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Management of Premature Infants (Understanding, Quality of Service, and Expectations of Nurses) on the Growth and Development of Young Infants

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KEYWORDS

development, infant management, prematurity, service

ABSTRACT:

Introduction: Neonatal emergency treatment plays a crucial role in addressing children's growth and development disorders.

Objectives: This study aimed to determine the relationship between premature infant management (understanding, service quality, and nurse expectations) to the growth and development of young infants in the perinatology room.

Methods: Using both quantitative and qualitative approaches, data were collected from 36 nurses and 20 premature infants in perinatology, Data analysis was carried out qualitatively using the discourses analysis technique.

Results: Results indicated that 75% of nurses had good knowledge of premature infant care, though 14% provided only adequate services. Enhance support is needed for high-risk infant management.

Conclusions: Fluid intake in infants improved from 71ml to 95ml over 5 days, though some infants faced challenges due to metabolic immaturity. The study recommends advanced training for nurses and better equipment to improve the quality of care for premature infants and support healthy growth and development.

1. Introduction

The success of handling neonatal emergencies has not reached 100% of all cases of newborns at risk in every Banyumas Regency health center. According to the Born to Soon Milk, The Global Action Report on Preterm Birth from the United Nations, the incidence of prematurity in Indonesia ranked fifth, namely 675,700 babies. An estimated 13.4 million babies were born prematurely in 2020 (before 37 weeks of pregnancy is complete) [1,2]. According to the WHO, 15 million babies are born premature, between 5-18% of all baby births. The infant mortality rate drops to 24 per 1000 live births. Globally, prematurity is one of the leading causes of death in children under five and is responsible for neonatal deaths [3,4].

Delay in handling neonate emergencies, impacting deaths [5]. Improper handling of at-risk cases results in the risk of impaired growth and development of children in the golden age phase, namely until the child is 5 years old. The mastery of health workers over perinatology management is an important factor that must be considered [6,7].

Routine performance by health workers is carried out based on the competencies possessed by officers with the education level of diploma and bachelor graduates. The basic competencies possessed are of course not enough as a provision for plenary services [8]. A small number of health workers, especially nurses, have been included in training related to perinaresti in perinatology science, both in the NICU (neonatal intensive care unit) and PICU (pediatric intensive care unit) rooms [9].

Environmental management of premature babies includes 1) Visual (lighting): reduce lighting, eye contact, incubator cover, hang black and white moving

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objects, or photos. 2) Auditory (the sound of tools, the conversation of the officer, the sound of the phone): minimize the voice, listen to the music of the ninabobo/murottal/mother's voice. 3) Olfaktorius. 4) Tactile. 5) Gustatory (taste response can be seen from facial expressions): 1-2 drops of breast milk when giving oral gastric tube (OGT). 6) Put the baby's hand to the mouth when there is a suction reflex movement; and 7) Proprioception (muscle & joint sensation): passive range of motion (ROM) [10], [11].

Kangaroo mother care is one of the most important premature infant management to improve the quality of life of neonates. The steps in the Kangaroo care method include 1) Improve state organization. 2) Reduce oxygen needs, and improve respiratory patterns. 3) Reduce apnea and bradycardias. 4) Improve thermal regulation. 5) Enhance parent-infant bonding and a parental sense of competence [12].

Positioning is one of the methods of managing premature babies. Infant positioning includes positions: 1) symmetrical postures; 2) trunk flexion, shoulder and hip flexion, and adduction; 3) shoulder protraction, hands near face; 4) neutral alignment of ankles and hips; 5) neutral alignment of head and neck whenever possible; 6) the use of swaddling or nesting to provide boundaries; 7) enhance cognitive and motor development [13].

Developmental care is given to neonates to achieve an optimal level of development, thereby reducing baby stress, conserving energy, accelerating recovery, preventing normal ab posture, and increasing the role of the parents. Care in the form of pain management, KMC, positioning, clustered care, bonding, FCC, and environmental management [14,15].

Growth and development are a process that humans experience in their lives that occurs starting from conception and lasts continuously until death. A person's ability to pass through these phases is individualized and can affect the level of health status. Growth is defined as an increase in the number and size of cells in all parts of the body that can be quantitatively measured/observed. It is also interpreted as a change in the basis, number, size, and dimensions of cells, organs, and individuals that can be measured by weight (gr, kg, and pounds), length (cm, m), age, and metabolic strength [14,16]. Growth is an increase in the weight or size of all or part of an organism. Growth occurs from the embryonic, fetal, and fetal periods during the womb and will continue after the individual is born [17,18].

Development is the gradual improvement of the maturation function of individuals from simple to more complex [19,20]. Development is characterized by the growth of more complex body structures and function capabilities in an orderly and predictable pattern as a result of maturation. Here it also concerns the differentiation process of body cells, body tissues, organs, and organ systems that develop in such a way that each of them can fulfill its function. Development can be interpreted as a progressive and continuous change in the organism from birth to death. Development is also defined as a change experienced by an individual/organism towards its level of maturity or maturity (maturation) which takes place systematically, progressively, and continuously, both physically and psychologically/spiritually. Child development includes motor, sensory, social, language, cognitive, and manipulative development [14,21].

In general, the ages according to the stages of growth and development are infants (0-1 years), toddlers (1-5 years), school age, adolescents, early adults, adults, old adults, and the elderly. In the stages of growth and development in infancy at 1 year old, psychological development is interrelated with physical development. The infant gets satisfaction and a sense of security that their need is satisfied from contact with his mother. In early childhood (18 months–5 years), the child's horizon expands where increased body control allows for the development of body control allows for the development of many physical skills [22,23].

Factors that affect development and growth include heredity/genetics (heredity/inheritance). Hereditary factors include gender, race, and nationality. Heredity is the first factor that affects individual development. Heredity is defined as the totality of individual characteristics that are inherited by parents to children or all potentials, both physical and psychological, that are possessed by individuals since the time of conception as inheritors from the time of parents through genes. The innate nature of a fertilized ovum depends on the characteristics found in the chromosomes of sperm and ovum [24,25].

Genetic function during cell growth is influenced by genes that are present continuously during the growth

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period in a specific sequence. An increase in growth rate depends on the production of enzymes involved in protein synthesis. Traits that are passed down from parents to their children are structural traits, not behaviors acquired as a result of learning or experience [25,26].

Environmental factors as the overall physical or social phenomenon (event, situation, condition) that affect or are influenced by individual development. The influencing environmental factors are the prenatal environment during pregnancy, the external environment (family culture and society, socioeconomic status, weather climate, the position of the child in the family, sports/physical exercise), and the child's internal environment (intelligence, hormonal, and emotional). Other environmental factors that interfere with growth include infections, infestations of parasites and instigators by various foreign substances as well as medications taken by breastfeeding mothers [27,28].

The socioeconomic status of the family can affect the growth and development of children because it can affect the quality of nutrition, living conditions, and parents' attitudes. Family factors that affect children's growth and development are family function, and children's parental relationship patterns (parents' attitudes or treatment of children and social classes and economic status) [29,30].

The prenatal environment includes nutritional, mechanical, chemical, endocrine, radiation, infection, stress, and immunity. The post-natal environment includes 1) Biological (race, ethnicity, gender, age, nutrition, health care, chronic diseases, susceptibility to disease, metabolic function, hormones); 2) Physical (weather, season, environmental sanitation, home condition, radiation); 3) Psychosocial (stimulation, motivation to learn, stress, reasonable rewards/punishments, peer groups, school, love and affection, quality and interaction of children with parents); and 4) Family factors/work customs, obedience to parents, number of siblings, gender in the family, parental personality, customs, norms, religion, urbanization of political life [6,18].

Poor health will suppress general growth although it can more or less improve during the recovery period. Malnutrition can interfere with growth. In the case of feeding high-quality supplementary foods such as milk, it can give rise to higher growth standards in seemingly normal children [31].

Growth disorders often accompany the clinical disease of the endocrine glandula. For example, protein accumulation involves nitrogen retention in the body and affects thyroid hormones, insulin, and androgens so that it interferes with growth. Defects in the function of the arrangement of the main organs will influence growth and development. For example, the central nervous system, cardiovascular and respiratory system, hematopoietic system, genitourinary system, and gastrointestinal organization [32].

External environmental factors include culture, social status, nutrition, deviations from health, sports/activities, and the order of children in the family. Meanwhile, the internal environment includes intelligence, hormones, and emotions. Factors that affect attitudes towards changes in development: 1) Self-appearance. Changes that improve one's self-appearance will be gladly accepted, and lead to a pleasant attitude. Meanwhile, changes that reduce one's appearance will be rejected, and every effort will be made to cover it. 2) Behavior. If the behavioral changes are embarrassing, such as those that occur during puberty and old age, it will affect attitudes towards unpleasant changes. The opposite happens if the changes are pleasing, for example, the helplessness of infancy develops gradually towards independence in childhood. 3) Cultural stereotypes. From the mass media, people learn cultural stereotypes associated with different ages. And that stereotype is used to judge people of those ages. 4) Cultural values. Each culture has certain values that are associated with different ages. Because maximum productivity is associated with youth from young to mid-adulthood which is generally more enjoyable than other ages. 5) Change of role. Attitudes towards people of different ages are greatly influenced by the role they play; and 6) Personal experience [33,34].

2. Objectives

The purpose of this study is to determine the relationship between premature infant management (understanding, service quality, and nurse expectations) to the growth and development of young infants in the perinatology room.

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3. Methods

This study used quantitative and qualitative research methods. The researcher conducted a descriptive analysis of the characteristic variables and variables of premature infant management (understanding, service quality, and nurse expectations) on the growth and development of young infants. The research has been carried out in two hospitals in the Banyumas Regency area. The research was conducted from December 2020 to July 2023.

The population in this study is pediatric nurses in the perinatology room of the Hospital in Banyumas Regency. The sample selection technique uses the total sampling method. The research subjects were 36 nurse respondents and 20 infants from two hospitals. The research data were collected by conducting focus group discussions with nurses about infant care management, education and training facilities, instrument facilities, and prenatal education. The parameter instrument for the understanding of premature baby management consists of room lighting, premature infants' physical factors, premature infants' responses mentoring of high-risk infants, infant nutrition and fluid needs, and advice for mothers. Furthermore, the parameter instrument for the service variable consists of knowledge updates about developmental care, clinical techniques in the neonatology room, emergency neonates, availability of emergency tools, and modern tools in the neonatology room.

Data analysis was carried out qualitatively using the discourse analysis technique. The discourse analysis technique is a systematic technique to analyze messages and manage messages, a tool to analyze the content of behavior or data presented. Discourse analysis is used to examine documents in the form of text, images, symbols, and others [35]. Qualitative data is presented descriptively with themes and categories. This research has obtained ethical clearance with the number of KEPK/UMP/31/I/2023.

4. Results

The results of this study describe the characteristics of the respondents in each variable, namely age, education, and length of work; variables of nurses' understanding, services, and expectations; as well as variables from monitoring the growth and development of premature infants. Intervariable analysis is also presented in the form of quantitative and qualitative data.

1. Respondent characteristics

The characteristics of the respondents in this study are described in the following table.

Table 1. Respondent characteristics

Variables	Frequency (36)	Percentage
Age (years)		
Mean	35,91	
Min-Max	27 – 48	
Education		
S1 Profession	11	31
D3 Nursing	25	69
Length of Service (years)		
Mean	12	
Min-Max	1 – 25	
Understanding of Premature baby management		
Good	27	75

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Enough	9	25
Service		
Good	31	86
Enough	5	14

2. Description of Nurse Expectations

This description is the interview results derived from focus group discussions with nurses in the perinatology room. The focus group discussions were conducted twice per hospital. The description of nurse expectations is presented in the following table. Accompanied by theme and category analysis.

Table 2. Perinatology nurse expectations

It	Description of expectations	Theme	Category
1	Fast and precise service.	Emergency Response Service, decreasing the incidence of cases and deaths	Service
2	Lowering the death rate		
3	Applying theory to practice	Premature baby care is implemented according to SOPs as a measure to minimize complications	
4	Take good care of		
5	Minimize sequels		
6	No complications		
7	Handling according to SOP		
8	Premature baby care training	Adequacy of trained human resources. Structured and specialized routine training	Education and Training Facilities
9	Regular training of knowledge and skills		
10	additional pediatric nurses		
11	Full tools available	Equipment fittings and additions	Instrument Facilities Sufficient
12	Addition of tools and routine materials		
13	Comfortable at work		
14	Addition of neonates resuscitation facilities		
15	Pre-Christmas education	Nurses accompany families to prepare for home care	Prenatal education
16	Baby mothers are more independent		
17	Baby's mother learns the contents of the KIA book		

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18	A wonderful collaboration between nurses and mothers of babies
19	Family assistance in caring for neonates

3. Growth and Development of Premature Babies

The growth and development of premature infants in the perinatology ward were observed in 5 days of monitoring. The description can be seen in the following table.

Table 3. Characteristics of neonates based on age, weight, length of the baby, and breath status

Variables	Frequency	Percentage
Baby's age		
Mean (days)	2	
Min-Max	0-29	
Birth weight		
Mean (gram)	1560	
Min-Max	1025-1940	
Body length		
Mean (cm)	40	
Min-Max	33-44	
Emergency breathing (times/minute)	12	60

Table 4. Monitor your baby's growth

	Day 1	Day 2	Day 3	Day 4	Day 5	Difference
Weight						
Mean (gram)	1549	1533	1522	1524	1518	-31
Min-Max	1030-1940	1035-1930	1040-1885	1060-1900	1065-1910	
Head Circumference						
Mean (cm)	27	27	27	27	27	0
Min-Max	23-31	23-31	22,5-31	22,5-31	22,5-31	
Chest circumference						
Mean (cm)	24	24	24	24	24	0
Min-Max	20-30	20-30	21-30	21-30	20,5-30	

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Fluid requirements						
Mean	146	168	197	221	217	71
Min-Max	96-315	120-315	144-315	156-315	162-315	
Fluid administration						
Mean	143	168	189	218	238	95
Min-Max	60-300	90-320	80-320	140-320	130-320	

Table 5. High-Risk Neonatal Development

Sucking reflex	There was an increase of 14 points for 5 days, meaning there was a change in the condition of the baby's suction reflex. There are still 6 babies who have not changed in five-day monitoring.
Grasp reflex	There was an increase of 8 points for 5 days, meaning that there was a change in the condition of the baby's grasping reflex. There are still 6 babies who have not changed in five-day monitoring.
Asymmetric tonic neck	There was an increase of 9 points for 5 days, meaning that there was a change in the condition of the baby's neck tone reflex. There are still 3 babies who have not changed in five-day monitoring.
Rooting	There was an increase of 10 points for 5 days, meaning that there was a change in the condition of the baby's rooting reflex. There are still 7 babies who have not changed in five-day monitoring.
Stepping	There was an increase of 25 points for 5 days, meaning that there was a change in the condition of the baby's suction reflex. There are still 3 babies who have not changed in five-day monitoring.
Moro	There was an increase of 8 points for 5 days, meaning that there was a change in the condition of the baby's suction reflex. There are still 3 babies who have not changed in five-day monitoring.
Babinski	There was an increase of 14 points for 5 days, meaning there was a change in the condition of the baby's suction reflex. There are still 6 babies who have not changed in five-day monitoring.

5. Discussion

1. Characteristics of Perinatology Room Nurses

The average age of nurses in the perinatology room is 35 years old. Although most of the nurses' higher education is Diploma 3, there are 31% of nurses with a bachelor's degree education, which considered good enough. Wider exposure to knowledge allows for a more varied service based on its evidence. The average length of work is 12 years, which indicates that they are experienced. The shortest experience is one year and the longest is 25 years. Age at a productive age makes it easier to receive information and enthusiasm in the learning process [7,36].

As many as 75% of nurses have a good understanding of caring for premature babies. However, some

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understanding on average is still lacking and some are categorized as adequate. Perinatology room nurses still have an understanding that the room needed must be bright. According to the correct standards, too bright lighting will provide uncomfortable stimulation for the newborn [15]. Another study said that in just 6 months, babies are moving from very limited color detection at birth to more sophisticated color perception that allows them to understand objects and the world around them. There is also evidence that at 6 months of age, babies can perceive color dimensions and categorize them, and at least have a basic mechanism to keep color constant despite variations in lighting. In addition, a baby's sensitivity to color is related to the statistical regularity of colors in natural landscapes. We illustrate the contribution of these findings to understanding the development of perceptual skills such as discrimination, categorization, and constancy [37]. Thus, the room should not be too bright. If it is necessary to assist with nursing actions, then use the Action light.

The understanding that is considered sufficient is that the statement of the type of object with monochrome color can be used as a visual stimulation medium. This is true, but it turns out that many do not have this understanding. The next statement of understanding that is considered sufficient is that the patient's sensory response can be known by facial expressions. A similar pattern of responses is seen immediately after birth within hours and days after birth, young babies react as expected to pleasant and unpleasant sensory stimuli [38–41]. Some of these facts show that nurses do not understand developmental care properly.

The services of perinatology nurses are good, but there are still 14% of nurses whose services are sufficient. This means that assistance is still needed in providing services to high-risk babies. The service that is considered prohibited is the statement "The officer maintains a good relationship with the patient's family by inviting parents to visit the baby intensively". This creates a dilemma for nurses between service conflicts and the risk of nosocomial infections. Better management is needed when arranging the arrival of the patient's family. More frequent parental visits to babies in the NICU will reduce baby stressors [42]. The statement that is judged to be adequate service is that the nurse allows the use of baby bottles or pacifiers. This will make it difficult for mothers to give their breast milk to their babies because of the frequent occurrence of confusion about putting.

2. Growth and Development of High-Risk Neonates

The youngest baby is 0 days old or can be said to be a newborn as much as 5%. The oldest baby is 29 days old because it was born very low which is 1025 grams. The treatment resulted in a weight gain of 45 grams. The average is 2 days and is dominated by babies aged 1 day. There are 3 pairs of twins. Newborns with a lower weight or below normal birth weight are at greater risk of emergency. Proper treatment will increase weight according to the portion, which means better absorption of the mostly immature intestines (Daneshzad et al., 2020; Hendrawati et al., 2020). The average birth weight of a baby is 1560 grams or is included in the category of very low birth weight (BBLSR). Even the heaviest birth weight of 1940 grams, is still included in the BBLR category. Normally, babies are born with a body weight of 2500 grams. The baby's weight drops slightly after birth up to 50 grams, so the addition in 5 days only has an average difference of 45 grams.

There is no increase in the size of the head circumference and chest circumference in the 5 (five) day monitoring. This means that there is no greater risk of hydrocephalus or others. It is good if there is no increase in the size of the head circumference and chest circumference. Although 60% experienced respiratory distress, it was resolved. Neonate anthropometry measurements are carried out daily to determine the baby's growth status and absorption of nutrients given, errors in service and monitoring will have an impact on the baby's growth and development [43,44].

The fluid needs showed good progress, there was an increase in the average need in 5 days of 71 cc and the provision of additional fluids in five days with an average of 95 cc. Some have metabolic difficulties so the progress of fluid administration decreases because the readiness of the organ to receive fluid input has not matured. In general, there is an increase in the improvement of the condition of premature babies who are treated. Increased intestinal absorption increases gastrointestinal readiness to receive nutritional inputs [45,46].

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Primitive reflexes have a tendency to improve. Some did not improve within five days due to more severe cases and respiratory distress, thus still relying on CPAP. The primitive reflex gradually became better over the next two months. A combined examination of primitive reflexes and postural reactions should be considered by a pediatric neurologist, as a simple yet predictive screening test for early identification of infants at risk of developing Cerebral Palsy. This is quick and easy to do, both in non-hospital settings and in underdeveloped countries, where certain time and resources are limited. Combined screening is also useful in developed countries because many developmental disorders such as Cerebral Palsy appear in groups that are not at risk while other disorders are not detected by metabolic screening programs. The more abnormal the reflexes, the less likely it is to reach the assessment deadline. Qualitatively, in each case, it is a better predictor of milestones than any reflex, except for walking, where the Babinski reflex is highly predictable. However, in terms of summation, the qualitative assessment still occupies the second and third positions in the prone and supine positions. The occurrence of the Babinski reflex at the age of 3 months has an impact on the achievement of sitting and walking functions. Galant's abnormal reflexes are strongly related to the failure to crawl on time. At the same time, a high-quality score at the age of 3 months guarantees the development of crawling, sitting, and walking on time [47,48].

3. Understanding and Service to the Growth and Development of High-Risk Neonates

The understanding and service of nurses in the perinatology room are on average good, so the implementation of premature baby care tends to be better. Hospitals have standards for nurses and health workers who are on duty in high-risk infant care rooms. Special training stages are programmed in stages [49]. A better work environment is associated with a higher likelihood of nurses reporting poor quality, safety, and outcomes. Improving the work environment may be a promising strategy to achieve a safer environment for at-risk newborns [50]. However, it is necessary to update the science related to developmental care and clinical techniques in the neonatology room, especially those that are emergency.

The need for modern digital and electrical equipment, specific to the emergency needs of neonates is needed by the nurses on duty. The addition and update of the latest tools will help improve service in the room [51].

Limitations of the Study

The tight schedules of perinatology nurses across various shifts complicated interview arrangements. To manage this, we opted for focus group discussions held at two convenient times, morning and afternoon, to ensure the interviews could be conducted smoothly.

Conclusion and Recommendation

This study concludes that most nurses have a good understanding. However, it still needs additional knowledge related to developmental care. The need for supporting tools and materials is also expected to improve the quality of service. Neonates are at high-risk, especially premature babies receive good service and achieve improved conditions. Some babies have not improved due to a bad start with several disorders such as BBLSR and respiratory disorders that require the use of CPAP.

Contributions to science are recommended by providing input on the need for advanced training for senior nurses and gradual training for junior nurses, to improve the quality of understanding of the care of premature babies. Management should provide more complete and up to date, equipment that supports emergency services.

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References

(1) Fenn, B.; Myatt, M.; Mates, E.; Black, R. E.; Wilkinson, C.; Khara, T. Effects on Child Growth of a Reduction in the General Food Distribution Ration and Provision of Small-

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JCHR (2025) 15(5), 687-699 | ISSN:2251-6727

Quantity Lipid-Based Nutrient Supplements in Refugee Camps in Eastern Chad. *BMJ Nutr. Prev. Heal.* **2021**, *4* (1), 235–242. https://doi.org/10.1136/bmjnph-2021-000292.

(2) Dimitrova, A.; Bora, J. K. Monsoon Weather and Early Childhood Health in India. *PLoS One* **2020**, *15* (4). https://doi.org/10.1371/journal.pone.0231479.

(3) Bradford, J.; Beck, K.; Nshimyiryo, A.; Wilson, K.; Mutaganzwa, C.; Havugarurema, S.; Ngamije, P.; Uwamahoro, A.; Kirk, C. M. Nutritional Evaluation and Growth of Infants in a Rwandan Neonatal Follow-up Clinic. *Matern. Child Nutr.* **2020**, *16* (4). https://doi.org/10.1111/mcn.13026.

(4) Amegbor, P. M.; Yankey, O.; Sabel, C. E. Examining the Effect of Geographic Region of Residence on Childhood Malnutrition in Uganda. *J. Trop. Pediatr.* **2020**, *66* (6), 598–611. https://doi.org/10.1093/tropej/fmaa019.

(5) Shirley, M. K.; Cole, T. J.; Arthurs, O. J.; Clark, C. A.; Wells, J. C. K. Developmental Origins of Variability in Pelvic Dimensions: Evidence from Nulliparous South Asian Women in the United Kingdom. *Am. J. Hum. Biol.* **2020**, *32* (2). https://doi.org/10.1002/ajhb.23340.

(6) Govender, L.; Pillay, K.; Siwela, M.; Modi, A. T.; Mabhaudhi, T. Assessment of the Nutritional Status of Four Selected Rural Communities in Kwazulu-Natal, South Africa. *Nutrients* **2021**, *13* (9). https://doi.org/10.3390/nu13092920.

(7) Solikhah, U.; Nurjannah, S.; Supriyadi. Therapeutic Intervention of Respiratory Tract Cases in Children. *Indian J. Public Heal. Res. Dev.* **2019**, *10* (9), 1916–1921. https://doi.org/10.5958/0976-5506.2019.02736.0.

(8) Marni, M.; Abdullah, A. Z.; Thaha, R. M.; Hidayanty, H.; Sirajuddin, S.; Razak, A.; Stang, S.; Liliweri, A. Cultural Communication Strategies of Behavioral Changes in Accelerating of Stunting Prevention: A Systematic Review. *Open Access Maced. J. Med. Sci.* **2021**, *9*, 447–452. https://doi.org/10.3889/oamjms.2021.7019.

(9) Anitha, S.; Muzanila, Y.; Tsusaka, T. W.; Kachulu, L.; Kumwenda, N.; Musoke, M.; Swai, E.; Shija, J.; Siambi, M.; Monyo, E. S.; Bekunda, M.; Okori, P. Reducing Child Undernutrition through Dietary Diversification, Reduced Aflatoxin Exposure, and Improved Hygiene Practices: The Immediate Impacts in Central Tanzania. *Ecol. Food Nutr.* **2020**, *59* (3), 243–262. https://doi.org/10.1080/03670244.2019.1691000.

(10) Gonete, A. T.; Kassahun, B.; Mekonnen, E. G.; Takele, W. W. Stunting at Birth and Associated Factors among Newborns Delivered at the University of Gondar Comprehensive Specialized Referral Hospital. *PLoS One* **2021**, *16* (1 January). https://doi.org/10.1371/journal.pone.0245528.

(11) Daneshzad, E.; Moradi, M.; Maracy, M. R.; Brett, N. R.; Bellissimo, N.; Azadbakht, L. The Association of Maternal Plant-Based Diets and the Growth of Breastfed Infants. *Heal. Promot. Perspect.* **2020**, *10* (2), 152–161. https://doi.org/10.34172/hpp.2020.25.

(12) Broadbent, E.; McConkie, M.; Aleson, E.; Kim, L.; Stewart, R.; Mulokozi, G.; Dearden, K. A.; Linehan, M.; Cherian, D.; Torres, S.; Crookston, B. T.; Hall, P. C.; West, J. H. Promoting Caregiver Early Childhood Development Behaviors through Social and Behavioral Change Communication Program in Tanzania. *Int. J. Environ. Res. Public Health* **2022**, *19* (9). https://doi.org/10.3390/ijerph19095149.

(13) Aryeetey, R.; Dykes, F. Global Implications of the New WHO and UNICEF Implementation Guidance on the Revised Baby-Friendly Hospital Initiative. *Matern. Child Nutr.* **2018**, *14* (3), 1–4. https://doi.org/10.1111/mcn.12637.

(14) Brander, R. L.; Pavlinac, P. B.; Walson, J. L.; John-Stewart, G. C.; Weaver, M. R.; Faruque, A. S. G.; Zaidi, A. K. M.; Sur, D.; Sow, S. O.; Hossain, M. J.; Alonso, P. L.; Breiman, R. F.; Nasrin, D.; Nataro, J. P.; Levine, M. M.; Kotloff, K. L. Determinants of Linear Growth Faltering

among Children with Moderate-to-Severe Diarrhea in the Global Enteric Multicenter Study. *BMC Med.* **2019**, *17* (1). https://doi.org/10.1186/s12916-019-1441-3.

(15) Masuke, R.; Msuya, S. E.; Mahande, J. M.; Diarz, E. J.; Stray-Pedersen, B.; Jahanpour, O.; Mgongo, M. Effect of Inappropriate Complementary Feeding Practices on the Nutritional Status of Children Aged 6-24 Months in Urban Moshi, Northern Tanzania: Cohort Study. *PLoS One* **2021**, *16* (5 May). https://doi.org/10.1371/journal.pone.0250562.

(16) Miyazaki, A.; Matsui, M.; Tung, R.; Taing, B.; White, L. V; Iwamoto, A.; Cox, S. E. Determinants of Growth Measurements in Rural Cambodian Infants: A Cross-Sectional Study. *Int. Health* **2021**, *13* (1), 49–56. https://doi.org/10.1093/inthealth/ihaa018.

(17) Berhe, K.; Gebremariam, G. Magnitude and Associated Factors of Undernutrition (Underweight and Stunting) among School Adolescent Girls in Hawzen Woreda (District), Tigray Regional State, Northern Ethiopia: Cross-Sectional Study. *BMC Res. Notes* **2020**, *13* (1). https://doi.org/10.1186/s13104-020-4926-4.

(18) Kundu, R. N.; Hossain, M. G.; Haque, M. A.; Biswas, S.; Huq, M. M.; Pasa, M. K.; Sabiruzzaman, M.; Bharati, P. Factor Associated with Anthropometric Failure among Under-Five Bengali Children: A Comparative Study between Bangladesh and India. *PLoS One* **2022**, *17* (8 August). https://doi.org/10.1371/journal.pone.0272634.

(19) Gayawan, E.; Orunmoluyi, O. S.; Adegboye, O. A. Geostatistical Patterns of Comorbidity of Diarrhea, Acute Respiratory Infection, and Stunting among under-Five Children in Nigeria. *Math. Popul. Stud.* **2022**, *29* (2), 58–72. https://doi.org/10.1080/08898480.2021.1942654.

(20) Mburu, W.; Conroy, A. L.; Cusick, S. E.; Bangirana, P.; Bond, C.; Zhao, Y.; Opoka, R. O.; John, C. C. The Impact of Undernutrition on Cognition in Children with Severe Malaria and Community Children: A Prospective 2-Year Cohort Study. *J. Trop. Pediatr.* **2021**, *67* (5). https://doi.org/10.1093/tropej/fmab091.

(21) Huang, P.; Zhang, L.; Tang, L.; Ren, Y.; Peng, H.; Xiong, J.; Liu, L.; Xu, J.; Xiao, Y.; Li, J.; Mao, D.; Liu, L. Analysis of Clinical and Genetic Characterization of Three Ataxia–Telangiectasia Pedigrees With Novel ATM Gene Mutations. *Front. Pediatr.* **2022**, *10*. https://doi.org/10.3389/fped.2022.877826.

(22) Tafasa, S. M.; Tura, M. R.; Mulu, E.; Begna, Z. Undernutrition and Its Associated Factors among School Adolescent Girls in Abuna Gindeberet District, Central Ethiopia: A Cross-Sectional Study. *BMC Nutr.* **2022**, *8* (1). https://doi.org/10.1186/s40795-022-00587-8.

(23) Amarasinghe, U. S.; Pauly, D. The Relationship between Size at Maturity and Maximum Size in Cichlid Populations Corroborates the Gill-Oxygen Limitation Theory (Golt). *Asian Fish. Sci.* **2021**, *34* (1), 14–22. https://doi.org/10.33997/j.afs.2021.34.1.002.

(24) Haberman, Y.; Iqbal, N. T.; Ghandikota, S.; Mallawaarachchi, I.; Braun, T.; Dexheimer, P. J.; Rahman, N.; Hadar, R.; Sadiq, K.; Ahmad, Z.; Idress, R.; Iqbal, J.; Ahmed, S.; Hotwani, A.; Umrani, F.; Ehsan, L.; Medlock, G.; Syed, S.; Moskaluk, C.; Ma, J. Z.; Jegga, A. G.; Moore, S. R.; Ali, S. A.; Denson, L. A. Mucosal Genomics Implicate Lymphocyte Activation and Lipid Metabolism in Refractory Environmental Enteric Dysfunction. *Gastroenterology* **2021**, *160* (6), 2055-2071.e0. https://doi.org/10.1053/j.gastro.2021.01.221.

(25) Ssentongo, P.; Ssentongo, A. E.; Ba, D. M.; Ericson, J. E.; Na, M.; Gao, X.; Fronterre, C.; Chinchilli, V. M.; Schiff, S. J. Global, Regional and National Epidemiology and Prevalence of Child Stunting, Wasting and Underweight in Low- and Middle-Income Countries, 2006–2018. *Sci. Rep.* **2021**, *11* (1). https://doi.org/10.1038/s41598-021-84302-w.

(26) Hackman, J. V; Hruschka, D. J. Disentangling Basal and Accrued Height-for-Age for Cross-Population Comparisons. *Am. J. Phys. Anthropol.* **2020**, *171* (3), 481–495.

https://doi.org/10.1002/ajpa.23990.

(27) Solikhah, U.; Chakim, S.; Handayani, D. Y. Promotion Media for Children's Health: Applicable Study of Management Child Illness. *Open Access Maced. J. Med. Sci.* **2021**, *9* (T4), 141–145. https://doi.org/10.3889/oamjms.2021.5859.

(28) Safitri, H.; Solikhah, U. Hubungan Antara Dukungan Sosial Dengan Kemampuan Interaksi Sosial Anak Berkebu_tuhan Khusus Di SLB C Yakut Purwokerto. *J. Keperawatan Muhammadiyah* **2020**, No. September, 302–310.

(29) Handiso, Y. H.; Belachew, T.; Abuye, C.; Workicho, A.; Baye, K. Undernutrition and Its Determinants among Adolescent Girls in Low Land Area of Southern Ethiopia. *PLoS One* **2021**, *16* (1 January). https://doi.org/10.1371/journal.pone.0240677.

(30) Aheto, J. M. K. Simultaneous Quantile Regression and Determinants of Under-Five Severe Chronic Malnutrition in Ghana. *BMC Public Health* **2020**, *20* (1). https://doi.org/10.1186/s12889-020-08782-7.

(31) Trübswasser, U.; Candel, J.; Genye, T.; Bossuyt, A.; Holdsworth, M.; Baye, K.; Talsma, E. Benchmarking Policy Goals and Actions for Healthy Food Environments in Ethiopia to Prevent Malnutrition in All Its Forms Using Document Analysis. *BMJ Open* **2022**, *12* (8). https://doi.org/10.1136/bmjopen-2021-058480.

(32) Hamed, A.; Hegab, A.; Roshdy, E. Prevalence and Factors Associated with Stunting among School Children in Egypt . *East. Mediterr. Heal. J.* **2020**, *26* (7), 787–793. https://doi.org/10.26719/emhj.20.047.

(33) Fithra, H.; Siska, D. The Correlation between Environmental Sanitation and Stunting Case in Pidie District. *Int. J. Adv. Sci. Eng. Inf. Technol.* **2020**, *10* (3), 1214–1220. https://doi.org/10.18517/ijaseit.10.3.11445.

(34) Krumpálová, Z.; Hujo, L.; Miklánek, F.; David, S. External Abnormalities and Body Deformities of Noble Crayfish (Malacostraca, Astacidae: Astacus Astacus) of West Carpathian Massive (Slovakia): Possible Causes for This Phenomenon. *Ekol. Bratislava* **2022**, *41* (4), 351–360. https://doi.org/10.2478/eko-2022-0036.

(35) Saul McLeod. Introducing Discourse Analysis for Qualitative Research. *Simply Psychol.* **2024**. https://doi.org/10.13140/RG.2.2.15391.57762.

(36) Santosa, A.; Arif, E. N.; Ghoni, D. A. Effect of Maternal and Child Factors on Stunting: Partial Least Squares Structural Equation Modeling. *Clin. Exp. Pediatr.* **2022**, *65* (2), 90–97. https://doi.org/10.3345/cep.2021.00094.

(37) Skelton, A. E.; Maule, J.; Franklin, A. Infant Color Perception: Insight into Perceptual Development. *Child Dev. Perspect.* **2022**, *16* (2), 90–95. https://doi.org/10.1111/cdep.12447.

(38) Lipchock, S. V.; Reed, D. R.; Mennella, J. A. The Gustatory and Olfactory Systems During Infancy: Implications for Development of Feeding Behaviors in the High-Risk Neonate. *Clin. Perinatol.* **2011**, *38* (4), 627–641. https://doi.org/10.1016/j.clp.2011.08.008.

(39) Siswati, T.; Iskandar, S.; Pramestuti, N.; Raharjo, J.; Rialihanto, M. P.; Rubaya, A. K.; Wiratama, B. S. Effect of a Short Course on Improving the Cadres' Knowledge in the Context of Reducing Stunting through Home Visits in Yogyakarta, Indonesia. *Int. J. Environ. Res. Public Health* **2022**, *19* (16). https://doi.org/10.3390/ijerph19169843.

(40) Hendrawati, S.; Adistie, F.; Maryam, N. N. A. Effectiveness Of Developmental Care On Physiological Functions' Low Birth Weight Babies: A Literature Review. *Indones. Contemp. Nurs. J.* **2020**, *4* (2), 52–63.

(41) Mediani, H. S.; Hendrawati, S.; Pahria, T.; Mediawati, A. S.; Suryani, M. Factors Affecting the Knowledge and Motivation of Health Cadres in Stunting Prevention Among Children in Indonesia. *J. Multidiscip. Healthc.* **2022**, *15*, 1069–1082. https://doi.org/10.2147/JMDH.S356736.

(42) Venable, E.; Discepolo, D.; Powell, E.; Liang, S. Y. 乳鼠心肌提取 HHS Public Access. *J. Vet.*

Behav. Clin. Appl. Res. **2017**, *21* (1), 53–58. https://doi.org/10.1038/jp.2011.144.The.

(43) Wondemagegn, A. T.; Mulu, A. Effects of Nutritional Status on Neurodevelopment of Children Aged Under Five Years in East Gojjam, Northwest Ethiopia, 2021: A Community-Based Study. *Int. J. Gen. Med.* **2022**, *15*, 5533–5545. https://doi.org/10.2147/IJGM.S369408.

(44) Beckmann, J.; Nqweniso, S.; Ludyga, S.; Randt, R. D.; Gresse, A.; Long, K. Z.; Nienaber, M.; Seelig, H.; Pühse, U.; Steinmann, P.; Utzinger, J.; Walter, C.; Gerber, M.; Lang, C. Evaluation of a Physical Activity and Multi-Micronutrient Intervention on Cognitive and Academic Performance in South African Primary Schoolchildren. *Nutrients* **2022**, *14* (13). https://doi.org/10.3390/nu14132609.

(45) Das, R.; Haque, M. A.; Chisti, M. J.; Ahmed, T.; Faruque, A. S. G. Nontyphoidal Salmonella among Children under 5 Years Old in Sub-Saharan Africa and South Asia in the Global Enteric Multicenter Study. *Am. J. Trop. Med. Hyg.* **2022**, *106* (2), 504–512. https://doi.org/10.4269/ajtmh.21-0762.

(46) Alam, M. A.; Richard, S. A.; Fahim, S. M.; Mahfuz, M.; Nahar, B.; Das, S.; Shrestha, B.; Koshy, B.; Mduma, E.; Seidman, J. C.; Murray-Kolb, L. E.; Caulfield, L. E.; Ahmed, T. Impact of Early-Onset Persistent Stunting on Cognitive Development at 5 Years of Age: Results from a Multi-Country Cohort Study. *PLoS One* **2020**, *15* (1). https://doi.org/10.1371/journal.pone.0227839.

(47) Wang, J.; Yu, Q.; Ma, X.; Yuan, Z.; Mao, J. Hutchinson-Gilford Progeria Syndrome Complicated with Stroke: A Report of 2 Cases and Literature Review. *Front. Pediatr.* **2022**, *10*. https://doi.org/10.3389/fped.2022.1056225.

(48) Surowińska, J.; Sobieska, M.; Gajewska, E. Qualitative Assessment in the Third Month of Life Allows for a Better Prognosis of the Achievement of Motor Milestones versus Assessment of Pathological Reflexes-Prospective Studies on Polish Children. *Front. Public Heal.* **2023**, *11*. https://doi.org/10.3389/fpubh.2023.1253137.

(49) Bauleni, A.; Tiruneh, F. N.; Mwenyenkulu, T. E.; Nkoka, O.; Chirwa, G. C.; Gowelo, S.; Chipeta, M. G.; Ntenda, P. A. M. Effects of Deworming Medication on Anaemia among Children Aged 6–59 Months in Sub-Saharan Africa. *Parasites and Vectors* **2022**, *15* (1). https://doi.org/10.1186/s13071-021-05123-4.

(50) Lake, E. T.; Hallowell, S. G.; Kutney-Lee, A.; Hatfield, L. A.; Del Guidice, M.; Boxer, B. A.; Ellis, L. N.; Verica, L.; Aiken, L. H. Higher Quality of Care and Patient Safety Associated With Better NICU Work Environments. *J. Nurs. Care Qual.* **2016**, *31* (1), 24–32. https://doi.org/10.1097/NCQ.0000000000000146.

(51) Fahim, S. M.; Islam, M. R.; Rasul, M. G.; Raihan, M. J.; Ali, N. M.; Bulbul, M. M. I.; Ahmed, T. A Qualitative Assessment of Facility Readiness and Barriers to the Facility-Based Management of Childhood Severe Acute Malnutrition in the Public Healthcare Settings in Bangladesh. *Public Health Nutr.* **2022**, *25* (11), 2971–2982. https://doi.org/10.1017/S1368980022002014.