

[DOI: 10.20472/IAC.2019.050.013](https://doi.org/10.20472/IAC.2019.050.013)

WYNAND CAREL JOHANNES GROBLER

North West University, South Africa

STEVE DUNGA

North West University, South Africa

ANALYSIS OF FOOD SECURITY STATUS AMONG THE ELDERLY IN SOUTH AFRICA

Abstract:

Food security remain an important measure of a households wellbeing or welfare. Poverty rates at household level has been deduced from food security status in many instances. Statistics South Africa uses food poverty line as one measure of poverty. The amount of food a household needs for survival is considered based on different measures, including the tradition calories approach. Food insecurity measure have evolved overtime and have become stronger and more encompassing taking into account all aspects of food security including, availability, access and dietary diversity. Poverty studies have identified women children and the old age people as the most vulnerable groups of people and at risk of poverty and food insecurity specifically. This study focuses of the Old aged people to analyse their food security status taking into account their sources of income. Special attention is given to those on old age grant and those excluded from the grant to assess the impact of the grant on food security status. Also a gender component is included since different age categories apply to the different gender categories. The paper uses data from the general Household survey collected by STATSSA in 2017. The paper also employs both univariate and multivariate analysis and a regression model to determine the statistical significance of age, gender and marital status on food security status.

Keywords:

Food security; the elderly; food poverty; household; pensioners

JEL Classification: D10, J14, J18

1. Introduction

Food security at household level remains a topical issue in development discourse (Brown and Upmanu 2006; Drimie and Casale 2009; Dunga and Grobler 2017; Grobler 2015). The global agenda 2030 which was signed by countries under the banner of sustainable development goals (SDGs) prioritised food security as goal number 2, only second to poverty, (United Nations, 2015; United Nations 2018) Food security at household level is the starting point in dealing with the topic of poverty and deprivation. The literature shows that women and children are the most vulnerable to poverty and food insecurity (Drimie and Casale 2009; Dunga 2017; The World Bank 2018). There is also evidence in the literature that the elderly people are vulnerable to poverty and other deprivations, especially in situations where there is no clear support structure after retirement (Gasparini et al. 2007; UNDESA 2017). In this regard the South African Bill of Rights guarantees that every citizen should have “the right to access to . . . sufficient food and water” and that “. . . the State must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights” (Constitution, 1996: 12). In 2002 the South African Government developed the Integrated Food Security Strategy (IFSS), and the National Planning Commission (NPC,2011) prioritise food security as a “key shaping force” in the development of South Africa. In 2013 during the State of the Nation Address the goals of the National Development Plan: Vision 2030 was confirmed as “tackling the problems of poverty, inequality and unemployment. It is a roadmap to a South Africa where all will have water, electricity, sanitation, jobs, housing, public transport, adequate nutrition, education, social protection, quality healthcare, recreation and a clean environment.” (South Africa: 2013). Since 2011 the South African Government promulgated the “National Policy on Food and Nutrition Security for South Africa” with the aim to ensure food security aligned with the National Development Plan (Department of Agriculture, 2013). The South African Government then implemented the Social Security Program after 1994, which includes social grants including the old age pension. In 1989 a total number of 2.4 million people benefited from this scheme, increasing to 16.7 million people in 2014 (Department of Social Development, 2019). Of this total number of beneficiaries 18.56% received the Old Age pension, 6.59% disability grant, 70.27% child support grant, 3.09% foster child grant and 1.49% care dependency grants (Department of Social Development, 2019). In 2018 a total of 31.0 % of South African individuals benefited from a Social Security Grant (General Household Survey, 2018). Notwithstanding the Social Security System grants, 23.8% of individuals have had complex Food Access in South Africa in 2018 (General Household Survey, 2018).

In the next section the literature on food security, and determinants of food security will be discussed. That will be followed by a discussion of the sampling and methodology, description of the model used in this study. Finally, the results will be discussed and a conclusion drawn.

2. Literature Review

Food security is defined by the Food and Agricultural Organisation (FAO) as a ‘situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’ (FAO, 1996). From a nutritional perspective Anderson (1990) defines food insecurity as a state “when the availability of nutritional adequate and safe foods or the ability to acquire acceptable food in socially acceptable ways is limited or uncertain”. More than 820 million people in the world are still hungry today, underscoring the immense challenge of

achieving the Zero Hunger target by 2030 (FAO, 2019). Hunger is rising in almost all sub-regions of Africa and, to a lesser extent, in Latin America and Western Asia (FAO, 2019). The literature on poverty has a myriad of dimensions and categories, and this is due to the complexity of poverty as a phenomenon. It is more and more acknowledged that poverty has an age dimension, where it is clear that as people become older, the ability to earn a living changes and their demand also increase (Dunga and Mncayi 2016; UNDESA 2017). The FAO (2019) in this regard state that social protection (social assistance in particular) can help address some of the economic and social determinants of malnutrition, including older people. Food insecurity amongst the elderly population in countries has been documented in several studies (Pérez-Zepeda et al, 2016; Moreira & Lourenco, 2013; Bartali et al, 2006). Fernandes et al (2018) further state that studies in the past tend to focus on children and the non-elderly. In a recent study (Shillington, 2016) it is highlighted that worsening conditions with regards to poverty and inadequate savings amongst the poor and working class will lead to a new wave of older people living in poverty.

Le Roux et al (2018) however state that research on food insecurity in countries with strong social safety nets for older people report lower rates of food insecurity among older people. Fernandes et al (2018) state in this regard "In older populations, food insecurity results from more than financial resource constraints. Functional impairment, not owning a home, isolation, gender, financial vulnerability, and poor health have statistically significant associations with food insecurity"

Studies since 1996 highlighted the negative consequences on health of food insecurity amongst the elderly (Zainuddin et al, 2017; Wolfe et al, 1996). In a recent study it was found that food insecurity affects the health and well-being of individuals (Bhargava et al, 2012). Le Roux et al (2018) further found older people, aged 75 years and older, had reduced odds of being food insecure as compared to younger older people aged 65 to 74 years. Wolfe et al (2003) stated that as older populations increase in size, it may need a different approach from a public healthy perspective.

Research based on the benefits of Social Security Systems that includes Old Age Pensions, concluded that cash transfers improve food security by improving food access and providing households with income to purchase food (Reilly et al., 1999). Other research indicate that social grants will lead to improved spending on food, thus improving food security status at the household level (Fiszbein et al., 2008; Lagarde, Haines & Palmer, 2008; Maluccio & Flores, 2005). In South Africa Van der Berg et al (2009) found that social grants affect food security in a positive way at the household level. However, studies by Grobler (2015) revealed that the existing grant allocations may not be sufficient alone to significantly alleviate food insecurity.

Earlier studies found a positive relationship between age of the household head (Babatunde *et al.*, 2007; Amaza *et al.*, 2006) and Food security status of the household. Other studies found female-headed households at an increased risk to be food insecure (Knueppel *et al.*, 2009; Joshi and Maharjan, 2007). Research showed also a negative relationship between level of education and food insecurity (Haile *et al.*, 2005). In a study of Arene and Anyaeji (2010), income and age of the head of the household were found to be important in explaining food security status of households.

3. Methodology and Sampling

This paper is based on 2018 data collected by statistics South Africa across the country as part of the General Household Survey. The sample involved households in all the nine provinces of South Africa. The sample representation by province is provided in Table 1. In this regard Gauteng had the highest percentage (23.9%), followed by Kwa Zulu Natal (16.0%), Eastern Cape (13.3%), Limpopo province (11.3%) Western Cape (10.0%), Mpumalanga (8.4%) North West Province (6.8%) Free State province (5.9%), and Northern Cape (4.4%) representation in the sample (Statistics SA, 2019). The percentage representation changes when only the elderly are considered as is shown in Table 2.

Table 1: Total sample representation by province

Province	Frequency	Percentage	Cumulative
Western Cape	2019	10.0	10.0
Eastern Cape	2775	13.3	23.3
Northern Cape	925	4.4	27.7
Free State	1239	5.9	33.6
Kwazulu-Natal	3337	16.0	49.6
North West	1424	6.8	56.4
Gauteng	4996	23.9	80.3
Mpumalanga	1748	8.4	88.7
Limpopo	2373	11.3	100.0
Total	20908	100.0	

Source: GHS data 2018

Table 2 shows that the numbers of the elderly as a percentage of the sample increases for Eastern cape from 13.3% to 17.3% for example. According to Table 2 the representation of the elderly in the sample is Gauteng with the highest percentage (17.8%), followed by Eastern Cape (17.3%), Kwa Zulu Natal (16.8%), Eastern Cape (13.3%), Limpopo province (12.5%) Western Cape (9.6%), Mpumalanga (7.5%) North West Province (7.1%) Free State province (6.3%), and Northern Cape (5.0%) representation in the sample (Statistics SA, 2019). This is an indication that the distribution of the elderly across the country's provinces is not the same. In this regard some of the provinces with more rural areas have more elderly people than the provinces with more urban areas.

Table 2: The Elderly in the sample (60 years and above)

Province	Frequency	Percentage	Cumulative
Western Cape	504	9.6	9.6
Eastern Cape	914	17.3	26.9
Northern Cape	266	5.0	31.9
Free State	333	6.3	38.3
Kwazulu-Natal	888	16.8	55.1
North West	376	7.1	62.2
Gauteng	937	17.8	80.0

Mpumalanga	398	7.5	87.5
Limpopo	657	12.5	100.0
Total	5273	100.0	

Source: GHS 2018

The data is collected by Statistics South Africa at the household level with household head and household information. Based on the head of household information, the data can be described by population group, age and gender of head of household. Based on this approach, more African/Black heads of households were samples representing 83% of the sample and coloured 7.9 % of the sample whilst white head of households represented 7.2% of the sample and Indians 1.9% in the sample. Out of the 20908 household that were sampled, 57.1 were male headed households and 42.9 were female headed households. However, when only the elderly is considered the percentages change as is shown in Table 3. This means 47.0% of the respondents were from male headed households, and 53.0% of the respondents interviewed was from female headed households.

Table 3: Gender distribution in the whole sample

Gender	Frequency	Percentage	Cumulative
Male	2476	47.0	47.0
Female	2797	53.0	100.0
Total	5273	100.0	

Source: GHS 2018

In households where both the man and women are available the man is usually the defacto head of households, and thus in most male headed household, both parents may be available. However, there are cases where a female head of household exists with a man available in the house. To check the extent of the application of the defacto head of household, a cross tabulation between gender of head of household and marital status is done. Table 4 show the marital status of the head of household among the 60 years and older sample. In table 4 it shows that 1864 of the 5273, or 35.3% of the households, have legally married members. In this regard 1735 of the 1864 legally married members 93.1% is headed by a male headed household. In contrast 2222 households or 42.1% indicated widowed as marital status. In these households 1887 or 84.9% is headed by a female headed household. Furthermore, the results in Table 4, show in the cross tabulation of marital status and gender, 93.1% of the legally married are headed by males and only 6.6% are headed by female head of household, confirming the defacto application of head of household in most African settings. Table 4 shows that more divorced households are headed by females. With regard to the marital status "single and never married before", 474 out of 585 or 81.0% is headed by a female as head of household.

Table 4: Marital status and gender of head of household

			Male	Female	Total
Marital Status	Legally married	Frequency	1735	129	1864
		% within Marital status	93.1	6.9	100.0
		% within gender	70.1	4.6	35.3
		% of Total	32.9	2.4%	35.3
	Living together like husband and wife/partners	Frequency	144	46	190
		% within Marital status	75.8	24.2	100.0
		% within gender	5.8	1.6	3.6
		% of Total	2.7	0.9	3.6
	Divorced	Frequency	74	156	230
		% within Marital status	32.2	67.8	100.0
		% within gender	3.0	5.6	4.4
		% of Total	1.4	3.0	4.4
	Separated, but still legally married	Frequency	51	51	102
		% within Marital status	50.0	50.0	100.0
		% within gender	2.1	1.8	1.9
		% of Total	1.0	1.0	1.9
	Widowed	Frequency	335	1887	2222
		% within Marital status	15.1	84.9	100.0
		% within gender	13.5	67.5	42.1
		% of Total	6.4	35.8	42.1
	Single, but have lived together with someone as husband/wife	Frequency	26	54	80
		% within Marital status	32.5	67.5	100.0
		% within gender	1.1	1.9	1.5
		% of Total	0.5	1.0	1.5
Single and never married/never lived together	Frequency	111	474	585	
	% within Marital status	19.0	81.0	100.0	
	% within gender	4.5	16.9	11.1	
	% of Total	2.1	9.0	11.1	
Total	Frequency	2476	2797	5273	
	% within Marital status	47.0	53.0	100.0	
	% within gender	100.0	100.0	100.0	
	% of Total	47.0	53.0	100.0	

Source: Calculation from the GHS 2018

The food security status in this paper was calculated using the self-reported questions that was asked in the survey. A total of five questions from the survey were used in calculating the food security status. The first question in the questionnaire was “if there was sufficient food in

the household”, the second question asked “if the household ever run out of money to buy food”, the third question asked if the household “ever cut the size of meal or skip any meals”, the fourth questions asked “if the household ever skipped meals” and the fifth question asked “if the household resorted to a smaller variety of food”. Based on the responses to these questions a food security score was calculated that split the sample into food secure and food insecure households.

3.1 Model specification

The food security measure was the used as a categorical variable with two categories namely food secure and food insecure households. In estimating the determinants of food security status a conditional probability model was considered as suitable to determine the head of household characteristics that significantly explain the probability of a household falling in a food insecure household category. The dependent variable is defined as follows:

1 food insecure

0 food secure

A binary logistic regression model was the used to estimate the probability of a household falling in the food insecure category. The binary logistic model is expressed as in terms of the odd of the success even occurring, and hence the add are the probability that the event will occur divided by the probability that it will not occur. Thus the odds of the success even are expressed as:

$$Odds(eventP) = \frac{p}{1-p} \quad (1)$$

However, modelling for a logistic regression is based on transforming the odds using the natural logarithm. With logistic regression it is therefore possible to model the natural log odds as a linear function of the explanatory variable (Park 2013):

$$logit(y) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \sum_i^n \beta_i X_{1...n} \quad (2)$$

Where P is the probability of the household of the elderly being food insecure and 1-P is the probability of the household of the elderly being food secure. Thus we modelling for the determinates of food insecurity among the households headed by the elderly. Thus the binary logistic regression being estimated is as follows;

$$logit(y) = \ln\left(\frac{\text{probability food insecure}}{\text{probability of food secure}}\right) = \beta_0 + \sum_i^n \beta_i X_{1...n} \quad (3)$$

The independent variable included in the model include gender, defined as 1 for males and 0 for females, Age, considering only those from 60 years and above; Pension, with 1 for those

receiving a pension and 0 for those not receiving a pension; Grant, with 1 for those receiving a grant (any type of grant) and 0 for those not receiving any grant, and Marital status, with 7 categories, and all the categories are explained in table 6 by their coding, with those legally married as the reference category.

4. Results and discussion

4.1 Descriptive Statistics

The results in Table 5 shows the tabulation of food secure and food insecure households. Table 5 also shows the number of households indicating that they receive a pension as income, and the households indicating that they received an old age pension (or other type of grant) Table 5 shows that 3683 of the 5273 households, or 69.8% of the households is food secure. A total number of 1590 of the 5273, or 30.2% of the households is food insecure. A total of 625 of the 5273 households indicated that they received a pension as main source of income, while 4433 of the household heads indicated that they receive a grant (including the State Old Age Pension Grant).

Table 5: Descriptive Statistics

Food Security Status	Frequency	Percentage
Food Secure	3683	69.8
Food Insecure	1590	30.2
Total	5273	100.0
Pension		
Yes	625	11.9
No	4648	88.1
Total	5273	100.0
Grants		
Yes	4433	84.1
No	840	15.9
Total	5273	100.0

Source: Calculation from the GHS 2018

This food security status is then use in the model to investigate the determinants of food insecurity among the elderly in South Africa.

4.2 Model Results

The results of the binary logistic regression model are shown in Table 7. The dependent variable was defined as 1 for food insecurity and 0 for food security. The results show that male headed households have a lower probability of being food insecure compared to the female headed household. The coefficient for gender was negative showing a negative relationship between male headed households and the probability of being food insecure.

The coefficient for gender was negative showing a negative relationship between male headed households and the probability of being food insecure. This is not in agreement with the apriori expectation, where theory shows that the older one get the lower the chances of earning an income and the higher the chance of being vulnerable, (Gasparini et al. 2007). However, in this model, only those above the age of 60 were included and hence this could mean that among the elderly, the older a person get the higher the chance of receiving a grant or an old age grant and hence that may reduce the chance of being food insecure.

Table 6: Results of Binary Logistic Regression Model

	B	S.E	Wald	df	Sig.	Exp(B)
Constant	1.106	.493	5.042	1	.025	3.023
Gender of household head (Male)	-.140	.090	2.382	1	.123	.870
Age of household head	-.010	.004	5.861	1	.015**	.990
Pensions(1)	-.457	.13820	10.907	1	.001*	.633
Grants(1)	.569	.142	16.171	1	.000*	1.767
Legally married			30.224	6	.000*	
Living together like husband and wife	.579	.166	12.102	1	.001*	1.783
Divorced	-.048	.181	.071	1	.790	0.953
Separated, but still legally married	.531	.218	5.937	1	.015**	1.701
Widowed	.233	.105	4.918	1	.027**	1.262
Single, but have lived together with partner	.934	.241	14.993	1	.000*	2.546
Single and have never been married	.152	.128	1.400	1	.237	1.164
Log Income	-.216	.038	32.545	1	.000*	.806

Variable(s) entered on step 1: Sex of household head, Age of household head, Pensions, Grants, Marital status. *significant at the 1% level, **significant at the 5% level, * significant at 10% level.**

The third variable that was considered was pension, which had those on a pension entered as 1 and 0 otherwise. The negative coefficient which had a p-value of 0.001 meaning it was significant at 1% shows that those with a pension had a lower probability of falling into the food insecure category as compared to those without a pension. The results on grants also had a p-value of 0.000 which is less than 0.01 for the 1% level of significance, meaning that grant is a significant predictor of food insecurity among the elderly. The positive coefficient means that those receiving a grant had a higher probability of falling into food insecurity. This could be understood in the sense that for one to qualify for a grant you have to be below a certain income threshold. Thus most of these people are poor and hence having a higher probability of being food insecure. The last but not least set of independent variable are on marital status. Marital status had 7 categories and legally married was used as a reference category, hence all the other marital statuses were compared to the legally married. All the categories were statistically significant with the p-values less than 0.05 for the 5% level of significance. Only the divorced was not significant with a p-value of 0.591. These results indicate the marital status is a significant predictor of food security among the elderly. Those

that were legally married had the lowest probability of being food insecure since all the other categories had a positive coefficient indicating a higher probability compared to the reference category.

5. Conclusion and Recommendations

This study analyses food insecurity amongst the elderly population in South Africa. A logit regression model was used to determine the factors that influence food security of the population above the age of 60. Data from the General Household Survey in South Africa was used to do the analyses. The results of the study indicate that food security amongst the elderly population is influenced by Age, source of income and marital status. The results show that male headed households have a lower probability of being food insecure compared to the female headed household. The coefficient for gender was negative showing a negative relationship between male headed households and the probability of being food insecure. The coefficient for gender was negative showing a negative relationship between male headed households and the probability of being food insecure. In this study only those above the age of 60 were included and hence this could mean that among the elderly, the older a person get the higher the chance of receiving a grant or an old age grant and hence that may reduce the chance of being food insecure. Social grants (State old age pension) was a significant predictor of food insecurity. The implication of this is that those who received a pension based on life time savings was less likely to fall into a food insecure category compared to those who relied on the state old age pension. The meaning of this is that the social grants may not be enough to secure a food security. The results also showed that marital status is a significant predictor of food security amongst the elderly. In this regard female headed households as widows is more likely to fall into food insecurity.

The results reported in this study contribute to the growing body of knowledge concerning food security of households, especially the elderly. It is suggested that policymakers must consider the socio economic factors that influence food insecurity amongst the elderly for Social Development purposes.

References

- Amaza, P.S., Umeh, J.C., Helsen, J. & Adejobi, A.O. (2006). Determinants and measurement of food insecurity in Nigeria: some empirical policy guide. Contributed poster prepared for presentation at the International Association of Agricultural Economics Conference, Gold Coast, Australia
- Anderson, S.A. (1990). Core indicators of nutritional state for difficult to sample populations. *Journal of Nutrition*, 120:1559-1600.
- Arene C. J. and Anyaeji R. C. (2010). Determinants of food security among households in Nsukka metropolis of Enugu state, Nigeria. *Pakistan journal of social sciences*; 30(1): 9-116, 2010.
- Babatunde, O.R., Omotesho, O.A. & Sholotan, O.S. (2007). Socioeconomics characteristics and food security status of farming households in Kwara state, North-central Nigeria. *Pakistan Journal of Nutrition*, 16(1):49-58.
- Bartali B, Frongillo EA, Bandinelli S et al. (2006) Low nutrient intake is an essential component of frailty in older persons. *J Gerontol A Biol Sci Med Sci* 61, 589–593
- Bhargava V, Lee JS, Jain R et al. (2012) Food insecurity is negatively associated with home health and out-of-pocket expenditures in older adults. *J Nutr* 142, 1888–1895.
- Brown, Casey and Lall Upmanu. (2006). "Water and Economic Development: Correlation Between Investment in The Water Sector and Economic Growth of Developing Countries." *Natural Resources Forum* 30(2005):306–17.

- Drimie, Scott and Marisa Casale. (2009). "Multiple Stressors in Southern Africa: The Link between HIV/AIDS, Food Insecurity, Poverty and Children's Vulnerability Now and in the Future." *AIDS Care* 21 Suppl 1(August):28–33.
- Dunga, Steven H. and Precious Mncayi. (2016). "Determinants of the Perceptions of Free Higher Education among Students at a South African University." *International Journal of Economics and Finance Studies* 8(1):161–76.
- Dunga, Steven Henry. (2017). "A Gender and Marital Status Analysis of Household Income in a Low-Income Township." *Studia Universitatis Babeş-Bolyai Oeconomica* 62(1):20–30.
- Dunga, Steven Henry and WCJ Grobler. 2017. "The Nexus of Food and Housing Insecurity in South Africa." *International Journal of Social Sciences and Humanity Studies* 9(2):95–108.
- FAO see Food and Agricultural Organization of the United Nations
- FAO. 1996. World Food Summit. Rome declaration on world food security. Rome
- FAO. 2019. State of Food Security and Nutrition in the World: 2019. [Http://www.fao.org/3/ca5162en/ca5162en.pdf](http://www.fao.org/3/ca5162en/ca5162en.pdf) Date of Access: 16 July 2019.
- Fernandes, S.G., Rodrigues.A.M., Nunes, n., Santos, O., Gregório. M.J., de Sousa. R., Dias, S. and Canhão1. H. 2018. Food Insecurity in Older Adults: Results From the Epidemiology of Chronic Diseases Cohort Study 3. *Frontiers in Medicine*. July 2018 | Volume 5 | Article 203.
- Gasparini, Leonardo, Javier Alejo, Francisco Haimovich, Sergio Olivieri, and Leopoldo Tornarolli. 2007. *Poverty among the Elderly in Latin America and the Caribbean*.
- Grobler, Wynand C. J. 2015. "Socio Economic Determinants of Household Dietary Diversity in a Low Income Neighbourhood in South Africa Proceedings of 30th International Business Research Conference." (April).
- Haile. H.K., Alemu, Z.G. & Kudhlande, G. 2005. Causes of household food insecurity in Koredegaga Peasant Association, Oromiya Zone, Ethiopia. *Agrekon*, 44(4):543-560.
- Joshi. N.P., Maharjan. K.L. 2007. Assessment of Food Self-Sufficiency and Food Security Situation in Nepal. *Journal of International Development and Cooperation*, Vol.13, No.1, 2007, pp. 209-230
- Knueppel, D. Demment, M. & Kaiser, L. 2009. Validation of the Household Food Insecurity Access Scale in rural Tanzania. *Public Health Nutrition*, 13(3):360-367.
- Lagarde M, Haines A, Palmer N. Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: a systematic review. *JAMA* 2007; 298: 1900–10
- Le Roux. J., Morrison. K., Rosenberg. M. 2018. Prevalence and Predictors of Food Insecurity among Older People in Canada. *Int. J. Environ. Res. Public Health* 2018, 15, 2511
- Maluccio, J.A. and R. Flores. 2005. *Impact evaluation of the pilot phase of the Nicaraguan Red de Protección Social*, Research Report No. 141, IFPRI, Washington D.C.
- Moreira VG & Lourenco RA (2013) Prevalence and factors associated with frailty in an older population from the City of Rio de Janeiro, Brazil: the FIBRA-RJ Study. *Clinics (Sao Paulo)* 68, 979–985.
- United Nations. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*.
- National Planning Commission. 2011. Diagnostic overview. Pretoria: Office of the Presidency
- Pérez-Zepeda1.M., Castrejón-Pérez1. R.C., Wynne-Bannister. E.,García-Peña3. E. 2016. Frailty and food insecurity in older adults. *Public Health Nutrition*: 19(15), 2844–2849
- Park, Hyeoun-Ae. 2013. "An Introduction to Logistic Regression : From Basic Concepts to Interpretation with Particular Attention to Nursing Domain." *J Korean Acad Nurs* Vol.43 43(2):154–64.
- Shillington, R. An Analysis of the Economic Circumstances of Canadian Seniors; Broadbent Institute:Toronto, on Canada, 2016; https://d3n8a8pro7vnmx.cloudfront.net/broadbent/pages/04/attachments/original/1455216659/An_Analysis_of_the_Economic_Circumstances_of_Canadian_Seniors.pdf?1455216659. Date of Access: 16 July 2019.

- South Africa (Department of Social Development). 2019. Sassa. <http://www.dsd.gov.za/> Date of Access: 15 July 2019.
- South Africa. 2013. State of the Nation Address. Parliament. Cape Town
- South Africa. 11996. Constitution of South Africa. Parliament. Cape Town.
- South Africa.(National Department of Agriculture). 2013. National Policy on Food and Nutrition Security for South Africa.
<https://www.nda.agric.za/docs/media/NATIONAL%20POLICYon%20food%20and%20nutrition%20security.pdf>. Date of Access: 15 July 2019.
- Statistics SA. 2017. "General Household Survey." *Statistical Release P0318* 21(4):482.
- The World Bank. 2018. *Poverty and Shared Prosperity 2018: Piecing Together the Poverty Puzzle*.
- UNDESA. 2017. *Income Poverty in Old Age: An Emerging Development Priority*.
- United Nations. 2018. *The Sustainable Development Goals Report: 2018*. New York.
- Van Der Berg, S., Siebrits, K. and Lekezwa, B. (2009). Efficiency and equity effects of social grants in South Africa. *Stellenbosch Economic Working Papers: 15/10: Stellenbosch, South Africa*.
- Wolfe W, Olson C, Kendall A et al. (1996) Understanding food insecurity in the elderly: a conceptual framework. *J Nutr Educ* 28, 92–100.
- Wolfe W, Frongillo E & Valois P (2003) Understanding the experience of food insecurity by elders suggests ways to improve its measurement. *J Nutr* 133, 2762–2769
- Zainuddin, N.S., Ainuddin, Husin.M.H., Ahmad.N.H, HUA, W., Chien.H.W., Shahar, S., Ismail, H. Singh, D.K. 2017. Association between Nutritional Status, Food Insecurity and Frailty among Elderly with Low Income. *Jurnal Sains Kesihatan Malaysia* 15(1) 2017: 51-59