

CONSIDERATION OF THE EFFECT OF NUTRITIONAL STATUS AND DISEASE PATTERNS ON WORK OUTPUT AMONGST BLACK SOUTH AFRICAN WORKERS INVOLVED IN MANUAL MATERIALS HANDLING (MMH) TASKS

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ABSTRACT

The prevalence of malnutrition amongst low-income earning South Africans has been well documented and is reported to be particularly high amongst Black South African males. This, combined with poor living conditions associated with their poor socio-economic status, results in an increased prevalence of infectious diseases amongst this sector of the population. Additionally, Black South African males are most often employed by companies requiring them to carry out heavy manual materials handling tasks. It would appear that limited research has focused on the relationship between inadequate dietary intake combined with poor health status and the impact this may have on the performance of manual workers. Energy intake is in all probability considerably less than energy expenditure.

INTRODUCTION

South African Ergonomists are faced with many unique challenges not generally faced by Ergonomists in developed countries. Problems which need to be addressed in IDCs are often a mix of both first and third world influences. Associated with this socio-economic mix is the contrast between affluent and poor people with associated, but often contrasting problems. On the one hand there are a large number of South Africans who are living under sub-optimal conditions and who are underfed and undernourished and thus at increased risk for infections, and on the other hand South Africa has a high prevalence of coronary heart disease (CHD) amongst the more affluent sectors of the population. Before political reform in the early nineties CHD was most prevalent in the White South African male group; but since then there has been a shift, with more Black, Coloured and Indian South Africans developing CHD. This, in all probability, is due to the increased consumption of Westernised diets and employment in managerial positions increasing the stressors imposed on these people. Ergonomists therefore need to be aware of the risk of CHD amongst "white collar" workers and introduce programmes such as Corporate Wellness and Stress Management. More importantly, however, they need to focus on the previously neglected "blue collar" worker who is faced with multifaceted problems which may negatively impact on their health and ultimately their performance at work.

Industrially Developing Countries (IDCs)

Despite the exponential development of technology and automation, people remain the most valuable resource of any country and in particular in IDCs. As many workers in IDCs are poorly educated they will do any type of work and put up with abhorrent working conditions to earn a living; the vast majority of these jobs are predominantly manual in nature that encompasses hard, physical labour.

A recent proposal by the World Health Organization states that the wealth of poor people is in their individual capabilities and their “assets”, the most important being their health which is their most precious commodity. Good health enables poor people to participate in the job market and is the key to productivity particularly in a ‘people’ dominated working environment. Having a physically healthy, strong body is an asset, while a sick and weak body is a liability both to the employee and the employer. Unfortunately the latter health status is far more prevalent in IDCs.

Furthermore, too many small, medium and large enterprises in IDCs have sub-optimal working conditions which breed ill health and/or are unsafe. Workers employed in these industries generally earn poor salaries and come from areas where there is a lack of adequate housing, a high prevalence of malnutrition and a lack of safe drinking water. The combination of all these sub-optimal conditions makes these workers particularly susceptible to disease. A further concern is that these individuals cannot pay for adequate health services and are therefore not cared for, and in fact are often not even aware they have a serious health problem. Many of these workers employed in industries are required to execute the same tasks as the worker next to them who could be healthier and as a consequence are likely to be physically more capable.

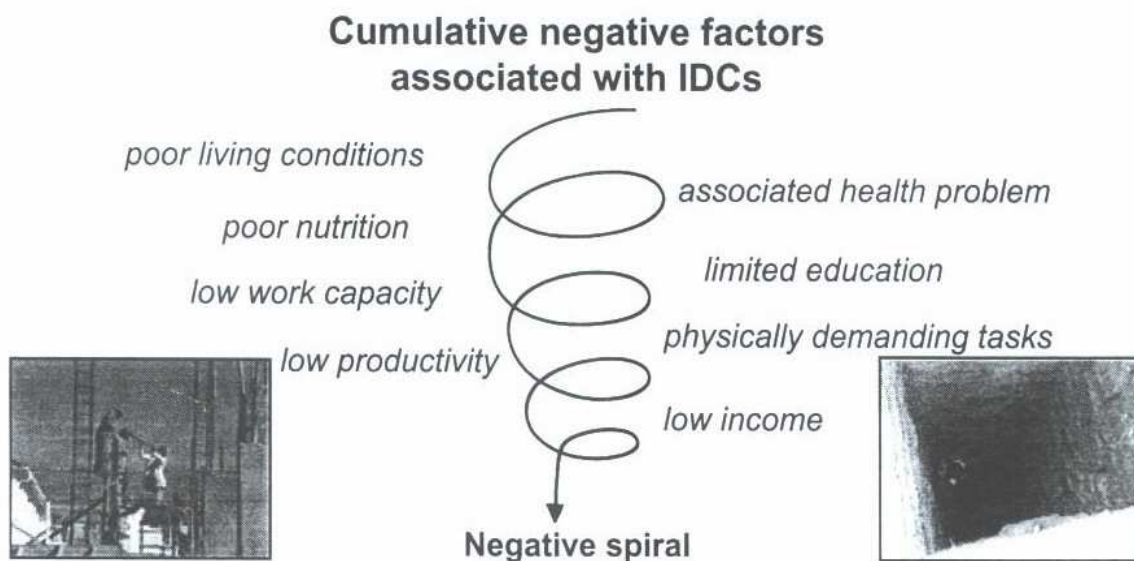


Figure 1: Schematic of negative factors associated with workers in IDCs. (From Scott, 2001)

South African manual workers

Focusing specifically on South Africa, the major problem facing the manual labour force is two-fold: most workers, particularly manual labourers, are of a lower income group often with poor health status and secondly, they are often required to perform physically demanding tasks. A predictable outcome is that workers suffer, productivity is compromised and ultimately the profitability of the company is decreased. This in turn will have a profound long-term effect on the country’s economy as a whole. It is important that Ergonomists ensure individuals are not being extended beyond their capabilities, while at the same time ensuring that productivity is not compromised. Although ergonomics interventions are common practice in developed countries, these types of intervention are severely lacking in IDCs. Many industries in IDCs have been acknowledged to be “a complex array of problems” receiving little or no ergonomic benefits (Scott and Shahnava, 1997). South African companies have yet to recognize the

substantial impact that ergonomics can have in improving worker efficiency thereby increasing productivity while at the same time reducing the physical and mental demands placed on the worker.

Risk of Coronary Heart Disease: the role of nutritional intake

Noteworthy is that the prevalence of cardiovascular disease amongst Black South African males is relatively low. In 1985 Ndaba and O'Keefe put forward that one of the reasons for this was that diets consist mainly of refined maize meal, while meat (often high in fat) and fresh milk are rarely consumed. On the other hand the diet of White South Africans and more urbanised Black South Africans consists largely of high fat diets, and this group tends to partake in very little physical activity thus increasing their risk of developing CHD.

A number of authors in South Africa have investigated the CHD risk factors in Black men in South Africa in an attempt to better understand why there is such a low incidence of CHD within this particular sector of the population. Of the conventional CHD risk factors, the most prevalent amongst Black men are smoking and hypertension (Steyn **et al.**, 1991; Seedat **et al.**, 1992; Steyn **et al.**, 1992). Hypertension is the single most prevalent risk factor for CHD in rural and urban Black South Africans, and because it takes a long time to manifest itself, it is thought that in the next few years it might become a major risk factor amongst Black males. Hypercholesterolemia is proposed to be the most independent risk factor for developing CHD and this appears to be an unusual occurrence in this sector of the population. This favourable serum lipid profile is thus thought to be of primary importance in explaining the low CHD mortality rate of Black men (Steyn **et al.**, 1992). As early as 1978 Seftel and co-authors suggested that it was highly probable that the low fat, high fiber diet common to Black South Africans contributed to a protective effect. Furthermore, obesity and diabetes are rare in this sector of the population due to the dietary/exercise interaction; however this scenario is likely to change due to increased urbanisation.

Risk of Coronary Heart Disease: the role of regular physical exercise

Further research has reported on the association between physical activity (PA) and CHD (Powel **et al.**, 1987; Berlin and Colditz, 1990; Sparling **et al.**, 1994). In 1992 the American Heart Association published a statement on the effect of exercise and summarised the health benefits of PA and formally recognised physical inactivity as a risk factor for the development of coronary heart disease (Fletcher **et al.**, 1992). There now exists substantial evidence for a dose-response effect between greater amounts of PA and lower CHD risk (Sparling **et al.**, 1994).

Although we are seeing an increasing number of Black South Africans in management positions there is still a considerable number of Black men in South Africa who are involved in MMH tasks involving a great deal of physical activity. Furthermore, many of these workers have to walk substantially far distances to get to and from their place of employment. These workers thus have a high level of habitual PA that most likely contributes to their low rate of CHD. In addition to work-related PA, they also tend to spend less time in cars or in front of the television, which are all common factors associated with sedentary living.

Most reports on these workers have tended to focus on the benefits of the physical nature of manual work (Seftel, 1978; Sparling **et al.**, 1994), yet when these workers return home they are living under poor conditions and eat diets, which although low in fat are also low in caloric content. Thus on one hand they are benefiting from the nature of the work, but on the other hand there is a considerable amount of under nutrition, even malnutrition and

disease. Early reports from rural areas within South Africa showed that Black males are most often undernourished and that the most common cause of death in this sector of the population is respiratory disease (O'Keefe *et al.*, 1983), which adds support for the association between undernutrition and increased susceptibility to infection. In all likelihood, other diseases may also manifest which could impact on performance. In 1985 Ndaba and O'Keefe went as far to say that approximately 39% of Black males in rural districts of Kwazulu Natal (KZN) were undernourished. In an earlier study O'Keefe *et al.* (1983) reported on the nutritional status of 803 Blacks workers in KZN, where they found that undernutrition was more marked in males as opposed to females. They also report that 82% of their sample of Black males had significantly reduced fat stores, and that there was a high prevalence of disease with respiratory problems predominating. Ulijaszek (2000) suggests two possible reasons for the relationship between undernutrition and infection: one in which poor nutritional status leads to impaired immunocompetence and the other, in which exposure to infectious diseases can lead to reduced food intake, absorption of nutrients or increased nutrient requirements.

Relevance to the working environment

The major concern regarding the execution of manual tasks by Black South African males is that there exists an imbalance between energy intake and energy expenditure. This in all probability will contribute to the early onset of fatigue during the execution of physically demanding tasks. There is a substantial body of evidence, largely from exercise physiologists, suggesting that dietary manipulation is essential when aiming to improve an individual's performance. Although limited research has been conducted on the nutritional status of MMH workers in IDCs, research on athletes has shown that proper nutrition is a significant determinant of athletic performance. Costill (1986) stated that no single factor, other than genetics and training, plays a greater role in optimising performance than diet. Undernourishment and malnourishment in conjunction with conditions which breed ill health results in a physically "unwell" work force. The combination of these negative factors will in all likelihood result in a lethargic work force who may often be perceived as being "lazy", but who in fact do not have the energy to sustain the physical activity over an eight hour work shift. With this scenario there are likely to be many unforced errors plus an increase in absenteeism because of poor worker health, and the combination of these factors will negatively impact on the company's productivity.

CONCLUSION

Ergonomics investigations into the demands of MMH tasks in South Africa should not only focus on the nature of the work activity such as the load to be lifted, the frequency of lift and the dimensions of the work site, but consideration also needs to be given to influencing factors beyond the workplace such as the living conditions, health status and nutritional intake of these workers. Accurate knowledge of work intensities and operators' physical status is necessary in order to adjust job demands to establish compatibility between what Ayoub and Mital (1989) called "the task requirements and the worker capabilities".

REFERENCES

NOTE: Asterisked citations * are secondary sources. These were not directly consulted and are referenced as fully as primary sources, indicated in brackets, permit.

Ayoub MM and Mital A (1989). **Manual Materials Handling**. London, New York and Philadelphia: Taylor and Francis Ltd.

*Fletcher GFS, Blair SN and Blumenthal J (1992). American Heart Association Medical/Scientific Statement on Exercise. *Circulation*, 86: 340-344. (see Sparling **et al.**, 1994).

Ndaba N and O'Keefe SJ (1985). The nutritional status of black adults in rural districts of Natal Kwazulu. **South African Medical Journal**, 68 (8): 588-590.

O'Keefe SJ, Thusi D and Epstein S (1983). The fat and the thin-a survey of nutritional status and disease patterns among urbanized Black South Africans. **South African Medical Journal**, 63 (18): 679-683.

*Powell KE, Thompson PD and Caspersen CJ (1987). Physical activity and the incidence of coronary heart disease. **Annual Review of Public Health**, 8:253-287 (see Sparling **et al.**, 1994).

Sparling PB, Noakes TD, Steyn K, Jordaan E, Jooste P, Bourne L and Badenhorst C (1994). Level of physical activity and CHD risk factors in black South African men. **Medicine and Science in Sports and Exercise**, 26 (7): 896-902.

Seedat YK, Mayet F and Latiff G (1992). Risk factors and coronary heart disease in Durban blacks – the missing links. **South African Medical Journal**, 82: 251-256.

Seftel HC (1978). The rarity of coronary heart disease in South African blacks. **South African Medical Journal**, 54:99-105.

Scott PA and Shahanavaz H (1997). Ergonomics training in Industrially Developing Countries: Case studies from "Roving Seminars". **Proceedings: 7th International Conference on Human-Computer Interaction**, 24-28 August, San Francisco, USA.

Scott PA (2001). Collaborative work between Ergonomists and Occupational health professionals. Keynote address: ASOSH Conference, SHE 2001, 27-29 August 2001, Johannesburg.

Steyn K, Jooste P and Bourne L (1991). Risk factors for coronary heart disease in the black population of the Cape Peninsula. **South African Medical Journal**, 79: 480-485.

Steyn K, Fourie J and Bradshaw D (1992). The impact of chronic diseases of lifestyle and their major risk factors on mortality in South Africa. **South African Medical Journal**, 82: 227-231.

Ulijaszek SJ (2000). Nutrition, infection and child growth in Papua New Guinea. **Coll Anthropol**, 24 (2): 423-429.