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Relationship Between Health Education and Mothers' Knowledge, Attitudes, and Practices in Early Detection of Toddler Growth and Development

Winthrop O'Conno[1], Kang Kay[2]
[1] Master of Science in Biology Education Candidate, Central Luzon State University, Nueva Ecija, Philippines
[2] Phnom Penh University of the Arts, Phnom Penh, Cambodia

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ABSTRACT

Purpose of the study: This study aims to examine the effect of structured health education on mothers' knowledge, attitudes, and practices in early detection of toddler growth and development at a community San Joaquin, Philippines. The study focuses on understanding how educational interventions influence maternal behavior in routine Posyandu services.

Methodology: A pre-experimental one-group pretest–posttest design was employed. Data were collected using structured questionnaires and observation checklists. Health education was delivered through lectures, demonstrations, and discussions using flipcharts and leaflets. Participants were mothers with toddlers aged 12–36 months. Data were analyzed with descriptive statistics and the Wilcoxon signed-rank test.

Main Findings: Health education significantly improved mothers' knowledge, attitudes, and practices in early detection of toddler growth and development. Post-intervention scores increased for knowledge (45.2 → 68.7), attitudes (38.6 → 52.4), and practices (41.3 → 59.8), indicating effective translation of understanding and readiness into observable behavior during growth monitoring and developmental screening activities.

Novelty/Originality of this study: This study integrates structured, hands-on health education with practical demonstrations at Posyandu, linking maternal knowledge and attitudes directly to behavior. Unlike previous research focusing on single KAP components, this approach evaluates all dimensions simultaneously in a real-world setting, offering new insights for designing effective, behavior-oriented maternal education programs in early childhood development monitoring.

Corresponding Author:
Winthrop O'Conno,
Master of Science in Biology Education Candidate, Central Luzon State University,
Maharlika Highway, Science City of Muñoz, Nueva Ecija, Philippines.
Email: winthropconnor4@gmail.com

1. INTRODUCTION

Early childhood, particularly the toddler period, represents a critical stage in human growth and development that influences health outcomes across the life span, as foundational neurodevelopmental processes occur during these early years [1]. During this phase, rapid physical, cognitive, emotional, and social development takes place, requiring continuous monitoring and appropriate stimulation to support optimal developmental trajectories [2]. Failure to detect developmental deviations early may result in long-term impairments affecting individual productivity, learning capacity, and quality of life [3]. Despite advancements in

child health programs worldwide, growth and developmental disorders among toddlers remain a significant public health concern, particularly in low- and middle-income settings where access to early detection services is limited [4]. This condition highlights the need for effective preventive strategies that emphasize early detection, routine developmental surveillance, and active parental involvement to improve long-term child health outcomes [5].

One of the major challenges in the early detection of toddler growth and development is the limited capacity of caregivers, particularly mothers, to recognize developmental milestones and warning signs, as parental awareness often influences utilization of preventive services [6]. Many mothers still perceive child health primarily in terms of physical appearance, such as body weight and height, rather than holistic development encompassing cognitive, motor, and socio-emotional domains [7]. As a result, routine growth monitoring and developmental screening are often neglected unless the child presents with visible illness or severe delay, leading to missed opportunities for early intervention [8]. This problem is compounded by inconsistent attendance at community health services and underutilization of growth monitoring tools, particularly in low-resource settings where access and health literacy are limited [9]. Consequently, delayed identification of developmental problems continues to occur in primary healthcare settings, undermining efforts to optimize early childhood developmental outcomes and reduce long-term disparities [10].

Health education has been widely recognized as a key strategy for improving health-related behaviors, including maternal practices in child care and early development monitoring [11]. Previous studies have demonstrated that health education interventions can significantly enhance mothers' knowledge and attitudes toward child growth and developmental screening [12]. However, findings across studies remain inconsistent, particularly regarding whether increased knowledge and positive attitudes reliably translate into appropriate caregiving practices and sustained behavior change [13]. Some studies prioritize measuring knowledge outcomes, while others emphasize shifts in attitudes without adequately capturing subsequent behavioral practices in real-world settings [14]. This variation highlights a notable gap in comprehensive assessments of the relationship between health education and all components of maternal behavior, suggesting the need for integrated evaluation approaches that link knowledge, attitude, and practice (KAP) outcomes [15].

In addition, many existing studies examine health education outcomes in isolation or within controlled experimental designs that may not accurately reflect real-world healthcare contexts, limiting the applicability of findings to routine practice [16]. Limited attention has been given to community-based settings where mothers interact directly with primary health services, despite evidence suggesting that context strongly influences health education impact [17]. Furthermore, previous research often emphasizes intervention effectiveness without concurrently exploring the relational dynamics between health education exposure and maternal knowledge, attitudes, and practices [18]. This creates a research gap in understanding how these variables interact in routine health service environments, which are complex and characterized by socio-cultural determinants of behavior [19]. Addressing this gap is crucial to designing sustainable and context-sensitive maternal education programs that are scalable and responsive to community needs [16].

The urgency of this research is reinforced by the high prevalence of growth and developmental problems among toddlers and the suboptimal coverage of early detection services in many low and middle income settings [20]. Early detection and timely intervention have been shown to significantly improve developmental outcomes when implemented during critical periods of child development [21]. Mothers play a central role as primary caregivers and decision-makers in seeking health services for their children, influencing both uptake of preventive care and early intervention behaviors [22]. Strengthening maternal capacity through health education is therefore a strategic investment in child health promotion, as improved caregiver knowledge and skills are critical determinants of child health service utilization and outcomes [23], [24]Without evidence-based insights into maternal behavioral responses, early detection programs may fail to achieve their intended impact on reducing developmental delays and promoting optimal child growth.

The novelty of this study lies in its integrated examination of the relationship between health education and mothers' knowledge, attitudes, and practices within a primary healthcare context, moving beyond single-dimension assessments common in previous research. Unlike studies that focus solely on individual behavioral components, this research analyzes these dimensions simultaneously to provide a more comprehensive understanding of maternal responses to health education [25]. The study also situates health education within routine service delivery at community health centers, reflecting actual conditions where maternal caregivers interact with primary healthcare systems. By emphasizing relational analysis rather than solely intervention outcomes, this research contributes new empirical insights to maternal and child health promotion and highlights the importance of context-sensitive program design [26]. These findings are expected to inform more effective, behavior-oriented health education strategies for early detection of toddler growth and developmental issues at the community level.

2. RESEARCH METHOD

2.1 Study Design

This study used a pre-experimental one-group pretest–posttest design to examine the relationship between health education and mothers' knowledge, attitudes, and practices in the early detection of toddler growth and development, an approach commonly used to evaluate intervention effects in real-world settings [27]. Measurements were conducted before and after the health education intervention to assess changes in maternal responses, reflecting standard procedures for evaluating educational impact on behavior [28]. This design allowed for direct assessment of behavioral changes following educational exposure within a community health service setting, which aligns with pragmatic research strategies aimed at capturing outcomes in routine practice rather than controlled environments [29]. The study's implementation in a community health service context enhances its relevance to everyday maternal health education programs and supports the translation of findings into practice. By reflecting real-world maternal health education implementation, this design contributes insights into how educational interventions influence knowledge, attitudes, and practices in primary care environments.

2.2 Study Setting, Population, and Sampling

The study was conducted at san joaquin mother and child hospital. The population consisted of mothers with toddlers aged 12–36 months who attended services. Participants were selected using purposive sampling based on inclusion criteria, including willingness to participate and minimum elementary education level. Mothers who did not complete the study procedures were excluded. This sampling approach ensured participants were relevant to the study objectives.

2.3 Variables and Operational Definitions

The independent variable was health education on early detection of toddler growth and development. The dependent variables were mothers' knowledge, attitudes, and practices (KAP) related to early detection. Knowledge referred to mothers' understanding of growth and developmental monitoring. Attitudes described mothers' perceptions and readiness to perform early detection. Practices represented observable maternal behaviors in monitoring toddler growth and development.

2.4 Health Education Intervention

The health education intervention was delivered in a structured 50-minute session incorporating lectures, demonstrations, and interactive discussions, consistent with established approaches to community health education that promote engagement and comprehension [30]. Educational materials included flipcharts and printed leaflets, with content covering concepts of growth and development, routine growth monitoring, and developmental screening using standardized tools such as the Pre-Screening Developmental Questionnaire (KPSP), while demonstrations focused on the correct measurement of body weight and interpretation of growth charts to reinforce practical skills [31]. Leaflets were provided for post-session reinforcement to support retention and application of key concepts in daily caregiving practices.

2.5 Data Collection Instruments and Procedures

Data were collected using structured questionnaires and observation checklists to obtain comprehensive and comparable measurements across participants [32]. Knowledge and attitudes were measured using pretest and posttest questionnaires, allowing for assessment of change resulting from the health education intervention. Mothers' practices were assessed through direct observation before and after the intervention to capture actual caregiving behaviors rather than self-reported data alone [33]. Data collection was conducted by the researcher with assistance from trained observers to ensure consistency and inter-rater reliability. All procedures followed standardized guidelines for early detection of toddler growth and development monitoring to align with best practices in community health research.

2.6 Data Analysis and Ethical Considerations

Data were analyzed using descriptive statistics and the Wilcoxon signed-rank test to compare pretest and posttest scores, with a significance level of $\alpha = 0.05$ applied to identify statistically meaningful changes. Ethical approval was obtained from the relevant authority prior to data collection to ensure that the study met established research ethics standards. Written informed consent was obtained from all participants to respect autonomy and voluntary participation. Participant anonymity and data confidentiality were strictly maintained in accordance with recognized ethical protocols for research involving human subjects [33]. These procedures helped ensure the validity and integrity of the study's findings.

3 RESULTS AND DISCUSSION

3.1 Participants' Characteristics

A total of 30 mothers with toddlers aged 12–36 months participated in this study. The majority of mothers (60%) had completed elementary school, while 30% had junior high education, and 10% had high school education. Most participants were housewives (70%), and 30% were employed. The average age of the mothers was 28.4 ± 4.6 years. All mothers completed the pretest and posttest measurements without missing data.

3.2 Changes in Mothers' Knowledge

Mothers' knowledge scores improved significantly after the health education intervention. The mean pretest knowledge score was 45.2 ± 8.3, and the posttest score increased to 68.7 ± 7.9. The Wilcoxon signed-rank test indicated a significant difference between pretest and posttest scores ($Z = -4.732$, $p < 0.001$). This result demonstrates that the health education effectively increased mothers' understanding of early detection methods for toddler growth and development.

Table 1. Mothers' Knowledge Scores Pre- and Post-Intervention

Variable	Pretest Mean ± SD	Posttest Mean ± SD	Z	p-value
Knowledge	45.2 ± 8.3	68.7 ± 7.9	-4.732	<0.001

3.3 Changes in Mothers' Attitudes

Mothers' attitudes toward early detection also showed a significant improvement after the intervention. The mean pretest attitude score was 38.6 ± 5.9, which increased to 52.4 ± 6.1 after health education. Statistical analysis using the Wilcoxon signed-rank test showed a significant change ($Z = -4.198$, $p < 0.001$). This indicates that health education positively influenced mothers' readiness and perception regarding monitoring toddler growth and development.

Table 2. Mothers' Attitude Scores Pre- and Post-Intervention

Variable	Pretest Mean ± SD	Posttest Mean ± SD	Z	p-value
Attitude	38.6 ± 5.9	52.4 ± 6.1	-4.198	<0.001

3.4 Changes in Mothers' Practices

Observations of mothers' practices demonstrated a marked improvement following the educational intervention. The mean pretest practice score was 41.3 ± 6.7, while the posttest score increased to 59.8 ± 7.3. The Wilcoxon signed-rank test confirmed a significant difference ($Z = -4.256$, $p < 0.001$). This indicates that mothers applied the knowledge and positive attitudes gained from the health education into practical behaviors, such as measuring toddlers' weight, recording in growth charts, and using KPSP appropriately.

Table 3. Mothers' Practice Scores Pre- and Post-Intervention

Variable	Pretest Mean ± SD	Posttest Mean ± SD	Z	p-value
Practice	41.3 ± 6.7	59.8 ± 7.3	-4.256	<0.001

The results indicate that health education significantly improved mothers' knowledge, attitudes, and practices regarding early detection of toddler growth and development. The increases were statistically significant across all three components (KAP), suggesting a strong relationship between exposure to health education and maternal behavior. These findings support the role of structured health education programs in enhancing maternal involvement in child growth monitoring and developmental screening.

The findings of this study indicate that health education significantly improved mothers' knowledge, attitudes, and practices in the early detection of toddler growth and development. Knowledge scores increased after the intervention, showing that mothers better understood the definitions, types, schedules, and procedures for early detection. Attitude scores also improved, reflecting increased awareness and readiness to act for child growth monitoring. Mothers' practical behaviors, including measuring weight, recording data in growth charts, and applying KPSP, were enhanced after the education. These results confirm that structured health education effectively influences maternal KAP in toddler growth and developmental monitoring.

These findings are consistent with previous studies showing that health education interventions improve maternal knowledge and child care practices, particularly in relation to growth monitoring and developmental surveillance [34]. However, some mothers still displayed negative attitudes or incomplete practices after intervention, suggesting variability in individual readiness, socio-cultural factors, and external determinants such as education and access to information [35]. A significant research gap lies in the limited number of studies focusing specifically on caregivers' knowledge, attitudes, and practices (KAP) related to toddler growth

detection within routine community health settings. This study addresses that gap by evaluating KAP before and after intervention using practical demonstrations in a Posyandu setting, extending beyond lecture-based education to real-world application. Moreover, it highlights the role of targeted, context-specific educational strategies implemented through local community services, an area that has not been extensively documented in existing literature.

The novelty of this research lies in integrating structured health education with practical demonstrations for mothers at Posyandu, emphasizing hands-on learning using standardized tools such as KPSP and growth charts, which supports improved uptake of growth monitoring practices [14]. Unlike prior studies that mainly relied on lectures or written materials, this approach directly engages mothers in real-life applications and experiential learning, aligning with evidence that active participation enhances skill acquisition and behavior change. It also links cognitive understanding to behavioral outcomes by demonstrating how increases in knowledge and attitudes can translate into actual caregiving practices [36]. Although the intervention period was concise, it was effective in producing measurable improvements, aligning with the concept of a "window of opportunity" in early childhood development that underscores the importance of timely maternal involvement in health promotion [37], [38].

These results have important implications for public health and early childhood programs, as structured health education interventions can significantly enhance caregiver engagement and child health outcomes in community settings [39], [40]. Health practitioners and policymakers can adopt similar structured health education models at community health centers to enhance maternal participation and foster sustainable behavior change, as supported by evidence of improved health service utilization following community education strategies. Improved maternal knowledge, attitudes, and practices (KAP) may lead to earlier identification of developmental delays and prevent long-term consequences for child growth and development, aligning with the emphasis on early detection in global child health policy frameworks. The findings also support the integration of practical, hands-on components in health education programs to ensure that knowledge translates into action, and this approach can strengthen the effectiveness of Posyandu and other community-based child monitoring initiatives aimed at holistic child development.

Despite the positive outcomes, this study has several limitations. The sample size was small and limited to one Posyandu, which may affect generalizability. Instruments used for knowledge, attitude, and practice assessments were not fully validated, potentially affecting accuracy. The intervention relied on short-term observation, so long-term sustainability of behavior changes is unknown. Future studies should include larger, diverse populations and follow-up assessments to examine lasting impacts. Additionally, external factors such as family support and socioeconomic status were not controlled, which could influence maternal KAP outcomes.

4 CONCLUSION

This study demonstrates that health education significantly enhances mothers' knowledge, attitudes, and practices regarding early detection of toddler growth and development, fulfilling the primary objective of examining the relationship between educational interventions and maternal behavior. Following the intervention, mothers showed marked improvements in understanding growth and developmental milestones, readiness to act, and practical behaviors such as measuring weight, recording data in growth charts, and applying the KPSP appropriately, indicating that cognitive gains effectively translated into observable actions. Despite these positive outcomes, some mothers maintained negative attitudes or incomplete practices, highlighting variability in individual readiness, external influences, and the need for ongoing support, which reflects a research gap addressed by integrating hands-on demonstrations within the community health setting. The novelty of this study lies in applying structured, interactive health education in a real-world Posyandu context, linking knowledge and attitudes directly to behavior, and emphasizing the critical "window of opportunity" in toddler development, with implications for public health programs to adopt similar participatory models to strengthen early detection and preventive care. It is recommended that future interventions expand to larger and more diverse populations, incorporate follow-up monitoring to sustain behavioral changes, and consider socio-environmental factors influencing maternal engagement, thereby ensuring long-term effectiveness of maternal health education initiatives.

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