



The effectiveness of WHO Anthro training in improving the data quality of nutritional status of preschool children

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ABSTRAK

Latar Belakang: Masalah triple burden di Indonesia menjadi salah satu target dari Sustainable Development Goals (SDGs) yang harus segera diselesaikan karena berkaitan dengan penurunan kematian balita akibat gizi buruk. Deteksi dini tumbuh kembang anak belum optimal mengatasi masalah gizi karena masih ada guru yang masih kesulitan menentukan status gizi sehingga data yang dilaporkan masih manual dan belum akurat..

Tujuan: Melihat efektifitas pemberian pelatihan WHO Anthro terhadap kualitas data status gizi anak sekolah.

Metode: Penelitian Quasi Eksperimental dengan rancangan pretest-postest equivalent repeated measured, menggunakan dua kelompok. Penelitian dilakukan bulan Januari-Maret 2023. Sampel sejumlah 40 guru terbagi dalam 2 kelompok sama rata. Guru TK ABA di Kapenawon Gamping yang berstatus aktif dan sudah mengisi informed consent, akan masuk menjadi responden. Peserta pelatihan yang tidak mengikuti tes sebanyak 3 kali akan dieksklusi. Kelompok kontrol dilatih pengeplottan status gizi menggunakan grafik WHO dan kelompok perlakuan dilatih menggunakan aplikasi WHO Anthro Plus. Pelatihan dilakukan selama 2 bulan untuk menilai pretes, midtes, dan postes. Analisa data menggunakan Uji Friedman dilanjutkan dengan uji post hoc Tukey HSD.

Hasil: Hasil uji friedman, kelompok yang dilatih menggunakan aplikasi WHO Anthro Plus terbukti kualitas data status gizi yang dihasilkan signifikan berbeda dengan nilai p value= 0,000 ($p < 0,05$) baik dari aspek keakuratan data maupun manfaatnya. Hasil Post hoc Tukey HSD membuktikan bahwa dari tiga kali penilaian kualitas data, penilaian yang dilakukan setelah dua bulan dari pelatihan terbukti signifikan berbeda p-value=0,007 ($p < 0,05$). Hal ini disebabkan peserta pelatihan langsung mempraktekkan WHO Anthro Plus di sekolah masing-masing.

Kesimpulan: Aplikasi WHO Anthro Plus terbukti memudahkan guru TK/PAUD dalam penentuan status gizi dan laporan status gizinya menjadi lebih berkualitas karena lebih akurat dan bermanfaat untuk deteksi dini tumbuh kembang anak di tiap sekolah

KATA KUNCI: gizi; pelatihan guru; WHO Anthro; stunting



ABSTRACT

Background: The triple burden problem in Indonesia has become one of the Sustainable Development Goals (SDGs) targets that must be urgently addressed due to its critical role in reducing toddler mortality attributed to malnutrition. However, the early detection of child growth issues is not optimal because some teachers still struggle to determine nutritional status, resulting in manual and inaccurate data.

Objectives: This study aims to assess the effectiveness of providing WHO Anthro training on the quality of nutrition status data for schoolchildren.

Methods: This research employs a quasi-experimental design with a pretest-posttest equivalent design, measured repeatedly, using two groups. The study was conducted from January to March 2023. A total of 40 ABA School Teachers at Kapenawon Gamping who had provided informed consent participated as respondents. Training participants who did not pass the test three times were excluded. The control group received training on plotting nutritional status using WHO charts, while the treatment group was trained using the WHO Anthro Plus application. The training spanned two months, including pre-tests, mid-tests, and post-tests. Data analysis involved the Friedman test followed by the Tukey HSD post hoc test.

Results: The results of the Friedman test revealed a significant difference in the quality of nutritional status data produced by the group trained using the WHO Anthro Plus application (p -value = 0.000, $p < 0.05$). This difference was observed in both data accuracy and the perceived benefits. This improvement occurred because training participants were able to practice using WHO Anthro Plus in their respective schools.

Conclusions: The study concludes that the WHO Anthro Plus application facilitates school teachers in determining nutritional status more accurately and efficiently. As a result, the reported data is of higher quality, enhancing the early detection of child growth issues in schools.

KEYWORDS: data quality; kindergarten teacher; training; stunting; WHO Anthro

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INTRODUCTION

Nutrition in Indonesia remains a significant issue. It has even become a target of the Sustainable Development Goals (SDGs) due to its critical role in reducing toddler mortality attributed to undernutrition or malnutrition (1). Nutritional issues in Indonesia are characterized by a triple burden, encompassing undernutrition, overnutrition concerning macronutrients, and undernutrition related to micronutrients. These complex nutritional challenges threaten the quality of Indonesia's future generations (2).

According to the Indonesian Nutritional Status Survey (SDKI) 2021, the prevalence of stunting was 4.4% (3). In contrast, based on the

SDKI 2018 data, stunting was lower at 19.3%, with malnutrition at 3.9% and overweightness at 8% (4). The health profile of Yogyakarta province revealed a malnutrition and under-nutrition rate of 8.3%, while stunting occurred at a rate of 11.08% and overweightness occurred at a rate of 3.14% (5).

Inadequate nutritional intake in children can disrupt their growth and development. It worsens when the condition remains unsolved, posing a risk of illness and death in children. Insufficient nutritional intake may compromise their immune system, rendering children more susceptible to diseases (6). Preventing and addressing nutritional problems in preschool children

involves conducting screenings and surveys. These screenings observe the growth and development of preschool children in various service areas, including health centers, integrated health posts (Posyandu), and educational institutions (7). Developmental screenings are conducted monthly by measuring the weight and height of children. Research conducted on kindergarteners in Semarang using digital scales for weight measurement and microtoise for height measurement can effectively detect nutritional problems in preschoolers (8).

Challenges persist due to teachers' lack of knowledge regarding proper growth measurement, the use of non-standard measuring instruments, and interpreting measurement results. In a community service conducted by Wahyuntari, it was found that in observing children's growth conducted by cadres, there was no plotting in the Growth Chart (KMS), resulting in a lack of result interpretation (9). Inputting weight and height measurements' growth data is imperative for early detection of nutritional problems (10). Similarly, previous research highlighted the absence of growth observation involving plotting weight and height measurements' results, leading to a lack of interpretation of children's nutritional status (11). In previous research, an improvement was observed in the quality of nutritional status information and the quantity of beneficial output information for planning, monitoring, and evaluating nutrition programs in the same research (12).

Considering the aforementioned challenges and gaps in previous research, this study aims to assess the effectiveness of teacher training in utilizing the WHO Anthro to enhance the quality of nutritional status data for students. This effort targets early detection of nutritional problems. The novelty of this research lies in involving schools in addressing malnutrition issues, equipping teachers at TK ABA to determine nutritional status using the WHO Anthro Plus application.

MATERIALS AND METHODS

Quasi-Experimental Quantitative Research design and samples

The research design employs a pretest-posttest equivalent repeated measures approach and utilizes two randomly assigned groups. The study was conducted from January to March 2023 at 20 TK ABA Kapanewon Gamping clinics. The total population of TK ABA teachers in the Kapanewon Gamping region, consisting of 98 individuals, serves as the affordable population for this study. A sample of 40 ABA gym teachers was selected, with 20 individuals forming the case group and 20 serving as the control group, chosen through random sampling techniques. Exclusion criteria include individuals who did not attend the training sessions and those who did not complete the data quality questionnaire on three separate occasions. The research has been registered with the ethics certificate from Aisyiyah Yogyakarta University's ethics committee number 2595/KEP-UNISA/II/2023.

Data collection

The research instrument comprises a questionnaire assessing respondent characteristics and the quality of nutritional status information data. This questionnaire has undergone validation and demonstrates a reliability of 0.67 and 0.63. Evaluations of nutritional status information data quality are obtained from observational assessments conducted during pre-tests, mid-tests, and post-tests. Two key aspects assessed for data quality include the accuracy of the produced data and the perceived benefits reported by the teachers. The training sessions spanned two days and were conducted in two groups. The case group received training on utilizing the WHO Anthro Plus software, whereas the control group received training on manually interpreting and determining the nutritional status of preschool children using WHO graphs. There was a two-month interval between the first and second training sessions to allow participants to implement anthropometric measurement data collection in their respective schools.

Statistical Analysis

Data analysis was performed using the Friedman test. After a difference in the average quality of nutritional status data was confirmed, the Post Hoc Tukey HSD test was conducted to identify which assessment group demonstrated the most significant difference in data quality within each case and control group.

RESULTS AND DISCUSSION

Research Subject Characteristics

The characteristics of research subjects comprise the aspect of age and latest education, in which both have equal proportion in the case group and control group.

Table 1. The Distribution of Research Subject Characteristics Based on Research Group

Variable	Research Group			
	Case		Control	
	n	%	n	%
Age (years)				
Productive (20-35)	5	25%	6	30%
Non-Productive (<20 or >35)	15	75%	14	70%
Education				
High	18	90%	17	85%
Middle	2	10%	3	15%

Table 2 illustrates that within the case group, fifteen respondents (75%) were of non-productive age, whereas in the control group, there were fourteen (70%). The majority of teachers in TK ABA hold higher education qualifications, with 18 individuals (90%) in the case group and 17 individuals (85%) in the control group having completed associate or bachelor's degrees. This suggests that the teachers in TK ABA in Kapenawon Gamping generally possess a solid educational background, having attained at least an associate or bachelor's degree. While most TK ABA teachers may not be within the productive age range, their enthusiasm for work remains high, likely honed during their active involvement in the Muhammadiyah/'Aisyiyah organization during their youth. A teacher is an individual possessing a professional diploma and specialized expertise in education. Their primary responsibilities include educating, teaching, guiding, training, examining, and evaluating students across various educational stages (14), as defined in the Indonesian Constitution No. 20 of the National Education System in 2003. The stages of education correspond to learners' developmental phases, the intended objectives, and the skills to be mastered. For preschool/kindergarten education, teachers are

required to hold academic qualifications of at least an associate degree (DIV) or a bachelor's degree (S1), as stipulated by the Department of Education in 2007 (Departement of Education, 2007).

Adherence to these regulations is in line with the Educational Minister's directives in 2007. The professionalism of teachers significantly impacts early childhood education, enabling them to innovate and devise diverse lessons to remain abreast of current conditions and developments (15). Generally, younger teachers tend to offer more engaging lessons, with age impacting a teacher's professionalism and performance (16). Studies, such as Sebayang (2020), have demonstrated that a teacher's educational background significantly influences their performance, leading to enhancements in motivation and work ethics (14).

The Data Quality of Nutritional Status

WHO Anthro Plus Application Training Group

The analytical data analysis includes normality and homogeneity tests conducted on two facets of data quality: data accuracy and benefits in the teacher group receiving WHO Anthro Plus training. The evaluation of data quality reveals an overall improvement in results before, during, and two months after the training sessions.

The Shapiro-Wilk test for data normality across the three repetitions in assessing data quality in terms of accuracy and benefit indicates that most p-values are < 0.05. This implies that the data from the three evaluation repetitions in each aspect data accuracy and benefit do not exhibit a normal

distribution. Conversely, the homogeneity test shows p-values > 0.05, signifying that all data repetitions in both the aspects of data accuracy and benefit demonstrate homogeneity. Detailed results are presented in **Table 3**.

Table 2. The Average of Data Quality in WHO Anthro Plus Application Training

Aspect of Data Quality	Pre -test	X ²	Mid-Test	X ²	Post-test	X ²
	Mean ± SD		Mean ± SD		Mean ± SD	
Data accuracy	76.65 ± 14.072	0.066 (0.541)	85.35 ± 10.604	0.010* (0.001)	87.90 ± 12.082	0.008* (0.541)
Benefit	69.50 ± 11,033	0.076 (0.575)	81.05 ± 11.232	0.356 (0.001)	90.70 ± 26.49	0.076 (0.575)

**)Significant on CI:95%*

Following the analysis presented in **Table 3**, the data examination proceeded with bivariate analysis utilizing the Friedman test to evaluate variations in the mean rank value among all sample groups measured three times or more at different intervals.

As depicted in **Table 4** blow, a noteworthy variation is observed in the aspects of data accuracy and benefit concerning the assessment of data quality from the pre-test, mid-test, and

post-test stages subsequent to the WHO Anthro Plus training, displaying a significant p-value of 0.000 (p<0.05). The statistical analysis substantiates a substantial improvement in the mean score of the data accuracy aspect, rising from 76.65 ± 14.072 in the pre-test to 87.90 ± 12.082 after the training. Furthermore, there was another noticeable increase to 90.70 ± 26.49 observed after two months of training.

Table 3. The Disparity of Data Quality Assessment after WHO Anthro Plus Training

Aspect of Data Quality	Pre-test	Mid-Tes	Post-test	N	X ²
	Mean Rank	Mean Rank	Mean Rank	Chi ²	
Data Accuracy	1.33	2.10	2.58	20 (22.750)	0.000*
Benefit	1.18	2.05	2.78	20 (32.094)	0.000*

**) significant on CI:95%, df=2*

The research findings align with Al Rahmad's study (2020), indicating that training utilizing WHO Anthro effectively enhances the quality of nutritional status information within a month of training (13). Training serves as a fundamental method to enhance data quality, involving a series of planned events aimed at improving participants' skills, knowledge, experience, or behavior change. Previous studies supporting this research have emphasized the effectiveness of training in determining children's nutritional status to prevent stunting by employing applications with audio-

visual mediums. These studies have shown significant improvement in respondents' competence and knowledge, elevating scores from 60 in the pre-test to 80 in the post-test (p=0.000). The implementation of training for preschool/kindergarten teachers holds the potential to optimize their roles in preventing stunting among preschool children (17). Moreover, web/application-based education on nutrition offers advantages in terms of user-friendliness and enhancing skills in observing

children’s nutritional status compared to conventional methods (18).

WHO Graph Plotting Training Group

Table 5 presents the outcomes of normality and homogeneity tests conducted on two aspects of data quality, specifically data accuracy and benefit, within the control group. In the teacher group trained in plotting WHO Anthro manual graphs, improvements in data quality were observed on average. Regarding the results of data normality obtained from the Shapiro-Wilk test for each assessment repetition in terms of quality

assessment based on data accuracy and benefit, it was noted that some displayed a p-value < 0.05. This indicates that the data from the pre-test, mid-test, and post-test in both aspects of data accuracy and benefit do not exhibit a normal distribution. Conversely, the results from the homogeneity test revealed a p-value < 0.05, signifying that all data repetitions analyzed from the perspectives of data accuracy and benefit indicate non-homogeneity within the data set. Upon evaluating the data quality in the control group, it was observed that the data did not follow a normal distribution.

Table 4. The Mean Value of Data Quality on the Training of WHO Anthro Manual Graphic

Aspect of Data Quality	Pre-test	X ²	Mid-Test	X ²	Post-test	X ²
	Mean ± SD		Mean ± SD		Mean ± SD	
Data Accuracy	79.25 ± 21.59	0.113 (0.001)	89.25 ± 12.38	0.785 (0.000)	90.25 ± 11.97	0.999 (0.001)
Benefit	79.50 ± 21.08	0.004* (0.001)	87.50 ± 14.00	0.986 (0.000)	91.50 ± 9.74	0.492 (0.001)

**)Significant on CI:95%*

Consequently, the bivariate analysis utilized the Friedman test to identify significant differences among each repetition of the data quality analysis in the control group. As depicted in Table 6, a noteworthy disparity was observed in the data quality assessment between the pre-test, mid-test, and post-test stages subsequent to receiving the training materials, demonstrating

a significant p-value of 0.000 (p<0.05). The statistical analysis confirms variations in the aspect of data accuracy, transitioning from an initial mean of 79.25 ± 21.599 to 90.25 ± 11.973. Similarly, in the aspect of benefit, a disparity was observed, starting from an initial mean of 79.50 ± 21.083 and rising to 91.50 ± 9.747 after two months of training.

Table 5. The Disparity of Data Quality Assessment after Plotting WHO Manual Graphic

Aspect of data quality	Pre -test	Mid-Test	Post- test	N	X ²
	Mean Rank	Mean Rank	Mean Rank	Chi ²	
Data Accuracy	1.45	2.23	2.33	20 (20.971)	0.000*
Benefit	1.45	2.05	2.50	20 (21.143)	0.000*

The training sessions introducing the utilization of WHO Anthro for kindergarten teachers serve as a pivotal step toward preventing stunting in preschool children. WHO Anthro Plus facilitates the easy determination of children’s nutritional status by providing automatic interpretations of z-score measurements for each indicator, making it user-friendly. In addition to using the application,

nutritional status determination can also incorporate the manual use of the standard growth chart provided by WHO Anthro. However, despite the improvement observed in data quality after employing WHO Anthro or the WHO standard manual growth chart in this research, certain challenges persist in using the manual growth chart. Teachers encounter

difficulty in interpreting children's nutritional status beyond merely measuring and plotting the graph. This aligns with Hadi's research (2018), indicating that while the manual growth chart is user-friendly, difficulties arise in interpreting the growth curve based on sex and months (19).

Outside of school, manual records of nutritional status are maintained at Public Health Center (Puskesmas) Kasihan I. Here, the plotting of nutritional status utilizing the Growth Chart (KMS) according to WHO standards has led to some inaccuracies in reported data. This inaccuracy resulted in an underutilization of data, with a reported data incompleteness rate of 9.75% in the 2019 nutritional data report (20). Despite encountering issues within our research subjects, Table 6 shows a significant difference in the average data quality. Respondents in this research were proficient in generating nutritional status reports. This proficiency is evident in the increased average scores of data accuracy from 79.25 ± 21.599 to 90.25 ± 11.973 and the benefit score from 79.50 ± 21.083 to 91.50 ± 9.747 after two months of training. This achievement is attributed to the high motivation and dedication of participants who actively engage in nutritional problem screening among preschool students, especially in Gamping, an area still facing stunting concerns since 2021 (21) and remains a focal location for stunting (22).

One crucial aspect assessed for accuracy in this research is the anthropometric measurement method (weight and height). It is imperative to employ standardized methods and equipment for children's anthropometric measurements (23). In this research, digital scales and microtoise were utilized, and teachers were trained in proper weight and height measurement procedures.

For instance, while measuring weight, it was recommended for students to wear minimal clothing/footwear/hats/bags to avoid measurement bias (23). Another crucial aspect for accuracy pertains to the provision of data required to measure nutritional status, particularly the children's age in months for those aged 0-72 months (7). Age significantly influences nutritional status determination, and

any error in noting children's age in months could lead to misinterpretation of nutritional status (6).

The disparity in data quality between both training groups indicates substantial differences in the assessment of data quality in the treatment group regarding the aspect of benefit compared to the control group for the same aspect, with a p-value of 0.001 ($p < 0.05$). This conclusion is substantiated by WHO Anthro Plus application v 1.0.0, which offers three user-friendly features facilitating research subjects' understanding and usage. These features significantly enhanced participants' abilities, notably improving from the initial score of 69.50 ± 11.033 to 90.70 ± 26.49 ($p=0.001$).

The anthropometry calculator feature simplifies determining children's nutritional status across weight/age (BB/U), height/age (TB/U), and body mass index (BMI/U). Categories are color-coded, aiding participants in easy identification. Additionally, the individual assessment feature allows participants to save students' anthropometric measurements monthly, aiding teachers in accessing previous measurements due to the program's seamless data integration. The nutrition survey feature enables kindergarten teachers to map students' nutritional status based on location (24). The significant improvement in benefit and data accuracy after employing the WHO Anthro application aligns with previous research. It highlights a 13.6% enhancement in the quality of nutritional status data among Nutrition Service Officers (TPG) at Public Healthcare Centers (Puskesmas) in Aceh, with a deviation of 5.623 and a 95% CI in accuracy and benefit aspects, each with $p=0.000$, after a month of WHO Anthro software-based training (25).

The Effectiveness of Training towards the Data Quality of Nutritional Status in Preschool Students WHO Anthro Plus Application Training Group

Statistical analysis demonstrates a 90% confidence interval (CI) in two aspects of data quality: data accuracy and benefit. Within the case group's data accuracy aspect, a

substantial average disparity of 11.25 with a standard error of 3.559 was observed from the pre-test to the mid-test, exhibiting a significant p-value of 0.007 ($p < 0.05$). Additionally, an average disparity of 8.700 with a standard error of 3.559 was noted from the mid-test to the post-test, with a significant p-value of 0.046 ($p <$

0.05). In contrast, concerning the benefit aspect, a considerable average disparity of 21.200 with a standard error of 5.626 was identified from the pre-test scores to the mid-test, with a p-value of 0.001 ($p < 0.05$) within a 95% confidence interval. The results of the post hoc test are detailed in **Table 7**.

Table 6. The Effectiveness of WHO Anthro Plus Training towards the Disparity of Data Quality

Aspects of Data Quality	Pre-test – Mid-test		Mid-test – Post-test	
	Mean ± SD	P-value (95% CI)	Mean ± SD	P-value (95% CI)
Data Accuracy	11.25 ± 3.56	0.007* (2.68-19.82)	-8.70±3.55	0.046* (-17,27-(-0.13))
Benefit	21.20 ±5.62	0.001* (7,66-34.74)	-11,55±5.62	0.109 (-25.09-1.99)

**)Significant on CI:95%*

The outcomes of the research affirm that the WHO Anthro Plus training administered to kindergarten teachers significantly enhances their skills in utilizing digital applications, as demonstrated by a p-value of 0.001 ($p < 0.05$). The term “benefit” extends beyond the mere outcome of data reporting from WHO Anthro Plus; it encompasses the enhancement of kindergarten teachers’ proficiency in using digitally-based applications. Previous research has revealed that some teachers possess relatively low technological maturity levels, necessitating improvement through training and innovative activities aimed at mastering digital technology (26).

The challenges posed during the COVID-19 pandemic have exacerbated efforts to combat stunting problems in Indonesia due to limitations in human resources at the primary care level in both healthcare and schools. There is a pressing need to enhance digital literacy among existing resources to effectively utilize software-based information systems for recording nutritional status (27). Remarkably, research subjects within the treatment group displayed adaptability in the post-COVID-19 pandemic setting, enabling nearly every teacher to benefit from utilizing the WHO Anthro Plus application.

In terms of benefit, teachers in the treatment group gained insights into interpreting nutritional status measurement results that were previously unknown to them. The training provided to teachers serves as a pivotal step in screening children’s nutrition problems and identifying stunting conditions. By understanding students’ nutritional statuses, teachers can offer guidance on balanced nutrition through the Balanced Nutrition Guide (PGS) (21). This guidance is intended for students to apply in their daily lives, such as through packed lunches. This aligns with Imani’s research (2017), indicating that students’ nutrition knowledge improves from low to sufficient levels after receiving nutrition lessons from teachers (28).

Furthermore, in addition to informing teachers of the students’ nutritional statuses, the results of anthropometric measurements are communicated to parents. This communication enables parents or primary caregivers to comprehend their children’s nutritional statuses. With this knowledge, it is hoped that parents can optimize their understanding to monitor children’s nutritional intake by regularly reporting students’ growth and development results (29).

WHO Graph Plotting Training Group

In terms of data accuracy, statistical analysis within a 95% confidence interval (CI) indicates an insignificant average disparity of 11.00 with a standard error of 5.044 from the pre-test score to the mid-test, with a p-value of 0.083 ($p > 0.05$). Similarly, from the mid-test to the post-test, there is an average disparity of 10.000 with a standard error of 5.044, yielding a p-value of

0.126 ($p > 0.05$). Conversely, concerning the benefit aspect, a statistically significant disparity is evident within a 95% CI. There is a substantial average disparity of 12.000 with a standard error of 4.952 from the pre-test to the mid-test, resulting in a p-value of 0.048 ($p < 0.05$). The detailed results of the post hoc test are presented in **Table 8**.

Table 7. The Effectiveness of Training on WHO Graph Plotting towards the Disparity of Data Quality

Aspects of Data Quality	Pre-test – Mid-test		Mid-test – Post-test	
	Mean ± SD	P-value (95% CI)	Mean ± SD	P-value (95% CI)
Data Accuracy	11.00±5.04	0.083 (-1.14-23.14)	-10.00±5.04	0.126 (-22.14-2.14)
Benefit	12.00±4.95	0.048* (0.08-23.92)	-8.00±4.95	0.247 (-19.92-3.92)

*)Significant on CI:95%

The outcomes of the “multiple comparisons” post hoc tests employing Tukey HSD reveal that in the aspect of data accuracy, the average disparity from the pre-test to mid-test and from mid-test to post-test is insignificantly different, indicated by an asterisk (*) or p-value > 0.05 . Conversely, in the aspect of benefit, there exists a significant difference in the average scores from the pre-test to mid-test with a p-value of 0.048 ($p < 0.05$). However, there is no significant difference in scores from the mid-test to post-test, yielding a p-value of 0.247 ($p > 0.05$). Consequently, it can be concluded that the scores obtained from WHO Anthro plotting training do not exhibit significant disparity in the data quality produced. Despite the inadequacy of the WHO manual graph in generating accurate data, it remains beneficial as it provides information about students’ nutritional status to parents.

The significance of counseling and training for preschool teachers is highlighted by a survey conducted among 200 teachers, revealing that a majority (69.85 ± 16.34 or 83.5%) possess little to no knowledge about nutrition, and a considerable portion (66.54 ± 18.71 or 22%) have never received education on children’s nutrition (30). This aligns with the scenario among TK ABA

teachers in the Kapanewon Gamping area, where most teachers are female and have limited experience in nutritional counseling or training. Hence, there is a crucial need to educate them, particularly in determining the nutritional status of preschool children.

This research emphasizes that the TK ABA teachers involved were initially unfamiliar with determining nutritional status using WHO Anthro, evident in the significantly different average results between the pre-test, mid-test, and post-test, with a p-value of 0.007. Before the training, teachers were unable to interpret anthropometric measurements, leading to a lack of knowledge about the students’ nutritional status. Preschool institutions should offer services, including counseling and training about health, growth and development, and preschool children’s nutrition, to contribute to addressing children’s nutritional issues (31).

CONCLUSIONS AND RECOMMENDATIONS

The training of WHO Anthro usage and WHO manual growth chart was proven effective in the improvement of data quality, seen from the aspect of data accuracy and the aspect of benefit. Notably, teachers who received WHO Anthro Plus training exhibited higher scores in data

quality within the aspect of benefit compared to those trained using the WHO standard manual growth chart. This research strongly recommends the implementation of WHO Anthro among kindergarten/preschool teachers as a valuable tool for the early detection of stunting in preschool children

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