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THE INFLUENCE OF TRAINING ON THE PRECISION AND ACCURACY OF UPPER ARM CIRCUMFERENCE MEASUREMENTS BY POSYANDU CADRES

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Abstract

Integrated Healthcare Center cadres are members who come from the community in their area and are willing, able, and have the time to organize Posyandu activities. This study aims to determine the effect of training on knowledge of precision and accuracy of UAC measurements by posyandu cadres. The research design used the pre-experimental with one group pretest-posttest design using a purposive sampling technique, selected by inclusion and exclusion criteria. With a total sample of 24 Posyandu cadres at the Sawah Lebar Health Center. The population in this study were Posyandu cadres at the Sawah Lebar Health Center with a total of 69 cadres. Data were analyzed using the T-test Dependent and Mc. Nemar. The results of the Dependent T-test showed that there was a change in the level of knowledge of UAC measurements by Posyandu cadres at the Sawah Lebar Health Center before and after being given training (p-value = 0.0001). The results of the McNemar test for cadres in measuring UAC showed that there was a change in the level of knowledge and skills in measuring UAC before and after training (p-value=0.0001). Suggestions for community health centers are that cadres need to be involved in training activities regarding UAC measurements to increase the precision and accuracy of UAC measurements, periodically regarding the results of UAC measurements carried out by posyandu cadres.

Keywords: *Training, Precision, Accuracy, UAC, Posyandu Cadre.*

1. Introduction

Integrated Service Post (POSYANDU) is a form of community-based health business (UKBM) that is managed and organized by, for and with the community in implementing health development. Community empowerment and easy access to essential health/social services for the community to accelerate the reduction of maternal mortality (MMR) and infant mortality (IMR), most posyandu activities are carried out by posyandu cadres (Chahyanto *et al.*, 2019).

Posyandu cadres are members who come from the community in their area and are willing, able and have the time to organize Posyandu activities. Posyandu cadres have made a significant contribution in reducing maternal, infant and toddler mortality. The knowledge and skills of cadres need to be increased through training so that they can lead Posyandu operations as well as possible so that Posyandu cadres can take measurements of the Upper Arm Circumference. This will ensure the achievement of skilled cadres in UAC measurements so that cadres can carry out measurements with precision and accuracy (Setyaningsih *et al.*, 2021).

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Measurement accuracy refers to the closeness of a large measurement to its true value, whereas precision refers to the degree to which repeated measurements under the same conditions produce the same results. Conducting accuracy and precision tests is useful for obtaining better data (data with minimum errors) when selecting prospective surveyors who are proficient in collecting survey data (Fitrya *et al.*, 2017).

Based on research conducted in the working area of the Pusakasari Health Center, Leles District, Cianjur Regency. Of the 47 samples, 33 (70.2%) cadres made poor UAC measurement accuracy, while 14 (29.8%) cadres made good UAC measurement accuracy and of the 47 samples there were 41 (87.2%) cadres made poor UAC measurement accuracy and 6 (12.8%) cadres made accurate UAC measurements (Nursusilawati, 2012).

Based on the results of observations made by researchers, there are problems that exist in the working area of the public health center in the city of Bengkulu. That is, Posyandu cadres at the Sawah Lebar Health Center have never conducted measurements and training on the precision and accuracy of UAC measurements. It turned out that most of the cadres had insufficient skills in measuring UAC, this was proven when observing that some cadres had never taken UAC measurements so that many cadres still did not understand the appropriate procedure for measuring UAC. Therefore the researchers conducted training on precision knowledge and accuracy of UAC measurements by Posyandu cadres.

This study aims to increase the knowledge and skills of cadres regarding UAC measurement so that they can make a good contribution in organizing Posyandu activities, and can add new knowledge to improve knowledge and skills before and after training. Therefore, researchers want to conduct research with the title "The Effect of Training on Precision and Accuracy of UAC Measurements by Posyandu Cadres in the Working Area of the Sawah Lebar Health Center, Bengkulu City" therefore researchers want to conduct research with the title "The Influence of Training on the Precision and Accuracy of UAC Measurement by Posyandu Cadres in the Working Area of the Sawah Lebar Health Center, Bengkulu City"

2. Method

The research design used the Pre-Experimental design with one group pretest posttest using purposive sampling technique. With a population of 69 Posyandu cadres at the Sawah Lebar Health Center. A sample of 24 Posyandu cadres at the Sawah Lebar Health Center. Those who met the inclusion criteria were: Posyandu cadres who are active in the working area of the Sawah Lebar Health Center, have been a cadre for > 1 year, age < 50 years, education > high school. Exclusion criteria were: Posyandu cadres who refused to be research respondents, cadres who were not present when filling out the questionnaire (illness, other activities). The independent variable is the UAC measurement training by Posyandu cadres, while the dependent variable is the precision and accuracy of the UAC measurement. while the dependent variable is knowledge of precision skills and accuracy of UAC measurements before and after training.
Data were analyzed using the T test Dependent and McNemar. The research was conducted on Posyandu cadres who were in the working area of the public health center in the city of Bengkulu, which took place in March 2023.

The implementation of this research was divided into 2 stages, namely the preparation stage and the implementation stage. The preparation stage includes making a proposal, initial survey and processing a pre-research permit in January 2023, then processing a research permit in February 2023 from an educational institution, namely the Bengkulu Ministry of Health Polytechnic, then continuing with processing a research permit at the Bengkulu City National and Political Unity Agency , and continued to the Bengkulu City Health Service office after that continued to the Bengkulu City Sawah Lebar Health Center which was the place where the research was carried out. At the ethical licensing stage the researcher made payment to be able to fill in the ethics after that, go to the registration link and create an account

after that you can fill in several stages and fill in the informed consent, CV and so on, then upload and wait until the ethical permission letter is issued.

The research implementation phase was carried out in March 2023. The initial data collection process was to meet the cadre mothers at each posyandu, then the researcher collected data by meeting the cadres by asking for permission to be a respondent and explaining the flow of the research implementation. After obtaining permission by signing the informed consent, the researchers conducted training which was carried out on March 7 2023. Data collection was carried out using respondent questionnaires and UAC measurement practices using the UAC tape tool.

Training activities were carried out once, starting with preparation from 06.00. Things that are prepared include: training place, projector, chairs, instruments and training media as well as food for training participants. For the pretest of UAC measurement knowledge using a questionnaire that has been tested for validity and reliability and for the skill level of posyandu cadres, UAC and Bookleat measurement tools are prepared.

After the preparations are complete, the next step is preparation for participant registration and approval to participate in the training until completion. After agreeing to take part in the training, the next step is to carry out a UAC measurement pretest where participants are asked to complete the pretest after which they carry out the LILA measurement skills procedure. using the LILA ribbon tool. Two measurements were carried out by posyandu cadres. Participants are divided into several groups based on and asked to practice one by one while paying attention and correcting the procedure if something goes wrong. Training activities are carried out once for ± 4 hours 30 minutes starting from 09.00 – 13.00. The material presented is material about measuring UAC and how to measureUAC. Delivery of material using power point media and training booklets. The material was presented by the researcher for ± 30 minutes.

The post-test was carried out once after the material was presented, the post-test procedure was the same as the pre-test which had been carried out previously. Starting with a post-test on UAC measurement knowledge. Next is the cadre's skills, namely the practice of measuring UAC, including measuring UAC using the UAC tape tool. Two measurements were carried out. Participants are divided into several groups based on and asked to practice one by one while paying attention and correcting the procedure if something goes wrong. After the event was finished, participants were given lunch and given gifts.

How to measure UAC, disinfect the measuring tape, determine the position of the base of the shoulder. Determine the position of the tip of the elbow by folding the elbow with the palm towards the stomach. Determine the midpoint between the base of the shoulder and the tip of the elbow using a measuring tape (see picture), and mark with a pen/marker (before politely asking permission from the respondent), determine the midpoint of the arm by folding the elbow to form a 900 line then measuring the length of the arm between the base of the shoulder and the tip of the elbow, then divide the measurement results by 2 (two). Make a mark with a marker/pen, then the respondent is asked to straighten his arm down and let it hang freely, circle the measuring tape according to the pen mark around the respondent's arm (halfway between the base of the shoulder and the elbow), loop the tape until the measuring tape sticks perfectly to the skin of the upper arm , don't be too tight or loose, read the number indicated by the end of the UAC measuring tape (towards the larger number). The reading of the measurement results must not be rounded to 0 or 5 after the comma, the measuring officer states the measurement result number loudly and clearly and then it is stated again by the recording officer while recording it. If it is correct then the measuring officer states it is correct, and if it is wrong then the measuring officer repeats the measurement result numbers loudly and clearly. Enter the measurement results in the entry program. Disinfect the UAC tape after use. Put the UAC tape back in its place and don't fold it. or torn.

How to calculate the Precision and Accuracy of UAC measurement data by cadres, previously processed with the help of Ms.Excel and then calculated the cadre's Precision and Accuracy values based on anthropometric measurements (Kemenkes RI, 2022).

Precision if $\sum ds^2$ cadres < 2 $\sum ds^2$ supervisors, Accuracy if $\sum D^2 < 3\sum ds^2$ supervisors.

Information :

ds^2: the square of the difference between the first and second measurements by the supervisor of what is being measured.

de^2: the square of the difference between the first and second measurement by the cadre of what is being measured.

D^2: the square of the difference between the sum of the first and second measurements by the cadre and the sum of the first and second measurements by the Supervisor.

At this stage, the data obtained from research that has been carried out previously is recapitulated and processed for analysis and discussed into a thesis.

Data analysis using univariate and bivariate. Univariate analysis explains the characteristics of cadres. Based on the p-value obtained, it is 0.001, that is, there is a significant influence because the p-value is <0.05. Shows that training is effective in increasing knowledge before training and after UAC measurement training by posyandu cadres.

1 posyandu cadre measured UAC on 5 pregnant women who were measured twice. From the results obtained, the overall value of de^2 was 0.32 ($\Sigma de^2 > \Sigma ds^2$) cadres were not precise because the value was greater than the Gold Standard, and the D2 value was 3.26 ($\Sigma D^2 > \Sigma ds^2$) cadre is not accurate because the value is greater than the Gold Standard.

Bivariate analysis explains the level of influence of training on knowledge before and after training using the Dependent T test method because the data is normally distributed. The effect of training on precision and accuracy and UAC measurement skills using the McNemar test method. The effect of training on the precision and accuracy of LILA measurements using the McNemar test method. No proper ethical permit (No.KEPK.BKL/136/04/2023).

3. Result and Discussion

Table 1. Characteristics of Posyandu Cadres

Characteristics	F	%	Min±Max	Mean±SD
Age				
≤ 40 Year	11	45.8	30±50	41.33±7.19
>40-50 Year	13	54.4		
Education				
SHS	20	83.3		
Collage	4	16.7		
Long Time As a Cadre				
New ≤5 Year	15	62.5	1±15	6.50±3.70
A Long Time > 5 Years	9	37.5		

Based on Table 1, most of them are 40-50 years old, the lowest age is 30 years, the highest is 50 years, with an average of 41.33 years. Based on education, almost all cadres graduated from high school. Based on the length of time being a cadre, most were ≤ 5 years, the new one was 1 year, the longest was 15 years with an average length of being a cadre of 6.5 years.

Table 2. Effect of Training on UAC Measurement Knowledge

Knowledge	F	%	Min±Max	Mean±SD	*p- Value*
Prior Knowledge					
Not Enough	15	62.5	30±90	61.67±20.57	
Good	9	37.5			
After Knowledge					*0.001*
Not Enough	3	12.5	50±100	82.92±11.22	
Good	21	87.5			

a Test T Test Dependent

Based on Table 2, before the training, most of the cadres' knowledge was lacking, after the training, almost all of them were good. The results of the Dependent T test analysis showed that there was an increase in the average prior knowledge of 61.77 after training increased to 82.92. Based on the p-value obtained, it is 0.001, which means that there is a significant effect because the p-value is <0.05. Shows that training is effective for increasing knowledge before training and after training on UAC measurements by Posyandu cadres.

The aim of the researcher is to measure knowledge so that the researcher can see changes before training and after training. This research was conducted to find out whether there were any changes after the UAC measurement training carried out by cadres. The results of this research increased cadres' knowledge after training was carried out both in terms of knowledge about UAC so that cadres could apply the knowledge they had gained from the training to the surrounding community, especially pregnant women and women of childbearing age.

Knowledge of cadres is not only influenced by the results of the training but many influencing factors such as age, education, experience and the level of trust of cadres in providing training materials/extensionists. Increasing the knowledge of cadres can be done through the provision of counseling, training, and health education. This is important to do considering the role of cadres as health motivators, health educators and also as health service providers through Posyandu activities. [13] Several studies have proven the effectiveness of health training on the perceptions of cadres (Indrawati *et al.*, 2018).

The results of this study are in line with research conducted at the Bachelor of Nutrition study program at Nahdiatul Ulama University, West Nusa Tenggara. There is an effect of upper arm circumference training (UAC) regarding chronic energy deficiency (CED) on the level of knowledge. Based on the results of the study it was found that the average value of the level of knowledge before being given upper arm circumference training (UAC) (pre-test) was 51.88 ± 7.50 and after being given upper arm circumference training (UAC) (posttest) there was an increase in the average value of knowledge level namely 67.50 ± 5.77 with a p-value of 0.000 meaning that there was an effect of upper arm circumference training on knowledge level (Septiani and Sulistiawati, 2022).

The knowledge and skills of cadres will be better if basic education or higher education receives five basic modules in courses, is active in conducting coaching and has a high frequency of participating in coaching. The high value of knowledge and skills of cadres is influenced by formal education, activeness of cadres at Posyandu and the length of time they have been cadres (Hamariyana, Syamsianah and Winaryati, 2013).

Table 3. Effect of Training on UAC Measurement Precision

Before Training	Not Precise	Precise	Ammount	*p- Value*
Not Precise	2	19	21	
Precise	0	3	3	
Ammount	2	22	24	*0.001*

a : Mc Nemar test

Based on Table 3, it shows that of the 21 people whose UAC measurements were not precise before training, 19 people became precise, from 3 people who were precise before training, remained precise after training. The results of the McNemar test show that the p-value is 0.0001 ≤ 0.05. There is an effect of training on precision before and after UAC measurement training by Posyandu cadres.

Precision is the degree to which repeated measurements under unchanging conditions produce the same results. Implementation of precision and accuracy tests is useful for obtaining better data (data with minimal errors), for selecting prospective measurers who are skilled in a research data collection activity.[3]

Based on the statistical test results of this study listed in table 4, it was found that there was an effect of training on the precision of UAC measurement by Posyandu cadres before and after training in the work area of the Sawah Lebar Health Center, Bengkulu City. The skills of Posyandu cadres at the Sawah

Lebar Community Health Center prior to this study were still in the low category, the reason being the lack of valid information regarding knowledge of UAC precision measurement skills according to procedures for each cadre.

The results of this study are in line with the results of research conducted in the work area of the Tarub Health Center, Tegal Regency. Which stated that there were differences in the skills of cadres in anthropometric measurements before and after training (p=0.0001) (Hida Fitri M., 2013). Meanwhile, according to research conducted in the Karang Pule Health Center Work Area on 31 Posyandu cadres, it showed that there was an influence on the skills of cadres before and after training (Octavia and Laraeni, 2017). An increase in skill level shows that there are differences in the skill level of Posyandu cadres before and after training (p=0.0001) (Awalukin, 2022).

Table 4. The Influence of Training on UAC Measurement Accuracy

Before Training	Not Accuracy	Accuracy	Ammount	*p- Value*
Not Accuracy	3	19	22	
Accuracy	0	2	2	*0.001*
Ammount	3	21	24	

a : Mc Nemar test

Based on Table 4, it shows that of the 22 people who did not have UAC measurement accuracy before training, 19 people changed accuracy, from 2 people who had accuracy before training, remained accurate after training. The results of the McNemar test show that the p-value is 0.0001 ≤ 0.05. There is an effect of training on precision before and after UAC measurement training by Posyandu cadres.

Accuracy in measurement is the degree of closeness of a quantity measurement to its true value.[3] Accuracy is a degree of providing information on how close a measurement is to its true value. Accuracy can be seen from the proximity of the weighing results to the same object between cadres and supervisors. Accuracy can be affected by systematic errors in measurements. The greater the systematic error, the less the accuracy. This systematic error is contributed by the measurer, the subject being measured, or the instrument (Toybah, Siti Hawah, 2020).

Based on the statistical test results of this study listed in table 4.4, it was found that there was an effect of training on the accuracy of UAC measurements by Posyandu cadres before and after training in the work area of the Sawah Lebar Health Center, Bengkulu City. The skills of Posyandu cadres at the Sawah Lebar Health Center prior to this study were still in the low category, and the skills of cadres in measuring UAC before training were still mostly inaccurate after the training underwent changes resulting in accurate UAC measurements according to the procedure.

Based on the results of existing research, it is known that the provision of training to cadres has a significant effect on the knowledge and skills of cadres, so the training model is one of the models developed to improve the competence of Posyandu cadres. It is hoped that the provision of training can be carried out routinely to recall the cadres' memories of the correct anthropometric measurement method. Thus the validity of anthropometric data can be increased (Utami and Widyaningrum, 2022).

4. Conclusion and Suggestion

The results of this research were obtained among 24 cadres aged ≤ 40 years (45.8%) and aged 40-50 years (54.2%). Cadres' educational history is high school (83.3%) and university (16.7%). Length of time as a cadre ≤ 5 years (62.5%) and > 5 years (37.5%).

In terms of vulnerable ages, 29-50 years, it is easier for cadres to think rationally to understand the information provided, the higher the education, the easier it is to receive good training materials and the longer a person becomes a cadre, the more skilled and better UAC measurement capacity is. After being analyzed, it was found that there was an effect of training on the precision and accuracy of UAC measurements as well as the knowledge of Posyandu cadres in the working area of the Sawah Lebar Public

Health Center in Bengkulu City before and after the training.

Based on the results of this study, the researcher would like to provide advice to related parties, including the Sawah Lebar Health Center, namely that it is advisable for the Public health center to have training on anthropometric measurements for cadres to include the training, for other researchers it is necessary to carry out further research on the effect of training on precision and accuracy UAC measurements by Posyandu cadres using different research designs and methods and for educational institutions they can add references to the nutrition department library as well as increase knowledge and insight regarding the effect of training on the precision and accuracy of toddler anthropometric measurements by Posyandu cadres

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6. References

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