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ARTICLE

Feasibility study on the use of the modified Finnish Diabetes Risk Score in South African context: a case of home-based carers

TM Mothiba[a], MH Mphasha[b*], TT Molepo[c], H Bastiaens[d] and J Wens[e]

[a]*Faculty of Healthcare Sciences, University of Limpopo, Polokwane, South Africa*
[b]*Department of Human Nutrition and Dietetics, University of Limpopo, Polokwane, South Africa*
[c]*Department of Nursing, University of Limpopo, Polokwane, South Africa*
[d]*Department of General Practice (S5), University of Antwerp, Wilrijk, Belgium*
[e]*Department of Family Practice, University of Antwerp, Wilrijk, Belgium*
**Correspondence: pitso85@gmail.com*

Background: The Finnish Diabetes Risk Score (FINDRISC) tool is used to identify undetected cases of diabetes and risk scores. The FINDRISC tool outlines questions to ask, including anthropometric parameters to measure, during screening and detection of diabetes cases. This study assessed the feasibility for the introduction of FINDRISC tool for use in South Africa. The aim is to determine the overall competence of home-based carers (HBCs) in utilising this tool.
Method: A quantitative approach and cross-sectional feasibility study was conducted involving 52 HBCs who were sampled using homogeneous purposive sampling. The study was conducted in clinics of Ga-Dikgale Village in Polokwane. A FINDRISC questionnaire was used to assess competence of HBCs. Data were analysed using SPSS, with both descriptive and inferential statistical analysis.
Results: None (0%) of the participants were fully competent, 6% were incompetent and 94% were moderately competent on use of the FINDRISC tool.
Conclusion: Most HBCs were moderately competent in the use of this tool, while none were competent. It is feasible that the FINDRISC tool can be adapted and utilised by HBCs in South Africa. However, a proper training should be offered to HBCs on the use of the FINDRISC tool. It is also recommended to assess components of requiring professionals considering the scope of work and qualification.

Keywords: competence, feasibility, Finnish Diabetes Risk Score, home-based carers, use

Introduction

The Finnish Diabetes Risk Score (FINDRISC) is one of the risk models established by Lindström and Tuomilehto,[1] with the purpose of identifying undetected cases of diabetes and risk scores.[2] The FINDRISC is a quick, easy, inexpensive, non-invasive questionnaire that has been validated and estimates a person's likelihood of developing diabetes within the next 10 years.[3,4] Use of the FINDRISC tool is critical and aids in primary diabetes prevention strategies.[5] Age, body mass index, waist circumference, physical activity, daily consumption of fruits, berries or vegetables, history of anti-hypertensive medicine treatment and history of high blood sugar were the original questions on the FINDRISC.[6] Later studies, however, changed the model's diet habits and physical activity questionnaires and included family history of type 2 diabetes mellitus (T2DM) in the study population.[2]

Home-based carers (HBCs) in South Africa refers to the provision of health services by formal and informal caregivers within the home. The HBCs are part of primary healthcare re-engineering and are responsible for bringing healthcare closer to communities, families and individuals, even in the most rural and underserved areas.[7] They are further responsible amongst other tasks for caring for households, health promotion, health education and identification of those who need prevention, curative treatment, rehabilitation and referral.[7,8] The HBCs also assist patients in establishing and maintaining health-promoting behaviours by modifying social norms and attitudes, enhancing self-efficacy and eliminating socioeconomic barriers by facilitating links to resources.[9–11] The everyday tasks of HBCs include community promotion and prevention work, while some offer curative and rehabilitative services, and the remainder perform a combination of these.[12] The HBCs give medical services without having any formal training.[13] A growing body of research is demonstrating the value of HBCs in the treatment of diabetes.[14] Interventions by HBCs have been identified as a viable technique for enhancing diabetes outcomes because they frequently address issues at both the individual and community levels.[15] Studies have also shown that HBCs are helpful in preventing diabetes,[16] and in the introduction of HBC programmes for the treatment of diabetes.[17] At this level, HBCs can create specialised tasks within the organizational framework of the healthcare system. The chronic illness care model offers a framework for conducting lifestyle medicine interventions on diabetes in primary care settings.[18] The World Health Organization (WHO) has created guidelines to support HBC initiatives;[8] however, particular guidelines must be customized to each culture employing experts from both cultures in an interactive setting.[19,20]

Feasibility studies are crucial in diabetes care interventions and assess the practicability, acceptability, sustainability and effectiveness of the proposed intervention and were found to be iterative, formative and adaptive.[21,22] They are usually implemented prior to conducting an outcome-focused pilot study or full-scale evaluation to test the effectiveness of an intervention.[23] The rationale for feasibility studies is to assess recruitment capability, data-collection procedures and

outcome measures, acceptability, resources and ability to manage and implement the intervention.[24] It also determines in advance whether main study or intervention can be carried out.[25]

Use of a community-based screening for diabetes tool was conducted in South Africa, and it was found to be a feasible method for early detection.[26] Therefore, the FINDRISC tool is one of the tools that can be used to identify undetected cases of diabetes and risk scores. This tool outlines questions to ask, including anthropometric parameters to measure. Hence, this study seeks to assess the feasibility for the introduction of the use of a modified FINDRISC tool by HBCs in South Africa.

Methodology

Research approach and design

A quantitative approach and cross-sectional feasibility study was conducted on the use of the FINDRISC tool within the South African context.

Study setting

According to Statistics South Africa,[26] Ga-Dikgale has a population of 430 people, of whom 54% were females and 46% males. The area has a total of 146 households, and residents are black Africans, of whom 98% observe Sepedi culture. The majority of residents in the area are below the age of 34.[27] The area of Ga-Dikgale has five clinics, which are predominantly staffed by nurses; however, these clinics use the services of HBCs in the care and support of patients. The clinics provides chronic care services such as diabetes to the community members.

Study population and sampling

The target population in this study was HBCs from all the clinics at Ga-Dikgale Village. Total population homogeneous purposive sampling was used to select all 52 HBCs. Total population sampling is a kind of purposive sampling approach in which the entire population is selected because it is relatively small and based on a certain set of qualities, such as experience, knowledge, skills or exposure to an event.

Data collection and instruments

In this study, a FINDRISC tool was adopted, modified and used to describe the competence of HBCs in assessing the risk status of people living with diabetes. Reliability was guaranteed by piloting the tool at clinics near Dikgale using HBCs, which yielded no changes. The results of the pilot study were/are not included in main study. Content validity was ensured through supervisors and use of a literature review. The modified FINDRISC tool had seven sections, which included biographic data, BMI, WC, physical activity, diet, taking of hypertension and diabetes medication, and presence of illnesses. Appointments with the HBCs were made through their coordinators and the operational managers of the clinics. The HBCs were scored on use of the FINDRISC tool after the HBCs had demonstrated all sections of the risk assessment tool. This was done for assessing the HBCs' competency level on the use of the FINDRISC tool. The HBCs were to score the patient on the adopted FINDRISC tool based on how they have adopted the FINDRISC tool. All variables on the adapted tool are dependent on each other, which implies that all variables should be done correctly. The researchers were used to assess or rate the HBCs. Halo-effect bias, which could occur during the rating process, was minimised through debiasing to confirm that researchers were rational and adhering to the assessment tool.

Data analysis

The Statistical Package for the Social Sciences (IBM Corp, Armonk, NY, USA) was used to analyse the data. Statistical analysis using Pearson's chi-square test was conducted to determine the correlation coefficient with 95% confidence interval, where a p-value of < 0.05 was considered statistically significant. The competence of participants on use of the FINDRISC tool was classified into incompetent, moderately competent and fully incompetent. The total score on the assessment tool is 17. Incompetent was classified as a score between 0 and 9, whereas moderately competent was classified as a score between 10 and 15, and fully competent was classified as a score of 16–17.

Ethical considerations

This study was approved by Turfloop Research Ethical Committee (TREC) and allocated clearance certificate number TREC/78/2016: PG. The Limpopo Department of Health (DOH) gave permission to conduct the study (Ref: 4/2/2). All participants gave written informed consent. Participation was voluntary and participants were informed of their right to withdraw from the study at any stage without penalty. Privacy and confidentiality of the participants' data were also maintained.

Results

Table 1 lists the competence levels of HBCs regarding use of the FINDRISC tool on biographical data, BMI and WC. With regard to the biographical data component, all HBCs (100%) were found to be moderately competent in their ability to ask patients their age. On BMI, only 75% were found to be moderately competent in weighing of patients using a scale and 81% were incompetent in measuring the BMI of patients. Moreover, 94% were incompetent in measuring the waist circumference of patients.

Table 2 confirms that there was no significant relationship between competency levels and use of the FINDRISC tool on biographical data ($p = 0.384$), BMI ($p = 0.384$) and waist circumference (0.659).

Table 3 shows that 90% of HBCs were found to be moderately competent in asking patients if they engage in physical activity and how long they exercise. With regard to diet, 75% of HBCs were found to be moderately competent in asking patients what they include in their diet, whilst 88% were moderately competent in asking patients how often they follow the diet. On the other hand, 94% of HBCs were incompetent in asking patients whether they have taken medication and 88% were moderately competent in asking patients about adherence to medication. Moreover, 79% were moderately competent in asking patients whether they have any other illness, whilst 88% were moderately competent in asking patients whether they have been found to have high blood glucose during an illness or during pregnancy.

Table 4 illustrates that there were significant associations between competency levels and use of the FINDRISC tool regarding physical activity ($p = 0.001$) and diet ($p = 001$), respectively.

Table 1: Competency level of HBCs for use of the FINDRISC tool on biographical data, BMI and waist circumference

Biographical data			
Question asked	Competency level	Respondents	
		Frequency	Percentage
Did the HBCs ask the patient his/her age?	Incompetent	0/52	0
	Moderately competent	52/52	100%
	Fully competent	0/52	0
Did the HBCs ask the patient his/her date of birth to confirm age?	Incompetent	0/52	
	Moderately competent	52/52	100%
	Fully competent	0/52	0
Body mass index:			
Did the HBCs demonstrate weighing of the patient using a scale?	Incompetent	13/52	25%
	Moderately competent	39/52	75%
	Fully competent	0/52	0
Did the HBCs demonstrate measuring of body mass index of the patient?	Incompetent	42/52	81%
	Moderately competent	10/52	19%
	Fully competent	0/52	0
Waist circumference			
Did the HBCs demonstrate measuring of waist circumference of the patient?	Incompetent	49/52	94%
	Moderately competent	3/52	6%
	Fully competent	0/52	0

Figure 1 shows that only 6% of HBCs were incompetent, and most were moderately incompetent (94%), while none is fully competent (0%).

Discussion

The purpose of this study was to determine the feasibility of introducing the FINDRISC tool in South Africa. This was done through assessing competence or lack thereof of HBCs in using the FINDRISC questionnaire to assess the risk status of diabetes patients. Diabetes patients frequently receive care from HBCs, who also act as a liaison between local communities and medical facilities. The following aspects of this instrument were examined to determine whether it was being utilized competently or not: physical activity, diet, body mass index, waist circumference and the existence of illnesses. Diet and exercise are crucial aspects of diabetes care.[28] Poor eating practices and insufficient physical exercise are linked to weight gain,[29] which in turn causes obesity,[30] and puts patients at higher risk of comorbid disorders and complications.. Comorbid

Table 2: Use of the FINDRISC tool item (biographical data, BMI and waist circumference) by competence levels

Performance of participants by question asked on FINDRISC tool items		Performance		*p*-value
		Competence levels	%	
Biographical data	Did the HBCs ask the patient his/her age?	Incompetent	0	$X^2 = 2.948$, $p = 0.384$
		Moderately competent	100%	
		Fully competent	0	
	Did the HBCs ask the patient his/her date of birth to confirm age?	Incompetent	0	
		Moderately competent	100%	
		Fully competent	0	
Body mass index	Did the HBCs demonstrate weighing of the patient using a scale?	Incompetent	25%	$X^2 = 758$, $p = 0.384$
		Moderately competent	75%	
		Fully competent	0	
	Did the HBCs demonstrate measuring of body mass index of the patient?	Incompetent	81%	
		Moderately competent	19%	
		Fully competent	0	
Waist circumference	Did the HBCs demonstrate measuring of waist circumference of the patient?	Incompetent	94%	$X^2 = 195$, $p = 0.659$
		Moderately competent	6%	
		Fully competent	0	

Table 3: Competency level of HBCs for use of the FINDRISC tool on physical activity, diet, taking of medication and presence of illness

Physical activity			
Question asked	**Competency level**	**Respondents**	
		Frequency	**Percentage**
Did the HBCs ask the patient if she/he engages in physical activity?	Incompetent	5/52	10%
	Moderately competent	47/52	90%
	Fully competent	0/52	0
Did the HBCs ask the patient how she/he exercises?	Incompetent	4/52	8%
	Moderately competent	48/52	92%
	Fully competent	0/52	0
Did the HBCs ask the patient how long or how often?	Incompetent	5/52	10%
	Moderately competent	47/52	90%
	Fully competent	0/52	0
Diet:			
Did the HBCs ask the patient what she/he includes in their diet, e.g. fruits, vegetables or berries?	Incompetent	13/52	25%
	Moderately competent	39/52	75%
	Competent	0/52	0
Did the HBCs ask the patient how often she/he follows the diet? Daily or sometimes	Incompetent	6/52	12%
	Moderately competent	46/52	88%
	Fully competent	0/52	0
Taking medication for hypertension and diabetes:			
Did the HBCs ask the patient if she/he has taken medication for high blood pressure and diabetes?	Incompetent	49/52	94%
	Moderately competent	3/52	6%
	Fully competent	0/52	0
Did the HBCs ask the patient if s/he adhered to medication if taken?	Incompetent	6/52	12%
	Moderately competent	46/52	88%
	Fully competent	0/52	0
Presence of illness			
Did the HBCs ask the patient if she/he has any illness diagnosed at present?	Incompetent	11/52	21%
	Moderately competent	41/52	79%
	Fully competent	0/52	0
Did the HBCs ask the patient if she/he has ever been found to have high blood glucose in illness or during pregnancy?	Incompetent	6/52	12%
	Moderately competent	46/52	88%
	Fully competent	0/52	0

diseases have been demonstrated to affect a patient's capacity to prioritise and control their diabetes.[31] Healthcare professionals in the community provide patient care and are a vital link between healthcare services and communities.

All participants (100%) in this study were found to be moderately competent with regard to use of the FINDRISC biographical data component, particularly the ability to ask patients their age. Biographical data such as age, income and educational status have been found to influence quality of life of individuals with or without diseases; however, this is more critical in disease management.[32] With regard to use of anthropometric measurements, 75% of participants were found to be moderately competent in weighing of patients using a scale and 81% incompetent in measuring BMI of patients. Moreover, 94% were incompetent in measuring the waist circumference of patients. The incompetence in calculation of BMI could be attributed to required knowledge on weighing the patient accurately using a BMI wheel. Similarly, knowledge is required in measuring waist circumference. Other factors such as posture of the subjects, phase of respiration, abdominal tension and the influence of the stomach content at the time of measurement have been considered for accuracy when assessing the HBCs.[33] Anthropometry in adults provides valuable assessment of nutritional and health status and future disease risk or comorbidity, and in the diagnosis of obesity.[34,35]

In total, 90% of HBCs were found to be moderately competent in asking patients if they engage in physical activity and how long they exercise. This was a dichotomous question requiring

Table 4: Use of the FINDRISC tool item (physical activity, diet) by competency level

Performance of participants by question asked on FINDRISC tool items		Performance		*p*-value
		Competence levels	%	
Physical activity	Did the HBCs ask the patient if she/he engagse in physical activity?	Incompetent	10%	$X^2 = 15.594$ $p = 0.001$
		Moderately competent	90%	
		Fully competent	0	
	Did the HBCs ask the patient how she/he exercises?	Incompetent	8%	
		Moderately competent	92%	
		Fully competent	0	
	Did the HBCs ask the patient how long or how often?	Incompetent	10%	
		Moderately competent	90%	
		Fully competent	0	
Diet	Did the HBCs ask the patient what she/he includes in their diet, e.g. fruits, vegetables or berries?	Incompetent	25%	$X^2 = 24{,}408$ $p = 0.001$
		Moderately competent	75%	
		Fully competent	0	
	Did the HBCs ask the patient how often they follow the diet? Daily or sometimes	Incompetent	12%	
		Moderately competent	88%	
		Fully competent	0	

HBCs to ask how the patient exercises.[36] On the other hand, 75% of HBCs were found to be moderately competent in asking patients what they include in their diet, whilst 88% were moderately competent in asking patients how often they follow their diet. Exercise has a significant role in the regulation of blood glucose, improves insulin action, prevents complications of diabetes, improves muscle flexibility and strength, and increases patients' life expectancy.[37,38] It is widely accepted that healthy nutrition is the basis for the treatment of type 2 diabetes. It contributes positively to the maintenance of blood glucose within the normal range and minimises the complications of the disease.[37,39]

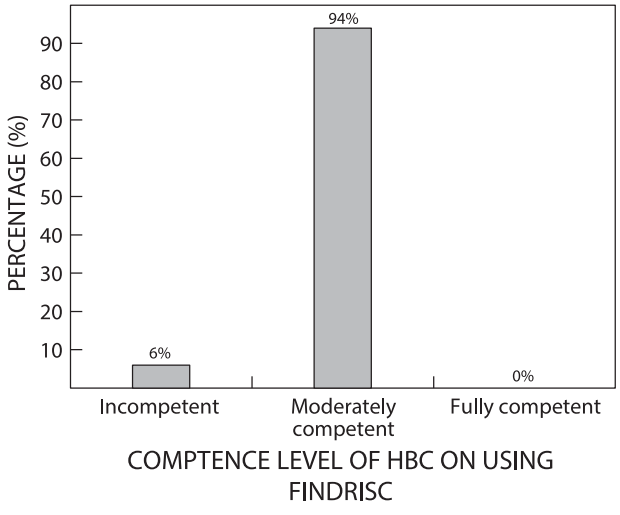

Figure 1: Overall competence level of participants in using the FINDRISC tool.

International guidelines recommend a stepwise approach to identify persons at high risk of or with as yet undiagnosed type 2 diabetes among the general population.[40] This study shows that 94% of HBCs are moderately competent in the overall use of the FINDRISC tool to assess the risk status of diabetes patients. Therefore, this finding suggests that there is a feasibility for HBCs to be utilised in assessing those at risk to develop diabetes using the FINDRISC tool. However, considering that none of the participants (0%) in this study were competent in the overall use of the FINDRISC tool, it is recommended that HBCs receive proper training in the use of this tool. A South African study indicated that if HBCs receive proper training, they will be able to deliver appropriate healthcare services in the management of NCDs, including type 2 diabetes.[40] An Australian study indicated that a culturally safe community healthcare worker model is the effective care of diabetes mellitus programme in rural areas.[41] Task shifting is another important evolution in addressing NCDs; it is the process whereby less professional tasks are shifted to other categories of workers such as HBCs in the provision. Task shifting to HBCs in the management of DM patients has focused on the improvement of adherence to medication or lifestyle modifications and screening. However, whether it is feasible to HBCs in the screening of people with DM remains unclear.[42]

Conclusion

This study showed that none of the HBCs were competent in the overall use of FINDRISC tool to assess the risk status of diabetes patients. However, most of the HBCs were moderately competent in the use of this tool. Therefore, this study concludes that there is feasibility for the FINDRISC tool to be adapted and utilised by HBCs in South Africa. However, proper training in the use the FINDRISC tool must be offered to the HBCs for the successful implementation of this intervention. Furthermore, in the

successful adoption of this tool, it is important to assess the tasks that can be done by HBCs and healthcare professionals while considering the scope of their work and qualifications.

Recommendations

This study suggests that while evaluating the viability of a study on the application of the modified Finnish Diabetes Risk Score in a South African context, HBCs' scope of work should be taken into account. Additionally, it is advised that less skilled/professional activities be transferred from healthcare professionals to other worker categories, such as HBCs, along with training in those tasks.

Limitations

This study did not consider knowledge and whether tasks listed on the modified Finnish Diabetes Risk Score Tool fall within the scope of work of HBCs. Although task shifting is recommended, it was not determined which particular tasks should be transferred from healthcare professionals to HBCs.

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Competing interests – The authors declare that they have no competing interests.

ORCID

MH Mphasha http://orcid.org/0000-0002-4812-5051

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