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# Nutrition and work efficiency as a strategic variable necessary in a mining environment for high productivity: A case of Filabusi mining community

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## Abstract

Work has a central role in the lives of big share of mine employees and meals they eat during the workday comprise an important factor in their nutrition, health, and wellbeing. The objective of this study was to examine the contribution of agricultural dimension, vegetable markets enhancing nutrition and work efficiency as a strategic necessity in a mining environment for high productivity during the COVID 19 pandemic. The study employed a Quasi –experiment quantitative research paradigm and a questionnaire was distributed to the mentioned population. Also of note, are the socio-demographic, socio- economic and work-related factors to the eating patterns of 150 mine employees from 6 different mines around Filabusi community during the working day and how their eating patterns influence dietary intake and productivity? The study revealed that, all the variables in the pre-test analysis indicated no significant difference in each of the listed variables between the two groups then the evidence in the post-test analysis point out that the two variables with a significant difference between the two group is strongly as a result of the treatment (eating habits, nutrition and diet) during this COVID-19 pandemic that has led to better emotional strength and improved productivity at work place.

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## 1. Introduction

It is frequently accepted that nutritious meals brace while, on the other hand, deficiency of nutritious food deteriorates people. Nonetheless, this conjectures a connection wedged between nutrition and work, a more wide-ranging inquiry of the encounter would seem to be suitable. It is candidly inferred that nutritive necessities alter according to various occupations. What is applicable for a sluggish life is not so for physically energetic people. Although the necessities of food also be contingent to some extent on body size, sex, age, climate and state of health, the most noticeable disparities are due to alterations in activity. Bodily activity is pooled with an outflow of energy which in turn is derivative from the oxidation of body material and ultimately from foodstuffs. Food must frequently replace the metabolized reserves of the body system. If the replacement is deficient, the body weightiness will decrease and, as a consequence, the working capacity will decline. Exploration on human nutrition and public health has long concentrated on regular nutrient and food intake, despite the increasing consciousness of the imminent to avert nutrition associated ailments by integrating healthy food behaviours into individuals' lifestyles (Oltersdorf, Schlettwein-Gsell et al. 1999). When reviewing food behaviours from a health viewpoint, it is imperative to take into consideration the social and cultural facets of food practices, i.e. attitudes and motivations behind food selections.. This study is to evaluate the nutrition and work efficiency as a strategic ingredient necessary in a mining environment for high productivity a case of Filabusi mining community Matabeleland South, Zimbabwe. The study will attempt to answer the following questions; is there a relationship between employee dietary intake, work place nutrition and work efficiency at a mine set up amidst COVID-19 milieu? What are workplace nutrition eating behaviours and economic factors that affect employee's attitude towards food and diet during COVID-19 setting?

## 2. Nutrition and workplace wellbeing

The significance of acceptable nourishment for wide-ranging healthiness and exertion efficiency barely need prominence. Subsequently its launch, the International Labour Organization has been disturbed with this topic. Scholarship on the subject started to appear in the 1930s, capping in 1946 with ILO's *Nutrition in industry* (ILO, 1946), a book about nourishing employees in huge establishments in Great Britain, Canada, and the United States. In 1956, the International Labour Conference and various ILO committees espoused the Welfare Facilities Recommendation (No. 102), which detailed strategies for the formation of canteens, cafeterias, mess rooms and other food facilities. The attention has transformed somewhat in industrialised nations since 1956, when the concern was to guarantee that employees had sufficient food, to today where obesity is a major problem in some areas; and there is also greater attention to food safety and education. The guidelines remain especially significant in developing countries where, whether at local- or foreign-owned enterprises, workers too often have poor diets. The workplace is a logical place for health intervention, for workers are usually there most days. Providing nourishing food to workers, even for a fee, can improve quality of life and work, and have positive "trickle down" effects for the family as well. In many cultures where food is in short supply, the adult male in the family is the first to eat and either the children or mothers are last. Food at work or provided by work can increase food availability at home. The ILO strives for decent work and equates decent work with human dignity. Through its Workers' Health Promotion and Well-being at Work programmes, part of the In Focus Programme on Safety and Health at Work and the Environment, the ILO endeavours to "further among the nations of the world programmes which will achieve...

adequate protection for the life and health of workers.

Furthermore, in order to yield material for strategy creators and nourishment educators, it is indispensable to study people's diet pattern in a more all-inclusive way instead of simply concentrating on nutrient intake. Mealtime arrangements have been considered in Finland generally within the frameworks of ethnology, sociology, and nutritional and medical science (Prättälä and Roos 1999). In the arena of public health, meal enquiry is scant, even though the predisposition to eat out of home is swelling globally. As diets prepared out of home, accessibility diets, and ready-to-eat meals have developed and become more prevalent (Carrigan, Szmigin et al. 2006; Orfanos 2007) posit and encompass a progressively substantial portion of people's total energy consumption, their nutritious value and significances to public health become more of an apprehension. Health preferment by means of health instruction purposes to progress public health by manipulating people's health-related behaviors, like eating patterns. Health way of life –which is the relationship between health-related behaviors and resources – comprises of life picks and physical options (Abel, Cockerham et al. 2000; Prättälä 2003). Mutual adoptions and life probabilities need to be well-thought-out when endeavouring to affect employee's health comportments. Of health behaviours, eating patterns are one of the adjustable causes of chronic diseases, and scientific indication progressively supportive of the view that modifications of diet have both immediate and delayed effects on health throughout the life course (World Health Organization 2003). One important nutritional factor is the low consumption of fruits and vegetables, which is among the ten most important risk factors for global mortality (Lock, Pomerleau et al. 2005). Worksites are a central arena (Downie, Tannahill et al. 1996) for promoting health among working-age people (Dubois, Strychar et al. 1996; Patterson, Kristal et al. 1997; Braeckman, De Bacquer et al. 1999; Emmons, Linnan et al. 1999; Chu, Breucker et al. 2000; Cook, Simmons et al. 2001), since they spend eight hours on average at their worksite on every weekday.

## 2.1. Food Quantities and health

Although exact data are not obtainable concerning the definite 'quantities of foodstuffs consumed per day by personnel engaged in the diverse trades in several countries, all powers that be are agreed that in most states in Africa, Asia and Latin America today the average food consumption decreases significantly short of the ideal necessary from the point of view of the health, as well as the competence, of the employee. The Inter-governmental Conference of Far Eastern Countries on Rural Hygiene, held at Bandung (Java) in 1937, reported: "The existing evidence recommends that malnutrition and poor diet is prevalent and that much damage of physical progression and overall healthiness, stumpy energy and real ailments result from deficient and inappropriate diet." The United Kingdom Committee, which revised the circumstances: concerning diet in the colonial empire, reported in 1939: "We have no doubt at all that there are few parts of the colonial empire where the diet of the majority of the population is at present anything like sufficient for optimum nutrition. Nourishments are commonly deficient in measure and still more inadequate in worth. If they are immense, the bulk is too often made up of nutriments that do not provide all the requirements of a well-adjusted nutrition, deficiency of variety and they lack protective worth

## 2.2. Economics and intangible cost of diet

Intangible costs refer to quality of life issues. The costs of diet-related diseases, although not an exact science, have been reported in numerous studies. Obesity accounts for 2–7 per cent of total health costs in industrialized countries (Kumanyika, 2002). Throughout the 1990s, the British health-care system was burdened with an estimated 525 million to 2.6 billion ECUs (US\$700 million to US\$3.5 billion) per year as a result of obesity (Eurodiet Project, 2003). This estimate (in the pre-euro currency) includes direct medical costs but not the indirect costs of lost productivity, and thus it is considered an underestimate of true costs. The United States has a much larger problem with obesity. Similar to that estimated in the Wolf and Colditz 1998 analysis, referenced earlier, another study in 2001 found that the direct costs were US\$45.8 billion and indirect costs were an additional US\$22 billion (Eurodiet Project, 2003). In 2004, the Centers for Disease Control and Prevention (CDC) in the United States co-published a report that found that obesity-attributable medical expenditures in the United States were US\$75 billion, and approximately half of these expenditures were financed by Medicare and Medicaid, systems of welfare for senior citizens and low-income people, respectively (Finkelstein, Fiebelkorn and Wang, 2004). In California, which declared a fiscal emergency in December 2003, Medicare costs were US\$1.7 billion (out of total costs of US\$7.7 billion). In the state of New York, Medicaid costs were US\$3.5 billion. The 2001 estimate for annual hospital costs for obese children in the United States was US\$127 million, up from US\$35 million in 1980 (Wang and Dietz, 2002). Cardiovascular disease is associated with obesity, and some costs intermingle. The total economic cost of cardiovascular disease for the United States in 2002 was US\$329.2 billion, with US\$199.5 billion in direct costs, US\$30.9 billion for morbidity and US\$98.8 billion for mortality (NHLBI, 2002, p. 29). In the United Kingdom the annual cost of heart disease is £7 billion (US\$13.6 billion), which includes £2.5 billion in informal care costs and £1.73 billion to the British health-care system for coronary bypass operations, heart transplants and coronary angioplasties (Liu, 2002). Indirect costs of coronary heart disease were twice the direct costs in South Africa and four times the direct costs in Canada and Switzerland (Leeder, 2003). Diabetes, also associated with overweight and obesity and, more broadly, with diet, accounts for 2.5–15 per cent of national health-care budgets (WHO, 2002b). As reported by the United States Congressional Diabetes Caucus, the cost of diabetes in the United States in 2002 was US\$132 billion (Hogan, Dall and Nikolov, 2003). Direct medical expenditures totalled US\$91.8 billion and comprised US\$23.2 billion for diabetes care, US\$24.6 billion for chronic complications attributable to diabetes and US\$44.1 billion for excess prevalence of general medical conditions (Hogan, Dall and Nikolov, 2003).

### 2.3. Occupational health and Non communicable disease

World Health Organization (WHO) and the ILO share a common definition of occupational health. Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations. It is in this context that the ILO includes nutrition as an element of a healthy workplace, alongside physical exercise, mental health, HIV/AIDS protection and programmes to reduce violence, stress and substance abuse. Governments and employers gain from a well-nourished population through revenue from increased work productivity, through reductions in health costs for adults, and, by feeding its children, through the security of future generations of healthy workers. Of the ten leading risk factors of morbidity – underweight, unsafe sex, high blood pressure, tobacco, alcohol, unsafe water and hygiene, iron deficiency, indoor smoke from fuels, high cholesterol and obesity – five are diet

related. Let us first discuss the rationale for addressing non-communicable diseases associated with diet and physical inactivity: obesity, diabetes, cardiovascular disease, stroke, hypertension and certain cancers. The following summary of the cost of chronic diseases is based on an unpublished literature review by Alexandra Cameron for the World Health Organization (WHO), along with other sources.

Non-communicable diseases are on the rise globally, with the greatest increases in incidence rates in developing and transitional countries. In 2001, non-communicable diseases contributed 46 per cent of the global disease burden and 60 per cent of all deaths worldwide, with cardiovascular disease alone amounting to 30 per cent of deaths (WHO, 2002a, p. 188). The global disease burden from non-communicable diseases is expected to climb to 57 per cent by 2020 (WHO/FAO, 2002, p. 4). Of deaths from non-communicable diseases, 79 per cent occur in the developing world; and by 2020, the WHO estimates that 70 per cent of diabetes deaths, 71 per cent of ischaemic heart disease deaths and 75 per cent of stroke deaths will occur in developing countries (WHO/FAO, 2002, p. 5). The WHO describes the cost of non-communicable diseases in terms of direct, indirect or intangible costs. Governments are sharply affected by direct costs: medical expenditures for hospitalization, medication, laboratory testing and welfare payments. Indirect costs are spread across government and business: lost productivity from sickness, disability, absenteeism or premature death.

#### 2.4. Work place health eating strategies

At workplaces, such as reducing barriers to healthy eating, may help employees to follow the guidelines for a healthy diet (Thorsen, Lassen et al. 2009) and improve the quality of their diet. A worksite canteen is an example of a benefit that an employer can offer to employees in order to enhance the possibility of eating a healthful meal that is balanced in line with dietary guidelines (National Nutrition Council 2005). To be able to further evaluate the public health relevance of eating patterns during working hours, more information is needed on the frequency of the use of worksite canteens and of the factors determining their use. This multidisciplinary study approaches eating from different fields of research: occupational health, public health, and nutrition. First, the literature review defines the main concepts. Then previous studies on worksite meals and eating outside home are reviewed. Due to the lack of scientific knowledge on the determinants and dimensions of eating during working hours, research questions for the empirical study originate from studies on eating out of home, and not only from research on eating during working hours. The empirical study consists of four sub studies. They examine sociodemographic, Socioeconomic, and work-related determinants of eating patterns during working hours among employed Finns. Also, the association between having a lunch at a worksite canteen and dietary quality is assessed as well as the frequency of and changes in worksite canteen use over time. Relation between mental changes, due to dietary deficiency, and working efficiency (A.C. Nielsen (2008)). The psychological effect of the diet is a problem of great importance in working efficiency. Our knowledge is derived mainly from the reports of famines and similar events. Experimental starvation has allowed a more detailed examination of the mental changes, by applying modern psychological methods.

The most obvious mental changes in cases of starvation are the emotional depression, the apathy and lassitude of the afflicted persons. Conversation is often restricted to a minimum; there is even a certain hostility toward others (Grantham-

McGregor, S.; Ani, C. 2001) Moodiness and irritability are other features regularly encountered, and are in part due to a sense of incompetence. The depression is coupled with a general lack of drive and of initiative (Ivanov, V.; Suvorov, A. 2003). Although some observers have reported a deterioration of mental capacity, factual impairment of intelligence has never been proved (Bowman, S. A. (2004). The intellectual powers are unaffected but are simply not applied. As initiative and ambitions are subdued, interests are narrower and it is found impossible to concentrate for long time on any task. Effect of dietary improvement on production in practice, the productivity of a worker depends on a number of factors, including the type of equipment and materials used in the plant or mine, and the efficiency of the management itself. It is therefore usually impossible to measure separately the increased efficiency resulting from the establishment of special feeding facilities for the workers in a plant where such facilities did not exist previously. However, in several instances, it has been possible to estimate directly the effect of dietary measures in industrial and other establishments Chu, C., G. Breucker, et al. (2000). The influence of dietary supplements on the work output of an employee work output can be studied and measured to ascertain whether the low production could be raised by increasing the food rations (Flynn, A. 2003).

## 2.5. Work-related food choice behaviours

Food choices during the workday are influenced by the availability of food in the worksite and the surrounding neighbourhood, workplace policies, organizational issues, and social norms among co-workers (Faugier, Lancaster et al. 2001; Sørensen, Linnan et al. 2004). Food sources near or at the workplace are, for example, worksite canteens, vending machines, other restaurants, and grocery stores (Larson and Story 2009). Workplace policies that affect eating behaviour include the amount of time reserved for lunch as well as lunch price subsidies. In Sweden, for example, one project aiming to improve the diets of the employees has three goals: to offer meals to employees at a reasonable price, to have meal breaks that last at least 40 minutes, and to ensure that 80% of the employees use the worksite canteen (Jørgensen, Arsky et al. 2010). However, policies at worksites are not always fair, since those with blue-collar jobs and with odd working hours are less likely to be provided with organized and healthy meal schemes (Jørgensen, Arsky et al. 2010). Wandel and Roos (Wandel and Roos 2005) studied men in three different occupations (carpenters, engineers, and drivers) in Norway. Researchers found differences in benefits related to food at work; those in higher positions received more benefits, like free or subsidized healthy meals and fruit baskets, than those in lower positions (Wandel and Roos 2005). The choice of where to eat lunch could be a way to strengthen one's sense of belonging to a certain social group or to differentiate oneself from other groups (Lindén and Nyberg 2009). For example, lunch has been found to have an important social meaning for male employees in Norway (Wandel and Roos 2005). Men tended to eat with their peers: office workers shared the same table, while "blue-collar" workers ate packed meals elsewhere. Furthermore, Uusitalo and her colleagues (Uusitalo, Prättälä et al. 1996) found in their study on Finnish male blue-collar workers that they chose to eat packed lunches in the same break room as their workmates instead of going to the canteen alone or in other company. Working conditions are associated with employees' diet (Marmot, Stansfeld et al. 1991; Wickrama 1995; Hellerstedt and Jeffery 1997; Laitinen 2000; Lallukka, Sarlio-Lahteenkorva et al. 2004; Ovaskainen, Reinivuo et al. 2006). Job demands (Hellerstedt and Jeffery 1997) and high workload (McCann, Warnick et al. 1990) are positively associated with high fat intake among male employees in the US whereas mentally strenuous work and high job control are

associated with healthy diet among Finnish female employees (Lallukka, Sarlio-Lahteenkorva et al. 2004). Low job control is associated with unhealthy diet among men in the US (Wickrama 1995) as well as low job status among civil servants in the UK (Marmot, Stansfeld et al. 1991). Physically demanding jobs in turn are associated with a snack-dominated meal pattern in male employees in Finland (Ovaskainen, Reinivuo et al. 2005). In addition, some structural conditions (Abel 1991; Cockerham, Rutten et al. 1997; Laaksonen 2002), like lack of time, shift work, and lunch possibilities at work, may affect lunch choices during working hours (Stewart and Wahlqvist 1985; Faugier, Lancaster et al. 2001; Devine, Farrell et al. 2009). Lack of time during the workday has been found to force employees to skip lunches, or eat packed meals at their desks (Faugier, Lancaster et al. 2001; Devine, Farrell et al. 2009).

### 3. Research Methodology

In this study we applied quasi experiment with assumptions that small scale artisanal miner's production is dependent of COVID-19 and eating habits or eating preferences. The advent of Covid-19 has affected different economic sectors including agriculture and mining, however more impact has been felt of the social and health aspects of live and this has led to changes in eating preferences and individual productivity. During this pandemic productivity, personal health and emotional health have been somehow implied by our view of diet. Hence, this study seeks to test the productivity levels, emotional health and job satisfaction amongst artisanal miners during COVID-19 pandemic.

Firstly, a questionnaire was used to capture our dataset with a quasi-condition set using one of the questions on food health benefits leading to improved productivity at work place. Our population size was balanced with 75 respondents hold the norm that eating health food can lead to improved productivity and the other 75 respondents holding on the norm that food health is not in any way related to work productivity. The total populations were  $N = 150$  respondents which satisfied the conditions for minimization of type II error in statistics. Therefore, a quasi-experimental design dataset was collected for artisanal miners around Filabusi Zimbabwe and data analysis of 2 groups post-test only was preformed and the results were summarized in the next section discussing the research findings.

### 4. Results

In this section we discuss the results starting with descriptive statistics and move on to more reliable inferential statistics. What will the descriptive statistic do? It will enable us to observe distributions within each variable of consideration and then the inferential statistics will enable us to make comparison between two variables.

**Table 1.** Health status view

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
I VIEW MYSELF WITH FOLLOWING HEALTH STATUS	Fair	0	1	1
	Good	14	14	28
	Very Good	31	38	69
	Excellent	30	22	52
Total		75	75	150

Table 1 indicates that the health status for the treatment group was, Fair (0), Good (14), Very Good (31) and Excellent (30). On the other hand, the distribution of health status view for the comparison group was Fair (1), Good (14), Very Good (38) and Excellent (22). In general, the category of very good and excellent in the treatment group were almost similar and as for the comparison group all categories had great margins of difference with very accounting for the largest share.

According to the dataset almost all artisanal miners in Filabusi view themselves as health strong individuals which is a great mental strength for anyone in this type of job. The job requirement revolves around a good health status and health physical appearance other than that one will not be attractive and will fail to find a working group. Therefore, the health status view seems to be similar for both of our groups which is a one of our assumption in this experiment but this will be test in table 10.

**Table 2.** Consideration when purchasing food

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
WHEN BUYING FOOD I CONSIDER THE FOLLOWING	Environmental Sustainability	3	2	5
	Price	31	30	61
	Healthfulness	3	1	4
	Taste	10	13	23
	Convenience	28	29	57
Total		75	75	150

The above Table 2 suggest that “when buying food one consider the following” variable “Environment sustainability” the respondents on “treatment group” only 3 respondents reveals that they consider this aspect of environment sustainability and 2 from “comparison group” suggested that they do not consider environmental sustainability and the total of respondents on this variable were 5respondents. The respondents who considered price 31 respondents were on

“treatment group” and 30 respondents were on “comparison group” and the total respondents were 61. On the “Healthfulness” variable 3 respondents indicated their concern on healthfulness and 1 on the “treatment group” and 1 respondent on the “comparison group” and a total of 4 respondents. On the “taste” variable 10 respondents from the “treatment group” indicated their concern on taste meanwhile 13 respondents from the “comparison group” indicated also their concern of taste with a total respondents of 23 respondents. The respondents who consider “Environmental sustainability” eat for “convenience” are 28 on the “treatment group” and 29 respondents on “comparison group” with a total of 57 making a total of 150 respondents reacted on this “environmental sustainability”.

**Table 3.** Frequency of eating carbohydrates

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
CARBOHYDRATES HOW FREQUENTLY DO YOU EAT THEM?	Average	2	3	5
	Very	18	29	47
	Extremely	55	43	98
Total		75	75	150

According to Table 3. The variable that says “Carbohydrates; How frequently do you eat them” suggests that “Average” responses 2 were on “treatment group” and 3 on “treatment group” with a total of 5 respondents. On those respondents who said “very” 18 respondents were on “treatment group” and 29 respondents were in the group “comparison” with a total of 47 respondents. The respondents who indicated ‘extremely” on the “treatment group” were 55 and those respondents on the “comparison group” were 43 making a total of 98 respondents on this carbohydrate variable and making a total of 150 respondents

**Table 4.** Frequency of eating vegetables

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
VEGETABLES HOW FREQUENTLY DO YOU EAT THEM?	Not at All	7	7	14
	Less Average	40	42	82
	Average	20	22	42
	Very	4	2	6
	Extremely	4	2	6
Total		75	75	150

Table 4 respondents on the variable “Vegetables; How frequently do you eat them” suggests that “Not at all” 7 respondents from the “treatment group” and 7 from the “comparison group” with a total of 14 suggested they do not eat vegetables at all. On the “less average” 40 respondents were on the group “treatment group” and 42 respondents in “comparison group” with a total of 82 respondents in both groups. Respondents who indicated on “average” are 20 from “treatment group” and 22 respondents from “treatment group” making a total of 42 respondents in both groups. Those respondents who indicted “very” were 4 on “treatment group” and 2 on “comparison group with a total of 6 respondents in both groups. As regards the “extremely” components 4 respondents in the “treatment group” and 2 respondents in the “comparison group” with a total of 6 respondents in both groups indicated their views

**Table 5.** Frequency of eating meat

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
MEAT HOW FREQUENTLY DO YOU EAT IT?	Not at All	34	33	67
	Less Average	28	30	58
	Average	11	11	22
	Very	2	1	3
Total		75	75	150

The respondents responses according to table 5 the following variable “Meat; how frequently do you eat it” suggested that “not at all” 34 respondents in the “treatment group” indicated that they have never had meat and 33 respondents in the “comparison group” suggested the same view with a total of 67 respondents in both groups indicating their view. For “less average” responses 28 in the “treatment group” and 30 respondents in the “comparison group” with a total of 58 respondents in both groups indicate their view on this variable. Furthermore, “average” responses were indicated as 11 respondents respectively in both the comparison group and the treatment group with a total of 22 respondents in both groups having participated in stating their views in this variable. The respondents who indicated “very” were 2 on the “treatment group’ and 1 on the “comparison group” making a total of 3 respondents in both groups indicating their views in the variable that related to “meat” intake.

**Table 6.** Frequency of eating beans

Count		QUASI CONDITION		
		TREATMENT	COMPARISON	Total
BEANS HOW FREQUENTLY DO YOU EAT?	Not at All	43	48	91
	Less Average	28	24	52
	Average	4	3	7
Total		75	75	150

Table 6 respondents reveal that “not at all” variable related to how frequently do you eat beans’ suggests that 43 respondents in the “treatment group” and 48 respondents in the “comparison group” making a total of 91 respondents indicated their views. For “less average” category 28 respondents were “treatment group” and 24 respondents were in the “comparison group” with a total of 52 respondents in both groups indicating their interests. Lastly, for “average” 4 respondents from the “treatment group” and 3 respondents from the “comparison group” with a total of 7 respondents in both groups.

**Table 7: Frequency of eating soya chunks**

Count		QUASI CONDITION		
		TREATMENT	COMPARISON	Total
SOYA CHUNKS HOW FREQUENTLY DO YOU EAT THEM?	Not at All	1	0	1
	Less Average	6	1	7
	Average	15	11	26
	Very	23	31	54
	Extremely	30	31	61
Total		75	74	149

According to table 7 the respondents in terms of “soya chunks” the respondents who indicated “not at all” in the “treatment group” were 1 and on the “comparison group” were 0 respondents with a total of 1 in both groups. The “less average” responses were 6 respondents in the group “treatment group” and 1 in the “comparison group” making a total of 7 in both groups. The respondents on “average” indicates that 15 respondents in the “treatment group’ and 11 respondents in the ‘comparison group’ with a total of 26 respondents in both groups. The respondents suggesting “very” were 23 respondents in the “treatment group” and 31 respondents in the “comparison group” making a total of 54 respondents in both groups. The respondents who indicated “extremely” were 30 respondents in the “treatment group” and 31 in the “comparison group” making a total of 61 respondents in both groups.

**Table 8.** Beer preference

Count		QUASI CONDITION		Total
		TREATMENT	COMPARISON	
WHICH TYPE OF BEER TO YOU PREFER?	Spirits	4	16	20
	Traditional (from grains)	56	49	105
Total		60	65	125

According to table 8 the respondents in terms of “what type of beer they preferred” the respondents who preferred spirits were 4 respondents in the group “treatment group” and 16 in the “comparison group” making a total of 20 respondents in both groups? As for the respondents who indicated their preference in traditional beer from local grains 56 respondents indicated in the “treatment group” and also 49 respondents in the “comparison group” with a total of 125 respondents in both groups participating. With a difference of 25 respondents who did not respond who might not partake in the beer variable to make a total of 150 respondents of the study

**Table 9.** Independent Samples Pre-Test for a continues variable (Age)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age	Equal variances assumed	.642	.424	-.957	148	.340	-.920	.962	-2.820	.980
	Equal variances not assumed			-.957	143.860	.340	-.920	.962	-2.821	.981

According to Table 9, the independent samples pre-test for age we obtained an F-value of 0.642 and p-value of .424 which is greater than .05 and this implies that we fail to reject the null hypothesis and hence we conclude that there is not significant difference between the mean age of the two group treatment and comparison. This result contributes to the foundational settings of pre-test variables which is going to be useful when comparing the pre-test and post-test.

**Table 10.** Independent Samples Pre-test for Categorical Data

Pre-test Categorical Variables	Chi-Square Value	df	Asymptotic Significance (2-sided)
Health status view	2.941	3	.401
Consideration when buying food	1.625	4	.801
Frequency of eating carbohydrates	4.244	2	.120
Frequency of eating vegetables	1.477	4	.831
Frequency of eating meat	0.417	3	.937
Frequency of eating beans	0.725	2	.696
Frequency of eating soya chunks	6.382	4	.172

Table 10 shows a list of independent pre-test for categorical variables starting with health status view chi-square (= 2.941), degrees of freedom (df = 3) and asymptotic significance (p-value = 0.401), followed by consideration when buying food with chi-square (= 1.625), degrees of freedom (df = 4) and asymptotic significance (p-value = 0.801), followed by frequency of eating carbohydrates with chi-square (4.244), degrees of freedom (df = 2) and asymptotic significance (p-value = 0.120), then frequency of eating vegetables with chi-square (1.477), degrees of freedom (df = 4) and asymptotic significance (p-value = 0.831), and then followed by the frequency of eating meat with chi-square (0.417), degrees of freedom (df = 3) and asymptotic significance (p-value = 0.937), and frequency of eating beans with chi-square (0.725), degrees of freedom (df = 2) and asymptotic significance (p-value = 0.696), and finally frequency of eating soya chunks with chi-square (6.382), degrees of freedom (df = 4) and asymptotic significance (p-value = 0.172). Therefore, for table 10 all the p-values were greater than .05 which implied not significant differences between the groups with respect to the categorical variables. Thus, the pre-test setting indicates that before the experiment the treatment group and the comparison group were similar and identical. Therefore, the non-randomness selection exists but similarity grouping before the intervention assumption holds then we proceed to explore the after treatment effects on the two groups.

**Table 11.** Independent Samples Post-test for Categorical Data

Post-test Categorical Variables	Chi-Square Value	df	Asymptotic Significance (2-sided)
How productive are you During COVID-19 pandemic on a scale of 5 to 1?	8.069	3	.045
During this COVID-19 pandemic I have optimum emotional health at work place	20.088	4	.000
During this pandemic I am happy with my job and the returns I earn from it.	7.208	4	.125

Again, observe table 11 for clarity let us redefine what we mean by treatment. Treatment or treatment group are artisanal miners who share the notion that food or eating habits leads to healthy and productive life especially at work place and they hold this mentality during COVID-19 pandemic. The comparison group did not share the sentiment but believed that there not correlation between food, eating habits and work place productivity during COVID-19 pandemic. Table 11 shows that the variable "how productive are you during COVID-19 pandemic on scale 5 to 1?" had chi-square (8.069), degrees

of freedom ( $df = 3$ ) and asymptotic significance ( $p\text{-value} = 0.045$ ), and this  $p\text{-value} = 0.045 < 0.05$  which implies that there is a significant difference between the two group on how they rate their productivity. Also the variable “During this COVID-19 pandemic I have optimum emotional health at work place” had, chi-square ( 20.088), degrees of freedom ( $df = 4$ ) and asymptotic significance ( $p\text{-value} = 0.000$ ), and this  $p\text{-value} = 0.000 < 0.05$  which implies that there is a significant difference between the two group in terms of their emotional health during this COVID-19 pandemic. Although, the variable “During this pandemic I am happy with my job and the returns I earn from it” had, chi-square ( 7.208), degrees of freedom ( $df = 4$ ) and asymptotic significance ( $p\text{-value} = 0.125$ ), this  $p\text{-value} = 0.125 > 0.05$  implies that there is a no significant difference between the two group in terms of job satisfaction and rewards during this COVID-19 pandemic.

## 5. Conclusion

The study concludes that, since all the variables in the pre-test analysis indicated no significant difference in each of the listed variables between the two groups then the evidence in the post-test analysis point out that the two variables with a significant difference between the two group is strongly as a result of the treatment (eating habits, nutrition and diet) during this COVID-19 pandemic that has led to better emotional strength and improved productivity at work place. Whereas, the evidence also highlighted that the state of your mind towards food and diet during COVID-19 pandemic did not affect the way artisanal miners feel about their job satisfaction and returns between the two groups. In the study however, there was no significance in terms of Age” between the two groups “comparison group” and “treatment group” and that rendered the groups similar and in terms of the age distribution the groups were the same and insignificant. In the study they were no significance of the study in terms of carbohydrates, vegetables, beans and chunks and hence the respondents also considered as the same in terms of the price and convenience and hence the respondents viewed themselves as health”. The study also reveals that there is a significant difference between those who believe and those who do not believe to health or quality of meal. This might be due to their mind set and such respondents view themselves high in terms of productivity. Now during the COVID-19 pandemic milieu there are those who trust in food and health and also they are those who do not trust in food and health as this is exacerbated by the pandemic atmosphere. There is however, no significance in terms of the variable “I am happy with my job...” In this study the reactions of the respondents in terms of their response to food is a reflection of the socio-economic environment of the country in the current volatile economic context. The eating habits and attitudes due to the COVID-19 milieu is now shaped by the economic environment as miners struggle to maintain high productive levels due to the pandemic they tend to compromise on the quality of food given to employees

## 6. Recommendations

The study recommends that policy makers in the ministry of mines in Zimbabwe, National social security authority and indigenous mine owners should formulate policies and laws that govern the importance of health checks to mine employees periodically and also offer funding to such entities. The government should also loosen up foreign investment policies to woo foreign investors in the mining sector. The Ministry of mines and the Ministry of health and child welfare

should partner in the training and development of indigenous mine workers in terms of the importance of health and pneumoconiosis awareness amongst their employees at a mine set-up. There is need for a paradigm shift in terms of health and eating habits of indigenous mining employees and their employers and hence the study recommends the miners to follow the WHO standards of running a mining entity in terms of ILO world standards on food and nutrition in the workplace

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