, aggregated to the level of the company and all subsequent analyses were using these data. Descriptive statistics were used to describe the basic features of the data in the study. Simple summaries of sample and measures are outlined. The data was analyzed using the SPSS software to determine the frequency of occurrence for a specific question. The statistical procedure was used in interpreting and analyzing the data was determined in consultation with the fellow researchers and with the statistician at the time the questionnaire and surveys were designed.

IV. FINDINGS AND RESULTS

A. Demographic Information

A total number of 70 questionnaires were sent out and 60 were received in a manner that could be used as part of the research. This translates to an 85.7% return rate. Demographic results are shown in Figures 1 to 4.

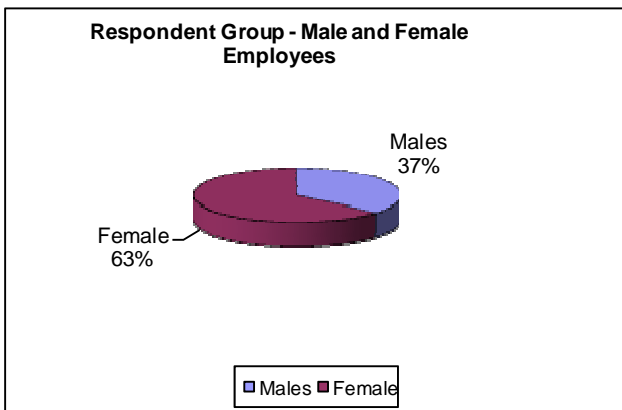


Fig. 1 Classification of Respondents by Gender

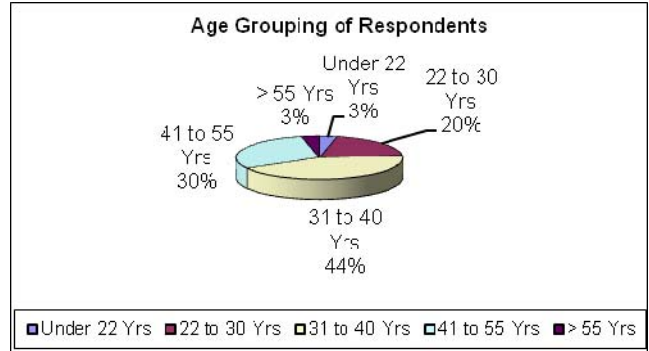


Fig. 2 Classification of Respondents by Age

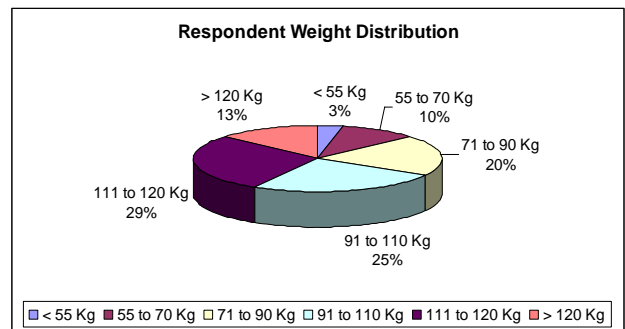


Fig. 3 Classification of Respondents by Weight

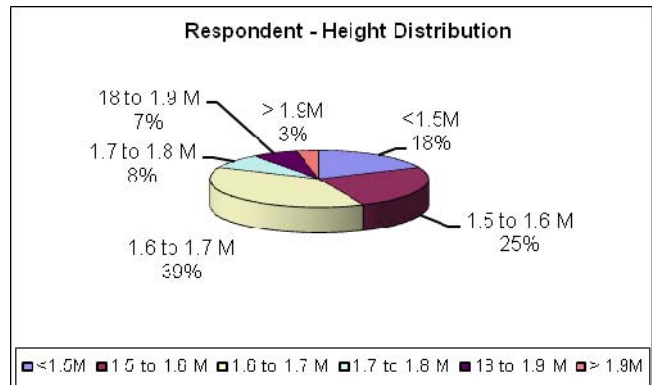


Fig. 4 Classification of Respondents by Height

The respondents are on the higher end of the Body Mass Index Scale. Table I Shows that for the employees, only a few had the correct body mass index (BMI).

TABLE I
THE BODY MASS INDEX RESULTS

Height	Count	%	Ideal Weight (BMI Scale)	Actual Weight	Count	%
<1.5M	11	18%	< 56 Kg	< 55 Kg	2	3%
1.5 to 1.6 M	15	25%	< 63 Kg	55 to 70 Kg	6	10%
1.6 to 1.7 M	23	38%	<70.5 Kg	71 to 90 Kg	12	20%
1.7 to 1.8 M	5	8%	79.5 Kg	91 to 110 Kg	15	25%
1.8 to 1.9 M	4	7%	88.6 Kg	111 to 120 Kg	17	28%
> 1.9M	2	3%	91 Kg	> 120 Kg	8	13%

Many employees have challenges managing their diet and fall into the overweight and obese category of the BMI Scale.

The following results focus on the general health status of the employees as well as sleep or sufficient rest as one of the key elements that affects employee health. A fairly high percentage of staff worked some sort of shift (44%). For the most part, the employees believe that their health status is satisfactory. It is often in these sedentary modes when the most damage is done. Many lifestyle diseases are called “Silent Killers”, due to the fact that the effects are not easily displayed and only picked up when the condition has got to a state of no return. Fig. 5 highlights another concerning fact where staff are using some form of medication to help them to sleep. 20% of the respondents have indicated that they use medication most of the time and 7% say that they use medication all the time to get some rest. The long term effects of prolonged use of medication can be devastating. About 22% indicated that their work performance was affected by working conditions “most of the time” because of being tired and due to lack of adequate rest.

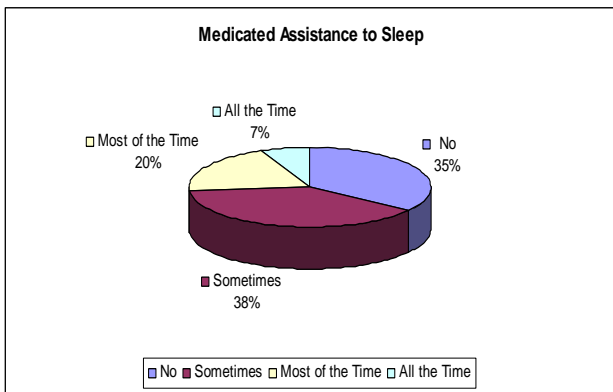


Fig. 5 Employees that get Medicated Assistance to Sleep

Effects of Smoking were equally devastating. Of the 60 analysed respondents, 42 were smokers. Figure 6 shows the respondents’ perception of how smoking intensity would be affected by stoppage of shift work. Tobacco smoking can contribute to poor health for workers through direct smoking and through indirect or environmental smoking by non-smoking colleagues.

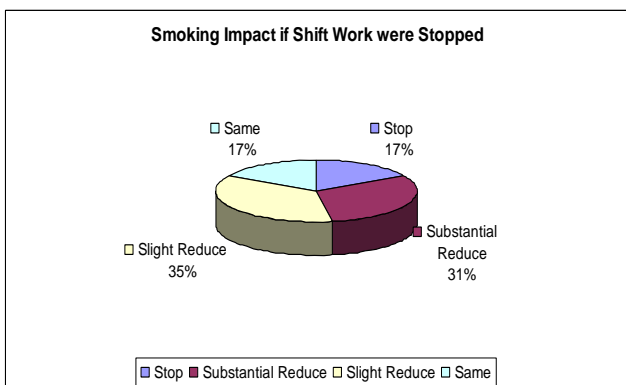


Fig. 6 Impact of Stopping Shift Work on Smoking Frequency

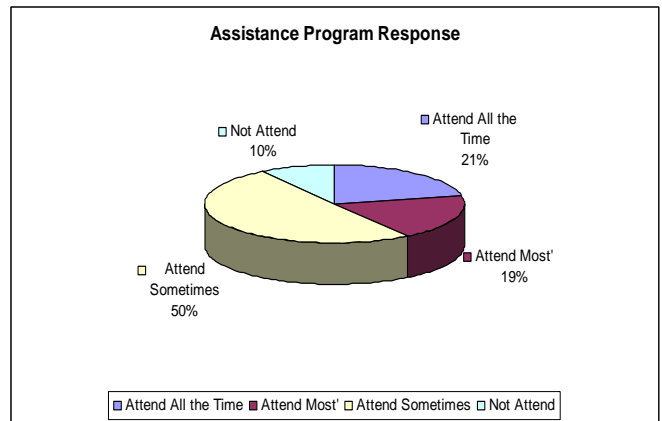


Fig. 7 Response if a Wellness Program me is Introduced

In Fig. 7 the attitude towards wellness programmes is shown. 21% of the respondents have indicated that they would attend “An Assistance Program” all the time if it were made available. 19% indicated that they would attend “Most of the Time”.

Fig. 8 shows how respondents would react to incentives to stop smoking. It reveals that employees will take the plunge if it were made worthwhile.

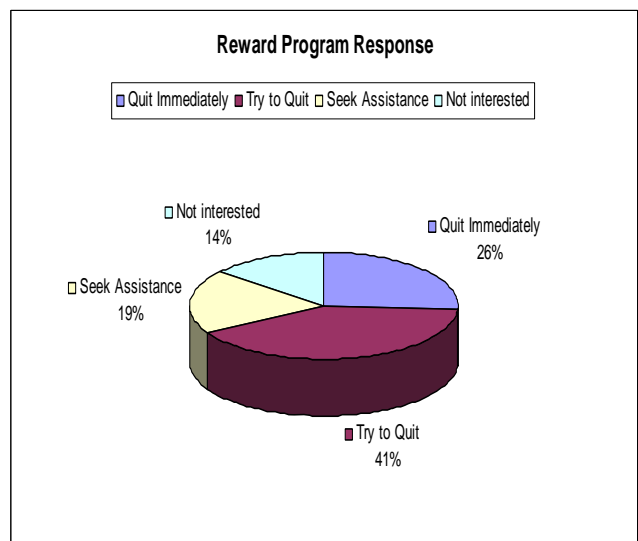


Fig. 8 Response to Reward for Stopping Smoking

Fig. 9 shows results on the frequency of exercises. A majority of the respondents did not exercise at all and less than 3% exercised three times a week.

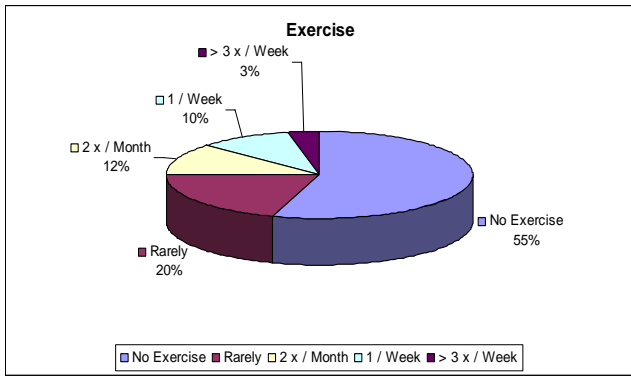


Fig. 9 Responses on Frequency of Exercises

Fig. 10 shows the employees' response to company sponsored gym membership.

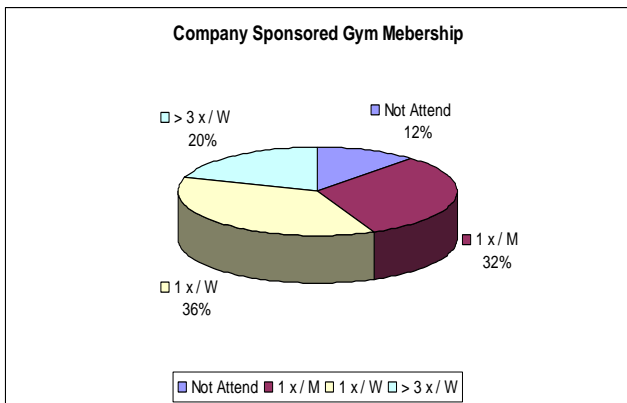


Fig. 10 Frequency of Company Sponsored Gym Attendance

When asked about a company sponsored program, 20% of the respondents indicated that they would visit the gym more than 3 times per week and 36% indicated that they would visit the gym at least once per week.

Fig. 11 shows the eating habits of the respondents. Many employees were found to be un-healthy eaters. The frequency of consumption of carbonated beverages was high as shown in Fig. 12.

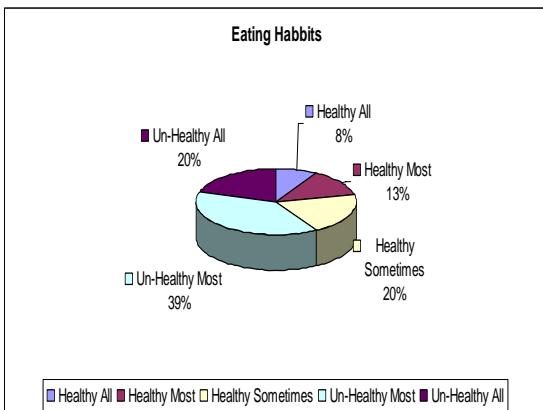


Figure 11: The Eating Habbits of the Respondents

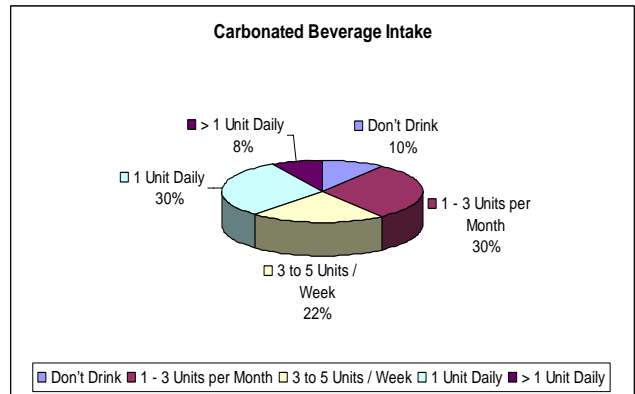


Fig. 12 Frequency of Consumption of Carbonated Beverages

Fig. 13 shows that most employees generally felt that eating habits would improve if they stopped shift work.

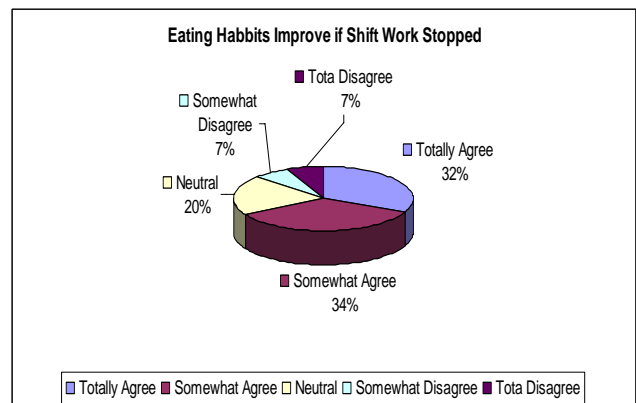


Fig. 13 Impact of Stopping Shift Work on Eating Habits

The employees were mostly averse to a company provided eating plan. However they were generally agreeable to buying health food if the company offered subsidies for it at a local supermarket. Most respondents could not concentrate at work and needed many stopping breaks. They found it very difficult to stick to routine work when they are tired and sleepy. They also struggled to manage the normal work load under such conditions.

V. CONCLUSION

The study shows that employees feel the negative impacts of shift work and over work. They are mostly receptive to well-ness programmes. The corporate strategy of this South African food manufacturing company needs to be revised and reviewed to reflect the company's commitment relevant wellness programmes. Aligning to the Corporate Strategy will be the review and revision of the human resources (HR) Strategy. Seeing that the program is primarily focussed on employees, the strategy must be carefully crafted to reflect the incorporation of wellness programmes.

A number of legal factors must be considered when embarking on the wellness programmes, especially when incentive programmes are considered. Another key aspect that

should be included is the staff retention strategy (as part of the HR Strategy). With health and wellness becoming a major part of people's lives, a key factor for staff choosing to either join or stay with a company may be the added benefits of well-crafted employee wellness, welfare, retention and empowerment programmes. This enables key personnel to remain in the organization for longer periods of time, which in turn contributes to the organizations improvement and maintenance of performance.

An organization's operations are strategically important precisely because most organizational activity comprises the day-to-day activities within the operations function. For the successful execution of wellness programmes, it is essential that there be an effective operations strategy that is aligned to the corporate as well as the HR Strategy. In addition there is need for a financial strategy that ensures that financial plans are realigned to employee needs as well. It is concluded that this approach will enable the South African company to find ways to improve performance through well planned and executed wellness programmes.

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