DEVELOPMENT OF A SCALE FOR ASSESSING DETERMINANTS OF CONSTRUCTION WORKERS' FOOD CHOICES

Okoro,C.[1], Musonda, I.[2] and Agumba, J.[3]

[1,2,&3]*School of Civil Engineering and Built Environment, Department of Construction Management and Quantity Surveying, Faculty of Engineering and the Built Environment University of Johannesburg*

ABSTRACT

Research on the factors influencing construction workers' food choices and overall nutrition is limited, in South Africa and indeed Africa. The aim of the present paper is to develop and validate a questionnaire of factors influencing construction workers' food choices. A quantitative, purposive approach was used in the study. Fourty-two items, divided into six constructs, were used to develop a field survey questionnaire after an extensive literature review. Principal components analysis (PCA) was conducted to examine the structures and validity of the constructs. Cronbach's alpha test and mean inter-item correlations were used to examine internal consistency reliability. After repeated factor analysis, the questionnaire of food choice factors revealed seven different factors: food context, biological factors, nutritional knowledge, personal ideas and systems, economic factors, resources and cultural background. These factors explained 60.09% variance. Cronbach's alpha coefficients ranged from 0.62 to 0.85, indicating good internal consistency reliability. The factors which influence construction workers' food choices are important considerations when designing and implementing nutrition interventions in the South African construction industry. Future research can adopt the instrument when conducting psychometric assessments of construction workers' food choices.

Keywords: c*onstruction workers, factors, food choice, health, reliability, validity*

INTRODUCTION

Nutrition is an occupational health and safety concern (Wanjek, 2005). It has been generally acknowledged that nutrition is an integral part of workers' health and overall wellbeing. It has also been recognized that the health and wellbeing of workers impacts on their safety and productivity. According to Wanjek (2005), as far back as a thousand years ago, the paramount role of workers' nutrition in producing high-quality work was understood. The International Labour Organisation (ILO) has been concerned with adequate nourishment of workers, food safety and education for general health, safety and work productivity since its establishment (Wanjek, ibid.). The benefits of healthy eating and overall workers' health and well-being, including inter alia, improved morale, sense of well-being, and productivity as

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Okoro,C.[1], Musonda, I.[2] and Agumba, J.[3] (2016) Development of a scale for assessing determinants of construction workers' food choices In: Mojekwu,J.N., Nani G., Atepor, L., Oppong, R.A.., Adetunji,M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 218-233

well as reduced absenteeism, health care costs, stress, and staff turn-over, are greater for low-paid workers in high risk occupations and settings, such as the construction industry (World Health Organisation (WHO), 2015).

Improving nutrition is even more important in the construction industry given the physically demanding and dangerous nature of construction work and the ever-increasing demand to improve the execrable image of the construction industry with regard to its health and safety (H&S) performance (Okoro, 2015). Safety on construction sites is linked to working conditions (Rawlinson and Farrell, 2008). For instance, while building the Eiffel Tower, not one life was lost. This was partly attributed to the working conditions at the site whereby a subsidized canteen that rose with the tower was established to provide workers with healthy food while at work. It therefore follows that a workforce furnished with adequate and healthy food would remain healthy in mind and body, and able to perform their tasks. Improving construction workers' nutrition is therefore of paramount importance if their health, safety, wellbeing and indeed productivity are desired. Individuals' food choices, eating behaviours and resulting nutritional health are influenced by a number of complex and inter-related individual, collective and policy-related determinants (European Food Information Council (EUFIC), 2005). Improving nutrition of a particular group requires an understanding of the factors which determine their food choice decisions (EUFIC, 2005; Okoro et al., 2016).

A plethora of studies have dwelt on food choice determinants. Some had a broad scope and employed qualitative methods (Sobal and Bisogni, 2009; Rose et al., 2010). Some studies presented reviews without focusing on construction workers (Arganini et al., 2012); others focused on only young construction apprentices in Australia (Du Plessis, 2011; 2012); and another literature recently examined the influence of nutrition determinants on food choices (Okoro et al., 2016). It appears, however, that few studies have been devoted to factors which could possibly influence construction workers' food choices, in South Africa and indeed Africa.The current study therefore develops a theoretical framework of food choice factors and assesses its validity and reliability as a measure.

In summary, the objectives of the study are to combine evidence, from extant literature, of factors which could possibly influence construction workers nutrition; and to examine the validity and reliability of the theoretical constructs. The ultimate goal of the study is to improve the nutrition of construction workers in the Gauteng Province of South Africa by highlighting the factors which influence their food choices. Hence, their health, wellbeing, safety performance and productivity at work could be enhanced.

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

REVIEW

The choices people make about food determine which nutrients enter their bodyand these choices are influenced by many interrelating factors including biological mechanisms, genetic profiles, knowledge, social and cultural factors (Arganini et al., 2012). Psychological, economic, religious and demographic factors were also indicated to be influential on food choices. Further, gender was noted to be a primary factor underlying many decisions made about food. Gender differences and stereotyping were found to influence people's habits, health consciousness, weight control, degree of resistance to nutrition education and body self-perception. Context (in terms of time, place or location and company, was also indicated to influence food decisions (Arganini et al., ibid.).

In another review, it was indicated that food choice decisions are based on economic factors (including cost, income and availability), physical factors (such as access, skill (for cooking), education and time), biological determinants (including hunger, taste and appetite), social factors, including culture, family, peers and meal patterns), psychological factors (such as mood, stress and guilt) as well as attitudes, beliefs and knowledge about food (EUFIC, 2005). Cultural influences lead to the differences in the habitual consumption of certain foods and in traditions of preparation, and in certain cases can lead to restrictions such as exclusion of meat and milk from the diet but they are amenable to change.

Social (including family and co-workers), cultural and economic, personal (including gender, genetic predispositions to diseases, taste, personality and preferences) determinants as well as equipment, skill, knowledge, relationships, values and traditions, mass media, climate and physical structures were depicted as important determinants in a comprehensive model of food choice factors (Sobal and Bisogni, 2009). The study employed qualitative methods to explore the perceptions of the participants. It had a very broad scope incorporating factors relating to life course events and experiences such as changes in family through marriage, changes in residence through migration, etc.

In a related study, Rose et al. (2010) reported that environmental influences (including location and accessibility to shops) determine food choice and consumption. Other factors were indicated to be social acceptability, promotional or advertising effects, cost and availability of foods. This study reviewed existing research conducted on food access, and developed a model which depicted relationship between food choice and neighbourhood food access (Rose et al., 2010). Similarly, a mixed methods research study in Canada revealed that knowledge of value to health influences what is eaten (Bruner and Chad, 2014). The study also indicated that variations existed amongst generations since older people preferred traditional foods which were healthier than conventional foods. This suggests that some food

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

choices depend on preference, age and health consciousness. Other factors were found to be taste, cost and availability of food. This study focused on women.

Studies conducted in the construction industry also express that availability and cost of healthy food alternatives on site or nearby, wages, work schedules (including length of meal breaks, since people generally do not make healthy food choices when they are rushed), work-related and welfare facilities (such as provision of eating areas), and the economic environment influence workers' food choices (Wanjek, 2005).

Additionally, construction apprentices' food choices are determined by nutritional knowledge and cooking skills, familial factors (socio-economic status of parents and parental influence), peer influence, food supply and acquisition (e.g., at home, work or through fast-food outlets) demographic factors (age and gender differences, income, ethnicity and cultural variables); dietary restraint (conscious choice to regulate body weight), work and financial responsibilities, unhealthy childhood and adolescent food practices which endure into adulthood (Du Plessis, 2011). The other factors were found to be media and stereotypical views about nutrition (since men generally view nutrition and cooking as socially prescribed for women and are relatively unconcerned about health and diet). In a related study, which explored these factors using focus groups and thematic analysis, apprentices' dietary practices were reported to be moderated by convenience, availability and cost of foods, nutritional beliefs, significant others, colleagues in the workplace and body image (Du Plessis, 2012). However, Du Plessis' studies focused on only on apprentices in the construction industry and therefore their results may not be generalized.

Literature reviewed in this section, seemed to suggest that there are a multitude of factors which determine food choices and uptake. The studies which dealt with construction workers' nutrition also identified the factors which influence the nutrition of construction workers in particular. Some nutrition factors were indicated to be economic, social and environmental elements. Other factors were indicated to be physiological, cultural, and religious in nature. Summarizing the classifications and views expressed in the above-discussed studies, the food choice determinants are theorized to be nutritional knowledge, economic factors, environmental factors, social factors, psychological factors and physiological factors. Table 1 presents a summary of the factors and their indicators, as extant literature revealed.

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Okoro,C.[1], Musonda, I.[2] and Agumba, J.[3] (2016) Development of a scale for assessing determinants of construction workers' food choices In: Mojekwu,J.N., Nani G., Atepor, L., Oppong, R.A.., Adetunji,M.O., Ogunsumi, L., Tetteh, U.S., Awere E., Ocran, S.P., and Bamfo-Agyei, E. (Eds) Procs 5th Applied Research Conference in Africa. (ARCA) Conference, 25-27 August 2016, Cape Coast, Ghana. 218-233

METHODS

Food choice factors questionnaire development

Based on the literature reviewed in the previous section, several factors which could possibly influence construction workers' food choices were identified. A 5-point likert-scale questionnaire was developed from the synthesis of the extant literature, with a scale from 1=strongly agree to 5= strongly agree. New instruments could be developed when available instruments do not measure some or all key aspects (Kimberlin and Winterstein, 2008). The questionnaire consisted of 42 questions divided into six constructs, inquiring about factors which determine food choice. The questionnaire was pilot-tested. Pilot-testing was done in order to identify problematic or complex questions in terms of the wording and structure of questions and the range of answers on the likert scale. Afterwards, some questions were reviewed and revised by experts before being self-administered to construction workers on construction sites.

Table 1: Food choice factors

Factor	Measures
Nutritional knowledge	knowledge of what an adult should eat in a day
	knowledge of the sources of nutrients
	knowledge of the sources of energy
	knowledge of health benefits (consequences of eating or not eating particular foods)
	knowledge of nutritional requirements for body size
	knowledge of nutritional requirements for age
	knowledge of nutritional requirements for existing health status
	knowledge of nutritional requirements for the type of work engaged in
	knowledge about nutritional requirements for gender
	cooking skills
Economic factors	wages/income
	availability of food
	cost/price of food
	marketing strategies/advertisements
	brand name
	discounts and subsidies
Environmental factors	location
	seasonality
	time constraints
	on-site eating facilities

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

	facilities for food preservation on site
Social factors	friends/colleagues' influence
	familial influence (family norms and traditions)
	social media and networking
	social class
Psychological factors	culture
	belief that killing animals for food is not good
	belief that avoiding meat keeps one healthier
	belief that avoiding meat save money
	belief about adequacy of diet
	fact that healthy eating increases productivity
	fact that healthy eating prevents accidents and injuries
	body image
	cynical attitude towards nutrition promotions
	mood
	eating habits
Physiological factors	hunger
	taste
	satiety
	quality
	appetite quality of food
	palatability/appearance

Data collection

Effort was made to include workers from different construction establishments involved in building, civil engineering and general construction projects in order to enhance generalizability of the results. Five building construction sites and three road construction sites were chosen heterogeneously in Johannesburg, Midrand, Samrand and Centurion. Participants at the site were chosen purposefully and conveniently. They included those who were actively engaged in construction activities, as opposed to managers and supervisors. Prior to administering the questionnaires, permission was obtained from the site manager/supervisor and/or the safety officer at each setting. A cover letter was included to enlighten the respondents and their supervisors on the purpose of the study. The cover letter also provided assurance of anonymity, confidentiality of responses and voluntary participation. The participants included construction site workers comprising electricians, brick-layers, tilers, painters, carpenters, steel-fixers, plumbers, pavers and unskilled workers. Out of a total of 220 questionnaires distributed, 183 were returned and used for empirical

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

analysis. Table 2 shows the response rates from the sites which were sampled. Table 3 shows the demographic details of the subjects.

Table 2: Response rates from selected sites

Description of setting		Distribut	Received
Building	Trading centre (new construction)	40	24
	Office property sites (new additions at	60	47
	New hospital site (7 two-storey hospital	75	67
	Students' residence (new construction)	16	16
	Residential property (renovation)	10	10
	Total	201	164
Road	One extension and two maintenance projects	19	19
Total		220	183

Table 3: Demographic characteristics of the study sample

Demographic characteristic	Response category	% frequency
Age (in years)	24 and below	26
	25–34	47
	35–44	21
	44 and above	6
Education	Primary school	32
	High school	39
	Training college	23
	Others	3
	No response	3
Specific job on site	Bricklayers	16
	Electricians	14
	Carpenters	10
	Steel-fixers	9
	Plumbers	10
	Unskilled workers	21
	Pavers	5
	Others (bobcartoperator, glass-fitter, manhole specialist, tiler, painters and cleaners)	15
Organization	Building construction	48
	Civil engineering	18
	General contractor	24
	No response	10

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Validity and reliability evaluation

Validity

Some of the measures undertaken to ensure validity of the study results have been highlighted above. Pilot testing and expert/professional content reviews served to enhance face and test content validity (van Teijlingen and Hundley, 2001; Ro et al., 2015). Test content refers to the extent to which a scale's items, in the aggregate, constitute a representative sample of the topic's content domain (Ro et al., ibid.).

Good internal structure (construct validity) of constructs was achieved through the application of factor analytic techniques (specifically, principal components analysis) to determine whether a factor represents the construct which it is intended to measure and does not represent others that are theoretically different (Ro et al., 2015). Including workers from different locations in Gauteng served to enhance external validity (good generalizability) (Trochim, 2006).

Reliability

Internal consistency, which gives an estimate of the equivalence of sets of items from the same test and the reliability of measurement based on the assumption that items measuring the same construct should correlate, was assessed (Kimberlin and Winterstein, 2008). Cronbach's alpha coefficient α and mean inter-item correlations were applied to assess internal consistency reliability. Cronbach's alpha is a function of the average inter-correlations of items and the number of items in the scale. Cronbach's α coefficient is used when questions are rated on internal scales such as five-point likert scales and represents average correlations among items (Lin et al., 2008). Cronbach's α values should ideally be above 0.7 (Pallant, 2013). Because α values are sensitive to the number of items in the scale, the mean inter-item correlations could also be reported, ranging from 0.2 to 0.4 (Pallant, ibid.).

Data analysis

Raw data were subjected to Principal Components Analysis (PCA) using Statistical Package for Social Sciences (SPSS) version 22 software.

Data cleaning and screening

Preliminary descriptive analysis of data was conducted to check for normality. Outliers were identified and removed before analysis. Missing data were excluded using listwise deletion. The suitability of data for factor analysis was also assessed. The correlation matrix was inspected for evidence of coefficients greater than 0.3 (Pallant, 2013).

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were applied to assess the factorability of the data set. A KMO index of 0.6 is the suggested minimum value for a good factor analysis. Bartlett's test of sphericity should be significant ($p < 0.05$) for the factor analysis to be considered appropriate (Pallant, 2013).
Principal components analysis

As mentioned earlier, PCA was done in order to test the structures and composition of the theorized food choice factors. The forty-two items were subjected to repeated PCA. Principal axis factoring and direct oblimin rotation were used. Two frameworks emerged from the PCA. One was adopted as the final framework. The results are presented in the next section. Outputs from the PCA (principal components) were thought to contribute to the variance in the data set. They were obtained using the Kaiser's criterion (retaining eigenvalues above 1) and scree test (retaining factors above "breaking point") (Pallant, 2013).

RESULTS

Preliminary results

Preliminary descriptive analysis of data revealed a normal distribution. Inspection of the correlation matrix revealed the presence of many coefficients with 0.3 and above. The Kaiser-Meyer-Olkin value was 0.743, exceeding the minimum recommended value of 0.6 for a good factor analysis and the Bartlett's Test of Sphericity reached statistical significance ($p = 0.000$), supporting the factorability of the correlation matrix (Pallant, 2013), indicating that correlations existed among the factors and correlation was not unit matrix (Lin et al., 2008).

Construct validity

In accordance with the principles described above, the 42 items were subjected to two rounds of PCA. In the first analysis, eleven components exceeded eigen values above 1 (10.679, 4.145, 2.879, 2.241, 1.883, 1.818, 1.592, 1.432, 1.377, 1.300 and 1.117), explaining 25.43%, 9.87%, 6.85%, 5.34%, 4.48%, 4.33%, 3.79%, 3.41%, 3.28%, 3.10% and 2.66%, respectively of the variance, and accounting for a total variance of 72.53%.
However, after the second run, seven common factors were extracted. Interpretation revealed that items loaded evenly on the seven factors (principal components) (table 4). The table also evinces that the seven factors accounted for 60.09% of the variance in the data set. These factors comprised food context, biological factors, knowledge, personal ideas and systems, economic factors, resources and cultural background. The names were assigned to the factors, with reference to literature, based on the items which loaded on the factors.

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Table 4: Loading matrix and percentage variance of the seven principal components extracted

Constructs	Measures	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Food context	brand name	**.726**	.180	.065	.074	-.013	-.153	-.147
	food in season	**.694**	-.027	-.024	.084	.056	.024	.123
	time I have before work and during breaks	**.551**	.051	.017	-.067	.027	-.134	.373
	location of where the food is sold	**.540**	.046	-.065	.118	-.073	-.123	.064
	cooking skills	**.482**	-.029	.038	-.061	.078	.013	.369
	the way the food is advertised or marketed	**.469**	.178	.020	.133	-.010	-.158	.121
	what I am used to from home and family traditions	**.279**	.113	-.016	.129	.201	-.137	.106
Biological factors	the taste of the food	.156	**.765**	.283	-.093	-.030	.139	.110
	my appetite for particular foods	.186	**.623**	-.007	.020	-.081	-.086	.054
	how presentable the food is	-.002	**.612**	-.323	.067	-.043	-.243	.122
	the feeling of fullness I get from the food	.015	**.576**	-.046	.005	.346	.060	.012
	the quality of the food	-.096	**.564**	.009	.115	.031	-.142	-.061
	how hungry I am	-.016	**.507**	.108	.149	.307	.158	.057
Nutritional knowledge	what I know will give me energy	-.177	.046	**.786**	.085	.172	.149	.074
	what I know would give me different nutrients, eg., proteins, carbohydrates, vitamins and minerals	-.123	.105	**.721**	.069	-.094	-.163	-.091
	what I know can happen to my health if I eat or	.228	.206	**.427**	-.128	.178	-.270	-.099

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

	don't eat particular foods							
	what I know an adult should eat in a day	.180	-.138	**.404**	-.043	-.030	-.086	.122
Personal ideas and systems	my eating habits, eg. adding salt no matter what, having my food with beer or juice instead of water, eating something sweet after a meal, eating the same cereal everyday	-.058	.256	-.124	**.610**	.023	-.010	.038
	my idea that particular foods are advertised for the benefit of the sellers or advertisers	.142	-.206	.084	**.574**	.165	-.021	-.088
	my mood, eg. happy, sad, stressed, etc.	.196	.226	.018	**.538**	.110	.027	-.075
	the fact that healthy food will help me concentrate on my work and avoid accidents and injuries	-.331	.020	.064	**.521**	.104	-.182	-.092
	what my friends choose for us to eat	.104	.276	.011	**.483**	-.036	.075	.213
	the need to belong to a particular social group	.002	.114	-.068	**.471**	.013	-.112	.248
	social media and networking	.315	.277	.032	**.471**	-.102	-.034	.005
	my belief that avoiding meat will keep me healthier	.204	-.163	.080	**.448**	-.278	-.188	.313
	my belief that killing animals for food is not good	.328	-.047	.159	**.429**	-.106	.043	.268
	my belief that my current diet is adequate	.072	-.066	.258	**.358**	-.114	-.081	.093
Economic factors	the cost/price of the food	.049	-.168	.074	.118	**.845**	.051	-.127
	the foods available	.062	.074	-.014	-.249	**.729**	-.198	.100
	the wages I am paid/income I make	-.254	.069	.005	.079	**.636**	-.154	.233
	the foods on special offers or discounts	.333	.122	.006	.204	**.464**	.190	.011
Resources	the facilities on site for storing and heating up my	.466	.034	-.100	.106	.041	**-.633**	-.065

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

	food							
	the eating facilities provided on site, eg. benches, tables, washing bowls/sinks, etc.	.355	.033	.074	.120	.042	**-.616**	-.026
	what I know my body needs for my current health status	.174	.036	.237	-.080	-.071	**-.564**	.138
	what I know my body needs at my age	-.114	-.048	.151	.100	-.062	**-.558**	.300
	the fact that healthy food will help increase my productivity at work	-.188	.131	.055	.073	.232	**-.525**	-.112
	what I know my body size needs	.144	-.175	.212	-.059	.074	**-.413**	.263
	my idea that I will add or lose weight with particular foods	.047	.173	-.131	.298	.110	**-.318**	.020
Cultural distinctions	what I know I should eat as a man or woman	.202	.035	-.002	-.011	.014	.003	**.652**
	what I know my body needs for the type of work I do	-.222	.232	.109	-.059	.091	-.062	**.560**
	my belief that I should only eat food from my culture	.109	.027	.049	.396	.015	.022	**.515**
	my belief that avoiding meat will save money	.251	-.206	-.252	.367	-.097	-.138	**.427**
Eigen value		10.68	4.15	2.88	2.24	1.88	1.82	1.59
% variance explained by each factor		25.43	9.87	6.85	5.34	4.48	4.33	3.79
Cumulative %		25.43	35.30	42.15	47.49	51.97	56.30	60.09

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Internal reliability

The reliability of the results was assessed using the Cronbach's alpha values and the mean inter-item correlations. The initial theoretical constructs had alpha values ranging from "0.71 to 0.84", indicating good internal consistency.[16]It is notable that one of the indicators of food context (what I am used to from home and family traditions) had a low item loading (0.279) and was therefore excluded from reliability testing.

Alpha coefficients of the eleven empirical constructs ranged from 0.54 to 0.84. However, these values improved with regard to the seven constructs. The alpha values for the seven emerging constructs ranged from 0.62 to 0.85, as shown in table 5. The mean inter-item correlation coefficients are also presented.

Table 5: Cronbach's alpha and mean inter-item coefficients of the seven-factor solution

	Factor	Alpha values	Mean inter-item correlations	Number of items
1	Food context	0.850	0.487	6
2	Biological factors	0.817	0.428	6
3	Nutritional knowledge	0.623	0.304	4
4	Personal ideas and systems	0.841	0.341	10
5	Economic factors	0.740	0.430	4
6	Resources	0.797	0.357	7
7	Cultural background	0.713	0.379	4

DISCUSSION

The loading of items on the seven factors extracted seemed to suggest that there was convergence amongst the measures, i.e., testing the seven constructs resulted in certain items converging together on each construct (component) (Brown, 2010). Where questions had a high loading on the same factor, it may suggest that respondents who gave a particular answer to one of the questions tended to give a similar answer to the other questions Foods Standards Agency (FSA), 2008). Similarly, the converging items did not load as heavily on any other factors. This means that there was also sufficient discrimination amongst items which are thought to be unrelated in reality. Thus, the pattern of item loadings provides support, in real data, for the validity of the seven constructs (Brown, 2010).

With regard to internal reliability, the recorded indices (Cronbach's alpha and mean inter-item correlations) suggest that the constructs meet the requirements for internal consistency

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

of constructs. “Family norms and traditions” was too minor to suggest practical importance and was therefore excluded during the internal consistency analysis. The constructs and their indicators are adequate for psychometric assessment of construction workers’ food choice factors.

Some of the constructs identified in the current study are similar to previous studies (Sobal and Bisogni, 2009; Rose et al., 2010; Eertmans et al., 2001; Grunert et al., 2010). Food context encompassed the physical surroundings, social climate and specific foods supply factors such as types, sources and availability of foods (Sobal and Bisogni, 2009). Likewise, decisions on food choices are ideally determined by personal ideas and systems comprising previously resolved deliberations and values which may stem from considerations of health status, managing relationships, society’s ideologies about food, family environments, media and personal experiences, and which become habitual over time(Eertmans et al., 2001).

Furthermore, nutritional knowledge indicators correspond with a study which reported that nutritional knowledge was essentially based on awareness of what a healthy diet means, sources of nutrients, nutritional requirements and consequences of consuming or avoiding certain foods (Grunert et al., 2010). However, this finding is slightly different from a more recent research which found that nutritional knowledge is indicated by three factors, namely: knowledge of diet-disease relationship, of nutrient content of foods and of dietary guidelines (McKinnon, 2012).

Summarily, the results demonstrated that items in the questionnaire seemingly have good and acceptable internal consistency and validity in measuring what they were intended to measure amongst the subjects.

CONCLUSION

Research on the factors influencing the food choices of construction workers has hardly been conducted in South Africa. More importantly, whether the factors examined for workers in general and world over, can be used to assess construction workers’ food choices is poorly documented. This study therefore sought to identify, develop and assess the validity and reliability of a scale for assessing construction workers’ food choice factors. The identification and separation of correlated and uncorrelated variables as necessary was possible through PCA.

Although, the study was conducted in only one province of South Africa, the results are generalizable to construction workers in other parts of South Africa and could be applicable in other geographical regions which may share similar views with the study population. In

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

addition, due to time constraints, only eight construction sites were sampled. Future studies could sample more sites in order to improve generalizability of results.

REFERENCES

Arganini, C., Saba, A., Comitato, R., Virgili, F. and Turrini, A. (2012) 'Gender differences in food choice and dietary intake in modern western societies', Public Health - Social and Behavioral Health, pp. 83-102.

Brown, J. D. (2010) 'Shiken: Jalt testing and evaluation', SIG newsletter, vol. 14 no. 2, pp. 30-35.

Bruner, B. G. and Chad, K. E. (2014) 'Dietary practices and influences on diet intake among women in a Woodland Creek community', Journal of Human Nutrition and Dietetics, vol. 27 (Suppl. 2), pp. 220-229.

Du Plessis, K. (2011) Diet and nutrition: A literature review of factors influencing blue-collar apprentices, Incolink, Victoria: Australia.

Du Plessis, K. (2012) 'Factors influencing Australian construction apprentices" dietary behaviours', American Journal of Men's Health, vol. 6 no. 1, pp. 59-66.

Eertmans, A., Baeyens, F. and van der Bergh, O. (2001) 'Food likes and their relative importance in human eating behaviours: Review and preliminary suggestions for health promotions', Health Education Research, vol. 16 no. 4, pp. 443-456.

European Food Information Council (EUFIC). (2005) The determinants of food choice, EUFIC.

Foods Standards Agency (FSA) (2008) Food technologies: Findings from the 2008 British social attitudes survey, National Centre for Social Research, FSA.

Grunert, K. G., Wills, J. M. and Fernandez-Celemin, L. (2010) 'Nutrition knowledge and use and understanding of nutrition information on food labels among consumers in the United Kingdom', Appetite, vol. 55 no. 2, pp. 177-189.

Kimberlin, C. L. and Winterstein, A. G. (2008) 'Validity and reliability of measurement instruments used in research', American Journal of Health-System Pharmacists, vol. 65 no. 23, pp. 2276-2284.

Lin, S., Tang, W., Miao, J., Wang, Z. and Wang, P. (2008) 'Safety climate measurement at workplace in China: A validity and reliability assessment', Safety Science, vol. 46, pp. 1037-1046.

McKinnon, L. (2012). The contribution of psychosocial factors to socioeconomic differences in food purchasing, Doctoral Thesis, Queensland University of Technology.

Okoro, C. S. (2015). Nutritional quality and health and safety performance in the South African construction industry, Unpublished Master's Dissertation, South Africa: University of Johannesburg.

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za

Okoro, C. S., Musonda, I. and Agumba, J. (2016) 'Evaluating the influence of nutrition determinants on construction workers' food choices', American Journal of Men's Health, 1-15.

Pallant, J. (2013) SPSS survival manual: A step by step guide to data analysis using IBM SPSS, 5th edition, Allen and Unwin, Australia.

Rawlinson, F. and Farrell, P. (2008) 'Construction: A culture for concern?' In: Dainty, A (Ed). Proceedings of the 24th Annual ARCOM Conference, 1-3 September 2008, Cardiff, UK, Association of Researchers in Construction Management, 1093-1102.

Ro, H. K., Merson, D., Lattuca, L. R. and Terenzini, P. T. (2015) 'Validity of the Contextual Competence Scale for Engineering Students', Journal of Engineering Education, vol. 104 no. 1, pp. 35-54.

Rose, D., Bodor, J. N., Hutchinson, P. L. and Swalm, C. M. (2010) 'The importance of a multi- dimensional approach for studying the links between food access and consumption', Journal of Nutrition, vol. 140 no. 6, pp. 1170-1174.

Sobal, J. amd Bisogni, C.A. (2009) 'Constructing food choice decisions', Ann. Behav. Med., vol. 38 (Suppl. 1), pp. S37-46.

Trochim, W. M. K. (2006) Discriminant validity, Research Methods Knowledge Base, Web Centre for Social Research Methods.

Van Teijlingen, E. and Hundley, V. (2001) 'The Importance of Pilot Studies', Social Research Update, vol. 35, pp. 1-4.

Wanjek, C. (2005) Food at work: Workplace solutions formal nutrition, obesity and chronic diseases, International Labour Organization (ILO): Geneva.

World Health Organization (WHO) (2015) Occupational Health: Workplace health promotion, WHO.

[1]chiomasokoro@gmail.com,
[2]imusonda@uj.ac.za and
[3]jagumba@uj.ac.za