

Knowledge and practices of pre-school teachers on growth monitoring program – South Africa

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SUMMARY

The aim of this study was to determine knowledge and practices of pre-school teachers on growth monitoring. A quasi-experimental, one-group pre- and post-test intervention study was conducted in eight conveniently selected government subsidized pre-schools in Vhembe and Mopani districts of Limpopo Province, South Africa. Fifteen pre-school teachers participated in the study. An intervention in a form of nutrition education lessons on growth monitoring was developed and implemented. Pre-school teachers completed a knowledge test questionnaire prior to the lessons. The intervention also included the fol-

lowing training skills: procedure to take anthropometric measurements and plotting the Road to Health Chart. About 67% teachers understood the importance of growth monitoring at baseline. The results also showed an improvement 6 months after intervention. All (100%) teachers knew that growth monitoring can be used for diagnosing undernutrition. The results also showed an improvement in skills, such as the procedure to take anthropometric measurements. Knowledge and practices of teachers on growth monitoring were improved by nutrition education 6 months after intervention.

Key words: growth monitoring; pre-school teachers; anthropometry

BACKGROUND

It has become a common practice in many countries to leave children in day nurseries while their mothers work. The professionals who work with these children should have a minimum knowledge of how to deal with common situations (such as weight loss, poor appetite and diarrhea) involving child care (McAuliffe *et al.*, 1993). Furthermore, staff who work in day nurseries in developing countries should be able to identify which signs and symptoms that lead a child being referred to a health facility so that they can act not only in a preventive way, but also by implementing the

most common therapeutic measures. The World Health Organization (WHO, 2003) indicates that these measures might also include knowledge and skills related to preparation and administration of oral rehydration solutions to children with diarrhea and appropriate nutrition and breastfeeding counseling.

Malnutrition continues to affect the lives of millions of children in South Africa. Although some indicators show improvement, several conditions seem to have worsened over the past decade. Comparing the results of the 1999 National Food Consumption Survey (NFCS) (DoH, 2008) and the 2005 NFCS-FB surveys (Bhutta *et al.*, 2008) shows

that stunting and underweight remain by far the most common nutritional disorders affecting almost 1 in 5 and 1 in 10 children, respectively. However, the national average prevalence of stunting has decreased from 21.6 to 18%, with the overall best improvement in the rural areas (26.5–20.3%) (Bishnoid *et al.*, 2004). The largest number of malnourished children was found in the Eastern Cape, Limpopo (former Northern Province) and Kwazulu-Natal (Steyn, 2000; DoH, 2008). During the pre-school age period, children have special nutritional needs because of their extensive growth and development (Bishnoid *et al.*, 2004). A child's growth pattern is a useful criterion for judging his/her nutritional status. This study aimed to introduce growth monitoring in pre-schools through training pre-school teachers. Knowledge and practices of pre-school teachers on growth monitoring were determined prior to training and 6 months later.

METHODOLOGY

Study design

The study design was quasi-experimental, with a one-group pre- and post-test intervention. Quasi-experimental research involves manipulation of a variable but lacks a comparison group and randomization. Pre-school teachers were pre-tested on knowledge and training of growth-monitoring process. This was followed by an intervention which was education, after which a post-test was done to evaluate its impact.

Population and study area

The study was conducted in Vhembe and Mopani districts of Limpopo Province. These two districts are among five districts found in the province. Vhembe and Mopani districts were conveniently selected for the study. The target population was pre-school teachers, and the accessible population was pre-school teachers in Vhembe and Mopani districts. Pre-schools were used as the setting where the study and intervention took place.

Sample design and procedure

Convenient sampling was used to select the two districts. Teachers from eight government-subsidized pre-schools were selected purposively. The radius between the two districts was 100 km apart.

Data collection measurements and procedures

The study was conducted in 2005 until 2008, including the planning, piloting, data collection and follow-up and reporting. The data collection period was from August to September 2006 for baseline and intervention and February to March 2007 for follow-up.

The following variables were measured.

Knowledge of growth monitoring

Knowledge on basic measures that promote child health was assessed using a knowledge test questionnaire at baseline and 6 months. The focus was on the ability of pre-school teachers to use the Road to Health Chart (RTHC) tool correctly, their skills to take anthropometric measurements (weight and height) correctly, their understanding of the importance of growth monitoring, the frequency with which children should be weighed and identification of children who need referral to a health facility.

Practical observation of the skills on the use of the RTHC and anthropometric measurements was examined by evaluating: the usage of the RTHC and how pre-school teachers were completing and interpreting the graph.

The intervention: nutrition education on growth monitoring

The intervention was nutrition education on growth monitoring and its importance in children's development. This was aimed at training and improving participating pre-school teachers' knowledge and skills. The intervention consisted of four lessons. The first lesson was on anthropometric measurement, the second was on growth monitoring, the third covered skills training on techniques and the final lesson was assessment of the training sessions immediately after nutrition education.

After completion of lesson number one, pre-school teachers were expected to understand the procedures of anthropometric measurement. The lesson was assessed through asking preschool teachers questions, demonstration by them and active participation. The second lesson was based on the use of the RTHC. The RTHC posters were used to test their understanding of the different shapes and how to plot the child's weight and draw the growth curve. The researcher taught participants how to use the RTHC and how to take height and weight measurements through hands-on experience. Pre-school teachers were given RTHC

during lesson three to practice how to plot, connect and interpret the graph and the final lesson was the assessment on the entire training.

Pre-test assessment

All pre-school teachers were given a questionnaire which was divided into section A: demographic data, and section B: knowledge test questionnaire on growth monitoring process, before the intervention.

Intervention: training on growth monitoring

All lessons lasted for 3 h. The first hour focused on the importance of growth monitoring and the last 2 h focused on techniques of taking anthropometric measurements including a demonstration and assessment. The researcher used local languages for clarity and to explain unclear issues.

The researcher assessed the training by giving pre-school teachers a questionnaire to summarize their learning points. In addition, oral questioning was done to assess comprehension, and the process was audio recorded.

Pre-school teachers were expected to continue taking weight measurements every month for a period of 6 months, because weight is an easy indicator of child growth. The researcher communicated telephonically or sometimes visited pre-schools to monitor the implementation, compliance and reminding them to weigh the children. Each pre-school was given a solar bathroom scale and an RTHC for measuring and recording weight.

Post-test assessment

The post-test was done 6 months post-intervention. During post-intervention data collection, pre-school teachers were requested to weigh, plot and interpret the graph. Each participant was requested to weigh at least three to five children in the presence of the researcher. The researcher intervened by rectifying mistakes and explained where there were misunderstandings. The purpose was for the researcher to be able to assess the pre-school teachers weighing process and interpretation of the growth chart. In addition, participating pre-school teachers were given a post-test knowledge questionnaire which was similar to the pre-test questionnaire to complete.

Ethics

Permission to conduct the study was obtained from the Provincial Department of Education and from ethics committee of the University of Venda and principals. A written consent was obtained from teachers and parents.

Data analysis

Descriptive statistics such as percentiles were used in the analysis, which enabled the researcher to summarize and describe the quantitative data obtained from empirical observations and measurements. The Tshivenda and Xitsonga recorded responses from verbal questions during intervention stage were translated verbatim into English (MER Mathivha center for languages, UNIVEN). The information obtained about participating pre-school teachers' knowledge was grouped according to themes which were understanding of growth monitoring and the use of RTHC. All tables were arranged by themes and counting down similar responses. Each table contained the variable/response, percentage responses and an interpretation. The researcher used a standardized observation tool to analyze the demonstration of anthropometric measuring techniques by pre-school teachers. Lessons on growth monitoring were assessed using a self-administered questionnaire and their responses analyzed by grouping themes according to similar responses. The pre- and post-test knowledge data were compared in order to see whether there was any improvement of their understanding of growth monitoring change that was depicted by decrease or increase in responses after the intervention.

RESULTS

Knowledge and practices of growth monitoring process

When participants were asked to explain the importance of growth monitoring, at baseline the responses ranged from weight, health, growth and immunization. The common response was that growth monitoring was important for weight, disease and immunization.

The responses were different 6 months after intervention. The term 'diagnosis' was seen in 56.7% of the participants after intervention. Responses from participants are summarized in Table 1. The results also indicated that after

intervention, participants knew that growth monitoring can be used to detect poor growth.

Benefits of growth monitoring

When participants were asked whether they knew the benefits of growth monitoring, at baseline 20% said growth monitoring is beneficial for growth and nutrition, 80% indicated that is beneficial for weight, height and immunization, whereas 6 months after intervention when they were asked the same question, 35.7% indicated that it is beneficial for growth and nutrition, 7% said that it is beneficial for weight, height and immunization and interestingly 57.1% reported that it is beneficial for growth and diagnosis of malnutrition.

Frequency of weighing children

When participants were asked how often children aged 2–5 years should be weighed, different responses were observed. At baseline, 79% of the participants gave incorrect responses. These responses include ‘a child should be weighed every month, don’t know, and three times a year’. Only 21% gave correct responses at baseline.

After 6 months of intervention, the researcher asked the same question as in baseline and 35% gave correct responses which indicated an improvement in the knowledge of participants.

Table 2 summarizes the participant’s knowledge on identifying signs which indicate the need for referral of the child to a health facility. Most of the participants knew the signs that indicate that a child should be referred to a health facility. Participants cited more signs requiring referral after the intervention such as child not growing well. One participant did not respond to this question.

Pre-school teachers were interviewed on their knowledge on how to take anthropometric measurements. The responses are summarized in Table 3. The number of pre-school teachers who knew how to take weight was increased by 40% after training, whereas the number of those who knew how to measure height increased by 26%. This is a good indication that the intervention by the researcher on skills training was effective.

Demonstration of anthropometric techniques

The researcher demonstrated the techniques to the pre-school teachers. The researcher observed participants taking children’s weight and height

Table 1: Participants’ understanding of growth monitoring

Description of responses	Baseline data		Post-intervention data	
	Number of participating pre-school teachers, <i>n</i> = 15	Percentage	Number of participating pre-school teachers, <i>n</i> = 14	Percentage
Growth and nutrition	3	20	5	35.7
Weight, height and immunization	12	80	1	7
Growth and diagnosis of malnutrition	—	—	8	57.1
Total	15	100	14	—

Table 2: Knowledge of participating pre-school teachers on when urgent referral of children to health facilities is necessary

Participating pre-school teachers’ response	Baseline, <i>n</i> = 15 (%)	After 6 months, <i>n</i> = 14 (%)	Interpretation
Vomiting	64	64	No change
High temperature	46	64	Increase
Diarrhea	46	43	Noteworthy decrease
Injuries	26	21	Noteworthy decrease
Not playing	14	14	No change
When the child’s weight decreases which shows that the child is not growing well	7	14	Increase
Slumbering	7	7	No change
Rash	7	7	No change
Faint	7	7	No change
Crying a lot	7	—	Not mentioned after the intervention

Table 3: Skills for taking anthropometric measurements

Anthropometric measurements	Participating pre-school teachers' responses	Baseline, <i>n</i> = 15 (%)	After 6 months, <i>n</i> = 14 (%)	Interpretation
Weight	Know how to take weight	60	100	Marked increase
	Do not know how to take weight	40	—	Marked decrease
Height	Know how to take height	53	79	Marked increase
	Do not know how to take height	47	21	Marked decrease

plotting and interpreting growth curves during the follow-up period. Post-observation on only 14 participants was assessed where one participant who left the pre-school was not included. The conclusion from the observation was that 79% (11) of the participants were able to follow the growth monitoring process 6 months after intervention. About 21% (3) could not take height measurements correctly post-intervention. The reasons for this could be attributed to more workload and attending workshops which prove it difficult for participants to practice the skill regularly. The researcher motivated these participants and reinforced the importance of growth monitoring.

DISCUSSION

Nutrition knowledge of pre-school teachers is an important factor which affects children's food behavior. Low literacy has an impact on understanding growth charts; however, mothers in a predominantly illiterate population can understand the basic principles of the chart components (Grant and Stone, 1986). Regardless of literacy or level of education, mothers who receive instruction on reading growth charts demonstrate markedly better understanding compared with mothers who do not receive such training (Martinez *et al.*, 1996).

The results of this current study revealed that there was a lack of knowledge on growth monitoring at baseline. Many pre-school teachers do not have formal training on growth monitoring. Lack of training may cause incorrect dissemination of information and misdiagnosis. Interestingly, teachers had their own way of assessing the growth in children. They normally compare a child to another child of the same age. This way may be correct or incorrect in the diagnosis of common situations such as diarrhea and underweight.

When comparing baseline data to data obtained after 6 months of intervention, there

was an improvement in knowledge and practices on growth monitoring. The results of this study revealed that participants gave more information after intervention. After intervention, all participants answered questions on growth monitoring correctly. For example, they knew that growth monitoring can be used in diagnosing common situation during child care. Kapil *et al.* reported that in-service training on growth monitoring should emphasize its importance as a tool to detect early growth retardation and to intervene at an early stage to prevent continual growth retardation (Kapil *et al.*, 1991). In terms of skills, participants knew the procedure to take anthropometric measurements such as weight and height after they were trained. About 40 and 47% of participants did not know how to take weight and height, respectively, at baseline. However, there was a marked increase 6 months after intervention where all (100%) participants mastered the skill of taking weight. On the other hand, only 79% were able to take height measurements. The opposite is true for the study conducted in Thailand by Chotivichien *et al.* (Chotivichien *et al.*, 2006) where it was reported that more than half of the health officers and volunteers did not have skills to weigh properly. Furthermore, the study also revealed that about half of the volunteers could not plot and explain the growth chart correctly. If this exercise of giving nutrition education to pre-school teachers is done regularly, perhaps the prevalence of stunting and underweight can be decreased since stunting and underweight is a public health concern particularly in Limpopo province with the prevalence of 23.8 and 9.3%, respectively (Kruger *et al.*, 2007; Labadarios, 2007).

Another interesting finding from the study was even though teachers indicated a lack of knowledge at the beginning, teachers showed that they will continue to take weights and heights after they have received training. They indicated that they felt more knowledgeable. It is apparent

from the results of this study that pre-school teachers do not collaborate with nurses in growth monitoring- and nutrition-related education. However, pre-school teachers spend most of the time with children and if fully equipped with the knowledge they can detect any health-related concerns and may refer such cases if in need.

Nutrition intervention had a significant influence on knowledge and practices of pre-school teachers. Teachers and caregivers who integrate nutrition education and/or garden-based nutrition education program activities into their child care center or home can help shape children's nutritional status (Sherman and Muehlhoff, 2007).

The results of the study can only be generalized to eight government-registered pre-schools that were used as sampling frames.

CONCLUSION AND RECOMMENDATIONS

The knowledge of pre-school teachers was improved after training. Participants showed a better understanding of the importance and benefits of growth monitoring in improving children's health. Strategies should be developed to improve the level of pre-school teacher's knowledge and practices on growth monitoring. This can also be addressed by integrating growth monitoring as a part of the pre-school system and pre-school teacher formal training.

The study provides findings that are critical to understand gaps in child care that need to be addressed. It was found that growth charts are difficult for pre-school teachers to understand unless trained. The importance of growth monitoring, the benefits and important information contained in RTHC should be included in the formal training of pre-school teachers.

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