

Research Article

Empowerment of Posyandu Cadres Through Training in Anthropometric Measurement and Assessment of Children's Nutritional Status in the Baolan Community Health Center Work Area, Tolitoli Regency

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Abstract

Indonesia faces a critical challenge in tackling stunting, with the country ranking third in Southeast Asia for its prevalence. From 2005 to 2017, the average stunting rate for toddlers was 36.4%, which slightly decreased to 30.8% by 2018. However, as of 2023, Central Sulawesi continues to report a high stunting prevalence of 27.2%. This growth issue severely impacts cognitive development and academic performance, leading to delayed motor skills and reduced IQ. A survey from the Tolitoli Regency Health Office indicated significant nutritional problems, particularly in the Baolan Community Health Center's jurisdiction. Despite efforts to address malnutrition, no formal training on anthropometric measurements and stunting prevention was provided to Posyandu (Integrated Health Post) cadres. This study aims to empower these cadres by providing them with training on anthropometric measurements and assessing children's nutritional status using the WHO standard Z-Score method. This community service initiative involves lectures, demonstrations, and hands-on practice for health cadres, with the goal of improving their skills in child nutritional status assessment, ultimately contributing to the national effort to reduce stunting.

Keywords

Stunting, Posyandu, Nutrition



INTRODUCTION

Indonesia has the third highest prevalence of stunting in Southeast Asia. The average prevalence of stunting in Indonesia in toddlers from 2005 to 2017 was 36.4%. According to the Ministry of Health's Basic Health Research (Riskesdas), the national stunting rate decreased from 37.2% in 2013 to 30.8% in 2018. Currently, the prevalence of stunting in Central Sulawesi in 2023 remains high at 27.2%. One serious growth problem is the problem of stunted nutrition. Children who are stunted as toddlers have low cognitive levels, poor academic and psychosocial achievement. Infants who experience severe stunting in the first two years of life have a strong relationship with cognitive delays later in childhood. Stunting that occurs in childhood is associated with delayed motor development and lower IQ levels.

A preliminary survey from the Tolitoli Regency Health Office in 2023 based on the nutritional status of toddlers, from 15 Community Health Centers in Tolitoli Regency, the Baolan Community Health Center ranked 6th in the number of stunted toddlers, namely 120 toddlers (12.4%) stunted out of a total of 425 toddlers in the reporting system.

According to information from the Nutrition Program holder at Baolan Health Center, in 2023 the number of targeted toddlers is 860 children. Of this number, 159 children (18.%) experience malnutrition, with the following breakdown: TB/U (stunting) 95 children (11.05%), BB/U numbered 46 children (5.35%) and BB/TB numbered 18 children (2.09%).

The high number of stunting cases and the persistence of malnutrition in the Baolan Community Health Center's work area is certainly a matter of concern for us all. The government has implemented stunting prevention efforts through national priority programs, one of which is the acceleration of planned stunting reduction, namely increased nutritional surveillance such as growth monitoring, increased access and quality of community services, and increased community participation through community-based health efforts such as Integrated Health Posts (Posyandu). Posyandu remains the government's flagship program for addressing nutritional issues and preventing mortality in infants and toddlers. Implementation of Posyandu is greatly influenced by cadres as the drivers and implementers. Cadres in monitoring the growth and nutritional status of toddlers must have skills based on the parameters used in determining toddler nutritional status, namely age, sex, weight, and height, namely the anthropometric index. To assess a child's nutritional status, the weight and height of each toddler are converted into a standardized Z-Score value using anthropometric standards.

However, the stunting prevention program, which measures nutritional status based on height and age, has never been taught to Posyandu cadres in the Baolan Community Health Center's work area. The program has only involved providing healthy supplementary foods to toddlers. Therefore, the Palu Ministry of Health Polytechnic of Health will contribute and actively participate in providing strengthening training for Posyandu cadres in the Baolan Community Health Center's work area on anthropometric measurements and assessing the nutritional status of toddlers using the WHO Standard Z-Score method.

The targeted output in this community service is a scientific article published in a national community service journal that is accredited and has an ISSN.

Problems found and solutions offered:

The number of Integrated Health Posts (Posyandu) in the Community Health Center is 22. Those who assist in the health program, from the distribution of the working area of the Baolan Community Health Center, there are 110 health cadres with the distribution of cadres in Nalu Village 30 cadres, Tambun Village 10 cadres, Buntuna Village 20 cadres, Dadakitan Village 25 cadres, Pangi Village 20 cadres and Lelean Nono Village 15 cadres. The Baolan Community Health Center continues to strive to provide health services within the scope of its working area and is assisted by community empowerment, namely health cadres who have also played an active role in assisting in child health programs, especially Posyandu services. However, in 2023 there are still problems with children's nutritional health that need continuous handling.

A preliminary survey from the Tolitoli Regency Health Office and Baolan Health Center in 2023 based on the nutritional status of toddlers, from 15 Health Centers in Tolitoli Regency, Baolan Health Center ranked 6th in the number of stunted toddlers, namely 120 toddlers (12.4%) stunted from a total of 425 toddlers in the reporting system, after Ogoidide (15%), Basidondo (15.7%), Dondo (18.3%), Bangkir (24.2%) and Kayu Lompa (26.4%). Based on data from the Nutrition Program holder at Baolan Health Center in 2023, the number of target toddlers was 860 children. The number of children experiencing malnutrition was 159 (18.5%). The prevalence of nutritional disorders is divided as follows: TB/U (Stunting) 95 children (11.05%), BB/U 46 children (5.35%) and BB/TB 18 children (2.09%).

The stunting prevention program, which measures nutritional status based on height and age, has never been comprehensively taught to Posyandu (Integrated Health Post) cadres. The only program implemented is providing healthy supplementary food for toddlers. Therefore, the purpose of this community service activity is to educate cadres about stunting and its prevention, as well as to train cadres in anthropometric measurements and how to screen for stunting by measuring nutritional status based on height and age using the Z-Score method, a calculation that uses standards for measuring and monitoring toddler growth.

Based on the above description, in response to the existing situation and considering that the government is currently strengthening primary services with a national strategic program to reduce stunting, comprehensive monitoring is needed across programs, across sectors, and among Posyandu cadres in an effort to alleviate nutritional problems and reduce infant and toddler mortality rates. Therefore, training for Posyandu cadres is very necessary. The results of an initial study with the person in charge of the Baolan Health Center Nutrition Program showed that Posyandu cadres had never received training in assessing nutritional status using the z-score method.

Therefore, Poltekkes' contribution in the form of community service is one part of the tri dharma of higher education that is mandatory. The implementation of this activity is expected to increase lecturers and students' empathy, concern, multidisciplinary cooperation towards public health issues and be able to empower the community to improve health. In this community service, Poltekkes Kemenkes Palu through the Community Service Team will strengthen the cadres of Posyandu (Integrated Health Post) as part of the community who can contribute to development in the health sector according to their abilities, especially in preventing stunting in the working area of the Baolan Health Center.

Fundamental contribution to the target audience:

Health cadres have the knowledge and skills to routinely weigh children during integrated health posts (Posyandu), but they haven't received training on how to assess nutritional status using the Z-score in children. This is despite the fact that the Z-score is a WHO standard and has also been standardized by the Ministry of Health.

METHOD

A. Program Implementation

The implementation of this community service program consists of a Service Team from the D-III Nursing Study Program, Tolitoli, Poltekkes, Ministry of Health, Palu as a Service Team from the University with the composition of the Team consisting of a Chairperson, team members and 3 students from student elements. The program implementers from the target partners are Posyandu Cadres in the Working Area of the Baolan Health Center UPT who are appointed directly by the Head of the Baolan Health Center through the Village Head or Sub-district Head, as many as 2 employees representing several Nutrition units. Community service activities (Pengabmas) Empowerment of Posyandu Cadres Through Training in Anthropometric Measurement and Assessment of Children's Nutritional Status in the Baolan Community Health Center Work Area, Tolitoli Regency, with the target being Posyandu cadres and Puskesmas employees who are responsible for the Nutrition Program of the Baolan Puskesmas UPT.

The stages of implementing community service are as follows:

1. On June 20, 2025, coordination to implement community service was carried out with the Head of Baolan Health Center, coordination was continued on March 8, 2025.
2. On July 17, 2025, the final coordination with the Health Center and especially the Person in Charge of Risk Management at the Baolan Health Center
3. On July 24, 2025, the implementation of activities according to the schedule/TOR (attached) is as follows:
 - a. July 24, 2025, 08.00-08.30: Participant Registration
 - b. Date July 24, 2025 8:30-8:45 AM, Opening. The activity began with singing the Indonesian national anthem, a prayer by one of the students, a report from the Head of the Community Service Team, and a welcome speech and official opening of the event by the Head of the Baolan Community Health Center.
 - c. Date July 24, 2025 8:45-09.00 Report of the Head of the Community Service Team and Greetings from the Head of Baolan Center (Report of the Head of the Community Service Team is Attached).
 - d. July 24, 2025, 9:00 AM - 9:15 AM Participants completed a pre-test using a questionnaire provided by the Head of the Community Service Team to determine the cadres' knowledge of anthropometry and how to determine nutritional status using the Z-score method.
 - e. Date July 24, 2025 9:40-10.40 Presentation from the Head of the Center about ILP - Empowering Cadres for the National Priority Program to Reduce Stunting assisted by D-III Nursing students guided by the Head of the

Community Service Team. by the Head of the Baolan Center (Attached Material)

- f. Date July 24, 2025 10:40-11:30 Educational Material The role of cadres, anthropometric measurements & assessment of children's nutritional status using the Z-Score method assisted by D-III Nursing students guided by the Head of the Community Service Team.
- g. Date July 24, 2025 11:30-12:30 ISOMA
- h. Date July 24, 2025 1:45 PM - 2:30 PM Introduction of the Child Nutritional Development Status Calculator Application by the Head of Community Service
- i. Date July 24, 2025 1:45-2:30 PM Post Test
- j. Date July 24, 2025 14:30-15:00 Evaluation of the implementation of activities by the Head of Community Service followed by the handover of investment materials by the Head of Community Service to the target partners and continued with impressions and messages from the Head of the Health Center as well as the closing of the Community Service activities.

B. Partner Participation Forms

The form of Partner Participation includes preparing the place (hall), administration (invitations), preparing media such as infocus, sound system, recommending competent participants according to their work unit, taking notes, coordinating with relevant stakeholders.

C. Team Expertise and Duties

Position	Expertise	Team Tasks
Head of the Community Service Team	Nursing KKN I 7	a. Coordinating and preparing materials b. Managing Permits c. Coordination with target partners d. Designing TOR and budget plan e. Compiling a Report f. Preparing Publication Manuscripts
Team Members (Lecturers)	Nursing KKN I 7	a. Assisting the Team Leader and preparing materials b. Preparing the attendance list c. Preparing other administration
Team Members (Student Elements)	-	a. Help prepare materials and media such as banners, projectors, etc b. Preparing questionnaires during pre and post tests c. Inputting and processing data with the guidance of the head of Community Service d. Circulating attendance e. Documenting (recording) during activities f. Editing Training Video Scripts
Head of the Community Health Center	Health Center Administration and Health Center-Clinic	a. Mobilize employees according to provisions b. Coordination with related cross-sectors (Inviting cadres through the Village Head/Lurah in the Baolan Health Center work

Surveyors		area)
Head of Office Administration	administration	a. Making invitations, taking minutes, making letters of explanation and/or administrative forms required during community service according to the provisions b. Controlling data and post-training monitoring
PJ Nutrition Program of the Community Health Center	Acting member of PJ Kalster I ILP	a. Preparing nutritional coverage data, monitoring and follow-up of IT-based child nutrition monitoring reports b. Coordination with the head of community service regarding follow-up of training results on the application of knowledge and skills at each Posyandu

D. Location and Time

1. Location

Strengthening activities (training) were carried out in the Baolan Community Health Center Hall, Jl. Sona, Nalu Subdistrict, Baolan District, Tolitoli Regency.

2. Time

The activity was held on July 24, 2025 starting at 08.00-14.30 WITA.

E. Method of devotion

1. Q&A Lecture
2. Demonstration
3. Direct practice/simulation of measuring anthropometry and analyzing nutritional status using a z-score table (table and online nutrition calculator based on Android).

F. Relatedness

1. Person in charge (Pj) of the Baolan Health Center Nutrition Program
Helping to socialize and demonstrate how to weigh children, how to calculate nutritional status using the z-score table.
2. People who have toddlers
The public can learn about anthropometric measurements d
The correct way to assess nutritional status using the z-score standard
3. Educational Institutions
Implementing the Tri Dharma of Higher Education in the form of direct community service.

G. Parties involved

1. Person in charge of the Community Health Center Nutrition Program
2. Health Cadres in 6 working areas of Baolan Community Health Center
3. All representatives (employees) of the Health Center appointed by the Head of the Health Center
4. D3 Nursing Students in Tolitoli.

RESULT AND DISCUSSION

Knowledge results on Empowering Posyandu Cadres Through Anthropometric Measurement Training and Child Nutritional Status Assessment before and after being given education what was achieved was as follows:

Table 4.1 Distribution of Pre-test and Post-test Answers

No	Knowledge Questions	Pre-test				Post-test			
		Correct		Wrong		Correct		Wrong	
		n	%	n	%	n	%	n	%
1	Measuring a child's weight should be done with the child fully clothed so that the results are accurate.	6	60.0	3	30.0	9	90.0	1	10.0
2	The child's height is measured in an upright standing position for children over 2 years old.	5	50.0	5	50.0	10	100.0	0	0.0
3	Upper arm circumference (LILA) can be used to assess the nutritional status of toddlers, especially children under 6 months of age.	4	40.0	6	60.0	9	90.0	1	10.0
4	The WHO growth chart is used to assess the nutritional status of children based on the results of anthropometric measurements.	8	80.0	2	20.0	10	100.0	0	0.0
5	Children with a weight-for-age (BB/U) Z-score below -2 are categorized as malnourished.	5	50.0	5	50.0	7	70.0	3	30.0
6	Posyandu cadres do not need to understand how to read growth charts because they only need to record the measurement results.	6	60.0	4	40.0	10	100.0	0	0.0
7	Body length measurements are taken in a sleeping position for children under 2 years of age.	5	50.0	5	50.0	10	100.0	0	0.0
8	One of the objectives of Posyandu cadre training is to improve cadre skills in measuring and assessing child nutrition.	4	40.0	6	60.0	9	90.0	1	10.0
9	Nutritional status assessment only needs to be done once a year to get accurate results.	5	50.0	5	50.0	10	100.0	0	0.0
10	Small errors in anthropometric measurements will not affect the assessment of a child's nutritional status.	6	60.0	4	40.0	10	100.0	0	0.0
Total Value		540				940			
Average value		54.0				94.0			

Source: Primary Data, July 2025

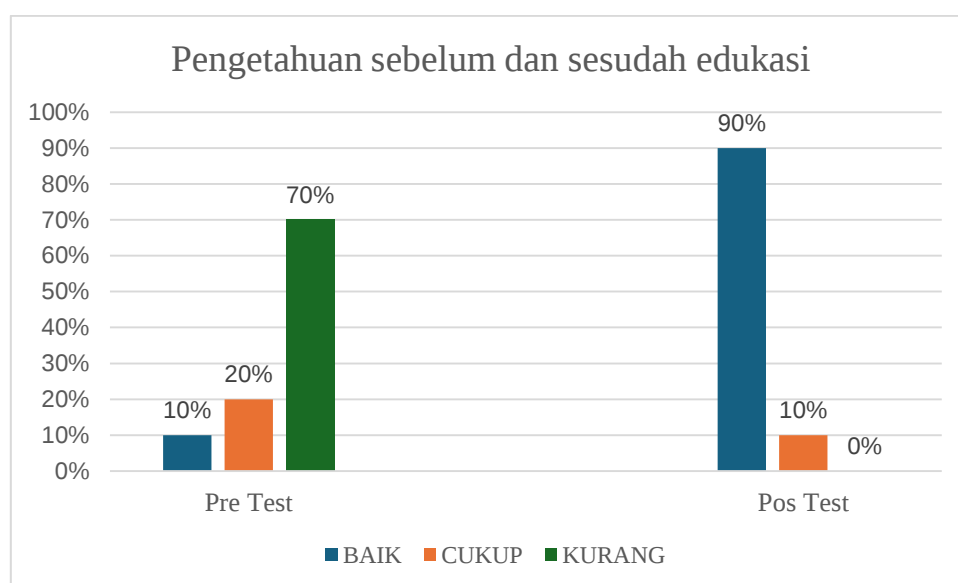
Based on Table 4.1, the distribution of answers from 10 respondents shows that before the education was carried out, the average class score was 54.0 (Poor). After the education on anthropometry and assessment of children's nutritional status using the z-score method, the average pre-test score increased to 94.0 (Good).

Table 4.2 Level of Knowledge of Cadres regarding Anthropometry and Nutritional Status Assessment Using the Z-Score Method (n=10)

No.	Category	Pre-Test		Post-Test	
		f	%	f	%
1.	Good	1	10.0	9	90.0
2.	Enough	2	20.0	10	10.0
3.	Not enough	7	70.0	0	0.0
Total		10	100.0	10	100.0

Source: Primary Data, July 2025

Figure 4.3. Knowledge Graph Cadre Knowledge (n=10).



Source: Primary Data, July 2025

Based on table 4.2 and graph 4.3, the knowledge scores of the 10 cadres increased. The highest pre-test knowledge scores before the training were in the poor category (70%), and only 1 (10%) was in the good category. After the training, the highest post-test scores were in the good category (90%), 1 (10%) was in the adequate category, and none were in the poor category (0%).

Table 4.3 Summary Results of Cadre Knowledge Measurement (n=10)

No.	Indicator	Average value	Average	Increase
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		<i>Pre-Test</i>	<i>Post-Test</i>	Increase	(%)
1.	Values of Posyandu Cadres	54.0	94.0	+40.0 points	75%

Source: Primary Data, July 2025

Based on table 4.3, there appears to be a significant increase in cadre knowledge of +40 points (75%) after training.

Community Service Activity Images	
 Figure 1. Head of community service providing material on monitoring nutritional status.	 Figure 2 Community Service Team, Community Health Center Partners and Cadres
 Figure 3 The Head of Pengambas handed over the investment in digital anthropometric equipment to the Head of Baolan Center (as a Partner)	 Figure 4. Community Service Team, Partners and Cadres

DISCUSSION

1. Anthropometric Knowledge and Assessment of Children's Nutritional Status

The increase in the average score from 54 to 94 demonstrates the training's effectiveness in strengthening cadres' understanding of anthropometric concepts and

the use of z-scores for nutritional status assessment. This aligns with the training's goal of improving cadres' ability to perform valid measurements and interpret child nutrition results.

Anthropometry is the primary method for assessing the nutritional status of individuals and groups, particularly toddlers. A sound knowledge of anthropometry is crucial for integrated health post (Posyandu) cadres to detect nutritional issues such as stunting, wasting, and underweight early. This training focused on basic knowledge of nutritional status indicators such as weight-for-age (BW/A), height-for-age (H/A), and weight-for-height (BW/H) using the Z-score method.

Based on Table 4.2 and Figure 4.3, there was a significant increase in the knowledge of cadres after the training. Before the training, most cadres were in the "Poor" knowledge category (70%), while only 10% were in the "Good" category. However, after the training, there was a drastic change where 90% of cadres were in the "Good" category and none were in the "Poor" category. This indicates that the training was successful in increasing the cadres' understanding of the importance of anthropometry and the method of assessing children's nutritional status using the Z-score. This increase is also reflected in Table 4.3, where the average score of cadres increased from 54.0 in the pre-test to 94.0 in the post-test, an increase of 40 points (75%).

This improvement aligns with the findings of research by Lestari et al. (2021), which found that training significantly improved cadres' knowledge and skills in monitoring toddler growth. Furthermore, Indonesian Minister of Health Regulation No. 2 of 2020 concerning Child Anthropometric Standards emphasizes the importance of cadres' understanding of the use of WHO standards in child growth monitoring.

2. Anthropometric Measurement Skills and Nutritional Status Assessment

Based on the TOR of the training designed by the head of Community Service with the aim of improving skills in measuring anthropometry (weight/weight ratio, height/weight ratio, and weight/height ratio) to assess nutritional status using the Z-score method.

Knowledge without practical skills will hinder implementation in the field. Therefore, this training not only emphasizes theory, but also on the practice of anthropometric measurement skills, such as: a) weighing children accurately; b) measuring height or length according to age, and c) recording and interpreting data using the WHO Z-score table. Cadres are trained to use standard tools and are taught to use simple software and manual WHO charts to calculate nutritional status based on the Z-score, where the Z-score value is: <-3 SD: Severe malnutrition/stunting; -3 SD to <-2 SD: Undernutrition/stunting; -2 SD to $+2$ SD: Normal nutrition and $>+2$ SD: Overnutrition/obesity

This practice-based training is considered effective because measurement skills are an integral part of the routine duties of cadres at integrated health posts (Posyandu). According to a study by Rahmawati et al. (2022), training that includes simulations and field practice can improve cadre measurement accuracy by up to 85%. This training activity also implements Minister of Health Regulation No. 2 of 2020 concerning Child Anthropometric Standards, which states that anthropometric measurements (weight, height, and z-score indicators) are national standards that must be used to assess children's nutritional status. This is also reinforced by Indonesian Minister of Health Regulation No. 25 of 2014 concerning Child Health

Efforts, which emphasizes that child growth assessments must be conducted regularly and accurately and be part of basic health screening.

By improving the skills of cadres in anthropometric measurements and Z-score-based nutritional status assessment, early detection of nutritional problems in toddlers in the community can be improved, which will ultimately support a reduction in stunting and malnutrition rates in Indonesia.

3. Practical Implications

- a. The significant increase in cadre knowledge demonstrates the value of practice-based training, hands-on mentoring, and structured materials.
- b. In the future, strengthening cadres will not only focus on theory, but also on field practice verification, including inter-cadre validation and the use of WHO Anthro software for z-score analysis.
- c. The use of technology (such as anthropometric sensors or applications) can complement the strengthening of the competence of Posyandu cadres.

CONCLUSION

Training on anthropometric measurements and assessing children's nutritional status using the z-score method effectively improved the knowledge of Posyandu (Integrated Health Post) cadres, as reflected in a 40-point increase in average pre- and posttest scores. This success supports the cadres' need for competency in measuring weight and height, as well as interpreting z-scores, in accordance with the guidelines of Minister of Health Regulation No. 2 of 2020 and WHO technical standards. Further implementation should focus on instrument validation, strengthening the use of digital tools, and ongoing mentoring.

Bibliography

- Al Rahmad A. H. (2020). Penggunaan Software WHO Anthro dalam Penilaian Status Gizi. (dokumen)
- Depkes RI. (2020). Panduan Pelatihan Kader Posyandu. Jakarta: Kemenkes RI
- Gde Yogi Pramana A.A. et al. (2024). ESDS: AI Powered Early Stunting Detection
- Iswanto, A. Y. (2021). Partisipasi masyarakat dalam penanggulangan balita stunting melalui program kegiatan gizi puskesmas kutukan di Desa Kediren Kecamatan Randublatung Blora. Skripsi, Universitas Islam Negeri Walisongo Semarang.
- Kementerian Kesehatan RI. (2014). Permenkes No. 25 Tahun 2014 tentang Upaya Kesehatan Anak. Jakarta: Kemenkes RI.
- Kementerian Kesehatan RI. (2020). Peraturan Menteri Kesehatan No. 2 Tahun 2020 tentang Standar Antropometri Anak. Jakarta: Kemenkes RI.
- Lestari, N., Sari, K. P., & Mulyani, A. (2021). Pengaruh Pelatihan Kader terhadap Pengetahuan dan Keterampilan dalam Pemantauan Pertumbuhan Balita. *Jurnal Gizi dan Kesehatan*, 9(1), 45-52.
- Nelsi, Afriani, Urwatil Wusqa Abidin. (2023). Validasi Pengukuran Antropometri Berat Badan (BB) dan Tinggi Badan (TB) oleh Kader Posyandu ..., *Jurnal Peqquruang: Conference Series*,.. journal.lppm-unasman.ac.id
- Rahmawati, D., Wulandari, T., & Putri, R. (2022). Efektivitas Pelatihan Antropometri terhadap Kemampuan Kader dalam Mengukur Status Gizi Anak. *Jurnal Kesehatan Masyarakat Indonesia*, 17(2), 133-140.
- Rudy Hartono, Mira Andini, Aswita Amir, Besse Uswatun Hasanah, Dwi Sartika.

- (2023).Peningkatan Profesionalisme Kader Posyandu Terhadap Pengukuran BB, PB/TB ...
Media Implementasi Riset Kesehatan, Vol 4 No 2. E-Jurnal Poltekkes Makassar
- Sutiari N.K. et al. (2017)Petunjuk praktikum Penilaian Status Gizi antropometry dan Dietary
Assessment; Jurnal Kebidanan dan Keperawatan Aisyiyah,. ejournal.unisayogya.ac.id
- World Health Organization (WHO). (2006). WHO Child Growth Standards: Length/height-
for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-
age: Methods and development. Geneva: WHO.