

# ผลของโปรแกรมการส่งเสริมพัฒนาการทางภาษาโดยย่า/ยายต่อความรู้ของย่า/ยาย และพัฒนาการทางภาษาในเด็กวัยหัดเดิน

## Effects of Grandmother Language Intervention on Grandmothers' Knowledge and Language Development of Toddlers

นิพนธ์ต้นฉบับ

Original Article

จุฑามาศ ผลมงคล<sup>1</sup>, วรณี เดียวอัครเศรณี<sup>2\*</sup> และ นุจรี ไชยมงคล<sup>3</sup>

<sup>1</sup> คณะพยาบาลศาสตร์ มหาวิทยาลัยพะเยา อ.เมืองพะเยา จ.พะเยา 56000

<sup>2</sup> คณะพยาบาลศาสตร์ มหาวิทยาลัยราชภัฏรำไพพรรณี อ.เมือง จ.จันทบุรี 22000

<sup>3</sup> คณะพยาบาลศาสตร์ มหาวิทยาลัยบูรพา อ.เมืองชลบุรี จ.ชลบุรี 20131

\* Corresponding author: wannee.d@rbru.ac.th

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Jutamass Ponmark<sup>1</sup>, Wannee Deoisres<sup>2\*</sup> and Nujjaree Chaimongkol<sup>3</sup>

<sup>1</sup> School of Nursing, University of Phayao, Muang Phayao, Phayao, 56000, Thailand

<sup>2</sup> Faculty of Nursing, Rambhai Barni Rajabhat University, Muang, Chanthaburi, 22000, Thailand

<sup>3</sup> Faculty of Nursing, Burapha University, Muang Chonburi, Chonburi, 20131, Thailand

\* Corresponding author: wannee.d@rbru.ac.th

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### บทคัดย่อ

**วัตถุประสงค์:** เพื่อประเมินประสิทธิผลของโปรแกรมการส่งเสริมพัฒนาการทางภาษาโดยย่า/ยายต่อความรู้เกี่ยวกับพัฒนาการทางภาษาของย่า/ยาย และพัฒนาการทางภาษาของเด็กวัยหัดเดิน **วิธีการศึกษา:** การวิจัยเชิงทดลองแบบสุ่มและมีกลุ่มควบคุม กลุ่มตัวอย่างเป็นผู้ย่า/ยายและหลานอายุ 12 - 18 เดือน ที่เด็กมาใช้บริการ ณ คลินิกสุขภาพเด็กดี โรงพยาบาลส่งเสริมสุขภาพตำบล ใน 4 อำเภอของ จ.พะเยา จำนวนรวม 34 คู่ แบ่งเป็นกลุ่มทดลอง 17 คู่ และกลุ่มควบคุม 17 คู่ กลุ่มทดลองได้รับโปรแกรมส่งเสริมพัฒนาการทางภาษาโดยย่า/ยาย ดำเนินการรายบุคคล ณ บ้านของตัวอย่าง ดำเนินการ 3 ระยะ คือ 1) ระยะประเมินและให้ความรู้ 2) ระยะพัฒนาทักษะและการกำหนดเป้าหมาย 3) ระยะติดตามและประเมินผล ดำเนินการทั้งหมด 4 ครั้ง ๆ 30 - 90 นาที ห่างกัน 2 วัน ถึง 2 สัปดาห์ วัดความรู้เกี่ยวกับพัฒนาการทางภาษาของย่า/ยายและพัฒนาการทางภาษาของเด็กวัยหัดเดินจำนวน 3 ครั้ง ได้แก่ ก่อน (สัปดาห์ที่ 0) และหลังการทดลอง (สัปดาห์ที่ 5) และระยะติดตาม (สัปดาห์ที่ 9) รวบรวมข้อมูลช่วงเดือนเมษายนถึงสิงหาคม พ.ศ. 2562 วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนา ไควีสแควร์ สถิติทีพิชเชอร์ การทดสอบที่ การวิเคราะห์ความแปรปรวนแบบวัดซ้ำ และการวิเคราะห์ความแปรปรวนร่วม **ผลการศึกษา:** หลังสิ้นสุดโปรแกรม ย่า/ยายกลุ่มทดลองมีคะแนนความรู้เกี่ยวกับพัฒนาการทางภาษา สูงกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ( $P$ -value < 0.05) โดยในกลุ่มทดลองพบคะแนนความรู้เกี่ยวกับพัฒนาการทางภาษาของย่า/ยายในระยะหลังการทดลองและระยะติดตามผลเพิ่มขึ้นจากระยะก่อนการทดลองอย่างมีนัยสำคัญทางสถิติ ( $P$ -value < 0.05) แต่ไม่พบการเพิ่มในกลุ่มควบคุม ส่วนในเด็กนั้น พบว่าคะแนนพัฒนาการทางภาษาของเด็กหลังการทดลองและระยะติดตามระหว่างสองกลุ่มไม่แตกต่างกัน ( $P$ -value > 0.05) **สรุปผล:** โปรแกรมการส่งเสริมพัฒนาการทางภาษาโดยย่า/ยายสามารถเพิ่มความรู้ของย่า/ยายเกี่ยวกับพัฒนาการทางภาษา ซึ่งอาจมีผลต่อพัฒนาการทางภาษาในระยะยาวในเด็กวัยหัดเดิน

**คำสำคัญ:** ย่า/ยาย, โปรแกรมส่งเสริมพัฒนาการทางภาษา, ความรู้เกี่ยวกับพัฒนาการทางภาษา, พัฒนาการทางภาษา, เด็กวัยหัดเดิน

#### Editorial note

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### Abstract

**Objective:** To determine the effectiveness of the Grandmother Language Intervention (GLI) by comparing the scores of grandmothers' knowledge of grandchildren language development and grandchildren's language development. **Methods:** In this randomized control trial, participants were 34 grandmother-grandchild dyads visiting well-child clinics of sub-district health promoting hospitals in 4 districts of Phayao province. There were 17 grandmother-grandchild dyads per group. The GLI was implemented in the experimental group at participant's home in 3 sessions, with 30 - 90 minutes per session, and 2 days to 2 weeks apart. The outcome variables, grandmothers' knowledge of language development and grandchildren's language development, were measured 3 times at baseline (week 0), post-intervention (week 5), and follow-up (week 9). Data collection was conducted from April to August 2019. Descriptive statistics, chi-square test, Fisher's exact, repeated measures ANOVA, and repeated measures ANCOVA were employed to analyze the data. **Results:** After completing the intervention, grandparents in the experimental group had statistically higher score than those in the control group ( $P$ -value < 0.05). The mean scores of grandmothers' knowledge at post-intervention and follow-up were significantly higher than those at baseline ( $P$ -value < 0.05); while shuch increase was not found in the control group. In the grandchildren, their language development scores at post-intervention and follow-up between the two groups were not different ( $P$ -value > 0.05). **Conclusion:** The GLI improved grandmothers' knowledge of grandchildren language development which could be beneficial in improving the child's language development in the long run.

**Keywords:** grandmother, language intervention, knowledge of language development, language development, toddlers

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## Introduction

Early childhood is a critical period to form and develop the foundation of a person's future well-being and learning ability. The primary caregiver is a significant person to provide the optimal attention necessary for a child's health and development. In Thailand, grandparents often need to help

raise their grandchildren due to Thai norms, inadequate child-care options, a need for financial support, family problems, and a desire for companionship.<sup>1</sup> The 2012 National Multiple Indicator Cluster Survey reported that 20.9% of Thai children under 17 years old did not live with either biological parent,

although both parents were living. The highest percentage of children not living with their parents was in the Northeastern (31.2%) provinces of Thailand, followed by provinces in the North (23.2%), Central (18.5%), South (12.5%), and Bangkok (13%).<sup>2</sup> In Phayao province, 23.9% of children aged up to 4 years have been reported not living with both parents.<sup>3</sup> In a large study that examined household caregiver relationships in Thailand, for most children under three years of age living in homes where both parents were absent, 57% of the primary caregivers were maternal grandmothers, whereas 29% were paternal grandmothers.<sup>4</sup>

When children are raised by their grandmother instead of their parents, the effects on both grandmother and grandchild can be positive and negative. Research reported that most grandparents are pleased to have their grandchildren in the home, while others say they are burden. The stress depends on the extent of responsibility required in caring for them especially financial obligations.<sup>5</sup>

Grandchildren who have been raised in the absence of both parents have delayed development more than those who live with their parents. One study showed that the highest percentage of suspected delayed development occurred in early childhood (i.e., 0 - 3 years of age) in which both parents were absent, and where most had a grandmother as the primary caregiver.<sup>4</sup> The suspected delayed development was found in 24.8% of the children with both parents absent, followed by children with absent father (17.4%), and by children with both parents present (17.1%). Among various skills, language development was one of the skills that is delayed significantly. Language development was suspected to delay in 15.2% of children which both parents were absent, followed by children whose father was absent (9.2%), and children who lived with both parents (7.9%).<sup>4</sup>

Given the above situation, grandparents' behaviors are essential for their grandchildren optimal language development. However, in a study of migrants in Thailand, results showed that in the households with both parents absent, most grandmothers acting as the primary caregiver had not read a book with grandchildren or had accompanied with their grandchildren to look at picture books. Similarly, the frequency of activities of calling names, counting numbers, and drawing was the lowest in households where both parents were absent.<sup>4</sup> In another study, grandmothers were asked how they promoted the development of their 3 to 6 years old grandchildren.<sup>6</sup> They reported using fewer stimulating

activities and toys that were developmentally appropriate by age. Moreover, children were allowed to watch television without a time limit. One researcher who explored competence in caring for toddlers concluded that grandmothers did not know about the development of their grandchildren or how to promote age-appropriate development activities.<sup>7</sup> Most grandmothers raised their grandchildren based on their own prior experiences.

The influencing factors of delayed language development are complex and have a dynamic interaction between genetic and environmental factors.<sup>8</sup> Family is an essential factor for child development because it is the primary source of experience. Family members provide children with the largest share of human contact, and families mediate a child's connection with the broader environment. A large number of studies show that language development in early childhood is strongly related to the caregiver and child interactions.<sup>9-11</sup>

Sociocultural theory by Vygotsky stresses the importance of social interaction for development.<sup>12</sup> Children develop and learn to function within a social context. This theory suggests that social learning and culture precede and shape cognitive development, and that development varies across cultures and social experience. Vygotsky argues for the concept of a zone of proximal development. This refers to the distance between the current maximum independent performance level of the child and the tasks that the child can perform, if guided by an adult or more capable person. Thus, child development can achieve with help from others.<sup>12</sup> Caregiver-child interaction behavior is an important feature in developing a child's language ability. A toddler learns by interacting with the caregiver.<sup>13</sup>

Caregiver's knowledge of child development influences their practice. Knowledge affects the caregiver's decision and practice that in turn affects child development.<sup>14-16</sup> There are interventions to promote language development. Typically, they are part of a number of parent training and education programs. Several studies provided knowledge and trained caregiver's skill. For example, a parent-directed language intervention aimed to increase parental knowledge of language development and improve the quality and quantity of parent-child language interaction among low socio-economic mothers.<sup>17</sup> The program incorporates educational components, such as behavioral feedback, video modeling, goal-setting activity, and appropriate children's book. Results have showed that the intervention increased knowledge of

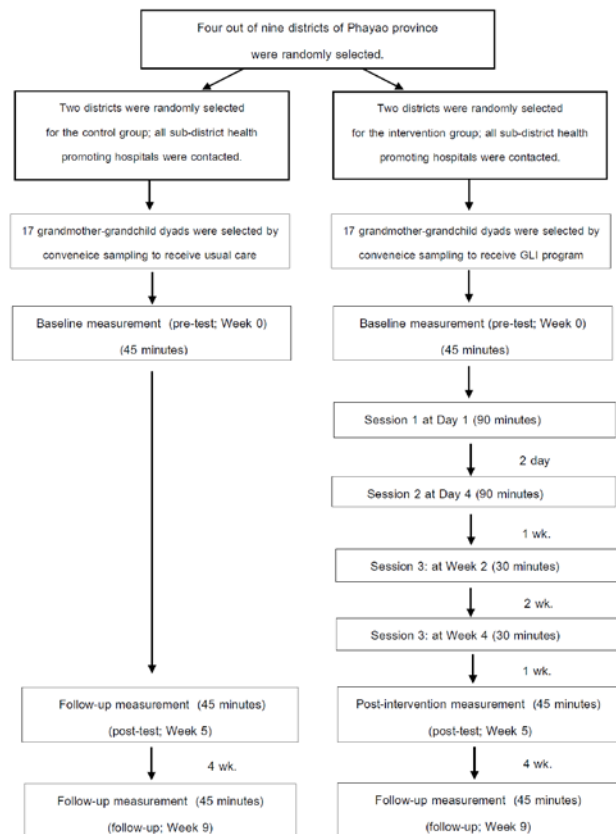
language development and enhanced parents' word types and number of words spoken.<sup>17</sup> An intervention study in Thailand aimed to improve grandmothers' competencies and behaviors in caring for toddlers.<sup>7</sup> The program included group process, demonstrations, skill training, and a home visit. The results showed that the grandmothers' knowledge, attitudes, and practice in caring for their toddlers significantly increased.<sup>7</sup>

A limited number of studies have been reported about grandparents promoting grandchildren language development with promising positive findings. Therefore, the purpose of this study was to examine the effect of an intervention to improve grandmothers' knowledge of language development and enhance grandchildren's language development. The specific aim was to compare the scores of grandmothers' knowledge and the scores of grandchildren's language development between the intervention and control groups across three time points of baseline, post-intervention, and follow-up stage. It was hypothesized that the grandmothers' knowledge of language development scores and grandchildren's language development scores in the intervention group were higher than those in the control group at post-intervention and follow up. It was anticipated that the results would be useful for health professionals in promoting language development for grandmothers raising their grandchildren in the absence of parents.

## Methods

In this cluster-randomized control trial, measurement of outcomes were made at baseline pre-test (week 0), post-test (week 5), and follow-up (week 9). The study populations were grandmothers and their grandchildren who were between 12 and 18 months old and received health services at well-child clinics at sub-district health promoting hospitals in Mueang Phayao, Dok Khamtai, Mae Chai, and Phu Kamyao districts, Phayao province. Based on the cluster sampling, four out of nine districts of Phayao province were randomly selected (Figure 1). Two districts were further randomly selected to be the intervention group; while the other two to be the control group. All sub-district health promoting hospitals in all four selected districts were contacted for prospective participants except four hospitals which were selected for testing research instruments. Only hospitals with child-grandparent dyads were continued in the study. With a concern about the far distance of some of the potential participants' residence and the travel

safety, a convenience sampling was used to invite grandmothers and grandchildren to participate.



**Figure 1** Study profile.

Note: GLI = Grandmother Language Intervention program.

To be eligible for the study, grandmothers needed to be between 35 and 65 years of age, the primary caregiver of a grandchild aged 12 to 18 months, living with the grandchild for more than 6 months, and able to read, write, and communicate in Thai language. The grandchild needed to have an absence of history of low birth weight, birth asphyxia, premature delivery, chronic disease, disability, congenital anomalies, or delayed language development. Moreover, the grandchild had to have lived with the grandmother for more than 6 months in a household where the parents were absent.

This study employed the G\*Power 3.1.5 program to determine the estimated sample size.<sup>17</sup> The effect size found in a previous study was a medium one. With a type I error of 5%, a power of 80% and an attrition rate of 20%, a total of 34 grandmother-grandchild dyads were required, with 17 dyads per group. Participants in the intervention group received the "Grandmother Language Intervention (GLI) program" while those in control group received usual care at the sub-district health promoting hospital.

The outcome variables were scores of grandmothers' knowledge of language development and scores of the grandchildren's language development. Grandmothers' knowledge of language development was referred to the understanding of grandmothers on the importance of and how to promote language development in children. Grandchildren's language development was referred to the expressive and receptive language ability of children aged 12 - 18 months.

### Research instruments

Two instruments were used in this study. For outcomes measurement, grandmother's knowledge of language development was examined using the Grandmother Knowledge of Language Development Questionnaire (GKLDQ) and the child's language development was tested using the Testing of Language Development. For the intervention, the Grandmother Language Intervention (GLI) was used.

The Grandmother Knowledge of Language Development Questionnaire (GKLDQ) took 27 items that fit the study population context from the questionnaire measuring parents' knowledge of child language development.<sup>18</sup> The original English language was translated into Thai with the back translation technique.<sup>19</sup> First, the English version was translated into Thai by two bilingual nursing instructors in pediatric nursing. The Thai version was later translated back to English by two experts from an English language institute. All discrepancies in back translation were settled.

The response format of GKLDQ was a Likert-type rating scale ranging from 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, and 5-strongly agree. In our present study, the internal consistency reliability was acceptable with a Cronbach's alpha coefficient of 0.74. To achieve a more concise outcome of the grandmother knowledge of language development, the five-point score was collapsed to either 1 or 0. For positive statement such as "the children should look at you while you are talking with them," it was supposed to get a positive response. Therefore, the response of "4-agree" or "5-strongly agree" was given a score of 1; while the response of "1-strongly disagree" or "2-disagree" was scored of 0. For the negative statement, the score was reversed. For the neutral response (or "3-neither agree nor disagree") and unanswered item, a score of 0 was given regardless of the direction of the statements.

Testing of Language Development was used to assess the receptive and expressive language development aspects of the child development.<sup>20</sup> This test was translated and modified for Thai children from the Developmental Skill Inventory (DSI) by the Rajanukul Institute of Thailand.<sup>20</sup> For 12 to 18-month old children, the instrument incorporates the items for testing receptive and expressive language development (9 and 14 items, respectively).<sup>20</sup> The researcher scored language development using two levels either being able (1 point) or unable (0 points) to do. The total scores in this study ranged from 0 to 23 points with higher scores indicating higher language development. The instrument's interrater reliability was high with a Cohen's kappa coefficient of 0.907.

In addition to the two measures, a modeling video of language facilitation technique was shown to the grandmothers. Two video clips were developed by the researcher depicting a smooth and difficult interaction between caregiver and child. The key principles were facilitated techniques during shared picture-book reading such as directives, labeling, yes-no questions, simple "what" questions, imitative directives, confirmation, repetition, expansion, and correction techniques. Grandmothers received a handbook promoting language development and a daily note for recording their activities. Picture books for reading to the grandchild were publicly available and validated for age appropriateness by three experts: They told the story about the daily routine of toddlers. All participants in both groups were measured at three-time points: baseline (week 0), post-intervention (week 5), and follow-up (week 9) (Figure 1).

### Intervention program

The Grandmother Language Intervention (GLI) was developed based on the synthesis of literature about language interaction and promoting child language development. The aim of the intervention was to improve grandmothers' knowledge of language development, grandmother-grandchild language interactions and that positive effect on the grandchildren's language development. The GLI was implemented at each participants' home. The components of the GLI program consisted of five stages of activity including stage 1: assessing knowledge and perception, stage 2: understanding language development, stage 3: enhancing grandmothers' skills for promoting language development, stage 4: setting goals and planning to promote language

development, and stage 5: supporting, maintaining and evaluating the intervention.

Three sessions of GLI were implemented in four sessions as follows. Session 1 was conducted at day 1 (assessing and understanding language development). Session 2 was carried out at day 4 (enhancing grandmother's skills, setting goals, and planning to promote language development). Session 3 was implemented at week 2 and 4 (supporting, maintaining, and evaluating intervention). Each of all sessions was conducted at each individual participant's home. While sessions 1 and 2 took about 90 minutes to complete, session 3 took only 30 minutes.

### Study procedure

With information provided by health professionals and village health volunteers at each well-child clinic, the researcher and research assistant located children who were 12 - 18 months old and identified the primary caregivers with whom the children were living. The researcher identified the development history, underlying health problems, and present health problems of the children who were living with their grandmothers with the help of the health professionals. The researcher and research assistants met with each grandmother and grandchild in their home to invite them for participation. Once informed consent was obtained, the researcher assessed outcome variables at baseline (week 0) or pre-test.

On the first day of the intervention (**session 1**), the researcher asked the grandmother about her perception of the grandchild's language development and encouraged her to talk about activities she had used to encourage language development (Figure 1). Information was discussed and shared with each grandmother about the importance of language development, including factors that may influence development, normal language ability, and strategies to promote language development. On **session 2** (three days after session 1, or day 4), the grandmother watched two video clips, each lasting 3 minutes. The videos modeled how interactions with her grandchild might properly facilitate language development. The researcher discussed with the grandmother the interaction behaviors shown on the videos. Then the grandmother selected a picture book to read with her grandchild. The activity was video recorded by a research assistant then shown to the grandmother. Initial feedback was given by the researcher with discussion. The grandmother was

encouraged to set goals and plan for promoting language development. As part of session 2, the grandmother received handbooks about the promotion of language development, a daily note to record daily activities and the frequency of promoting language development, and two picture books for children.

In **session 3** (a week after session 2 or week 2), the aim was to support and maintain the child promoting behavior. The researcher checked the participant's activities in daily note record, gave feedback, and re-planned by discussion. After the session 3 activities, the grandmother continued to promote language development with her grandchild. Two weeks after session 3 (week 4), the researcher visited the participant to support and maintain the child promoting behavior. One week later, post-test outcome measurement was done (i.e., week 5 of the whole study conduct). Four weeks later, the follow-up outcome assessment was carried out (i.e., week 9 of the whole study conduct). Study outcomes in the control group were also assessed at the timepoints comparable to those in the intervention group (i.e., weeks 0, 5 and 9). Participants in the control group received no GLI program (Figure 1).

### Ethical considerations

The study was approved by the Institutional Review Board Graduate Studies, Faculty of Nursing at Burapha University (number: 07-12-2561; date: 07-01-2562). The director of the Phayao Provincial Public Health Office gave permission to contact potentially eligible participants in each of the selected sub-district health promoting hospitals. The researcher explained to those who volunteered to participate the study's objectives, the intervention program, confidentiality and anonymity issues, potential risks and benefits, and the use of video recording. All grandmothers who agreed to participate in the study signed the informed consent form.

### Statistical analysis

All data were summarized as frequency with percentage and mean with standard deviation. Proportions between groups were tested by Chi-square test or Fish's exact test as appropriate. Mean differences between groups were tested by independent t-test or Mann-Witney U test as appropriate. Repeated measures analysis of variance (ANOVA) was used to compare mean scores between two groups across 3 timepoints<sup>21</sup>, i.e., at baseline, post-intervention, and follow-up. Where an outcome showed differences in mean scores at

baseline, mean scores were compared using repeated measures analysis of covariance (ANCOVA) to account for the difference in baseline values. With repeated measure ANOVA and repeated measure ANCOVA, the interaction term Time\*Group could be tested for the difference in the study outcome between two groups over time points. Statistical significance was set at a *P*-value < 0.05). All statistical analyses were conducted using SPSS version 26.0.

## Results

There were no significant differences in the grandmothers' characteristics between the intervention and control groups. The mean ages were 53.82 and 54.82 years in the intervention and control groups, respectively. Most of them had a primary school education (88.23% and 94.12%, respectively). About half (52.94%) of grandmothers in the intervention group received information about child development from health personnel while 64.70% in the control group (64.70%) did so (Table 1).

No significant differences were found in the grandchildren's characteristics between two groups. Their mean ages of the intervention and control groups were highly close (14.59 and 15.29 months, respectively). Slightly more than half of these grandchildren were male (58.82% in both groups). About one-third of grandchildren in the intervention group (35.30%) had watched a screen on TV, smartphone, or tablet for 1 to 30 minutes/day, and another one-third (35.30%) watched for 31 to 60 minutes/day. On the other hand, slightly more than half of grandchildren in the control group (52.94%) had watched a screen for 1 to 30 minutes/day. While almost two-thirds in the intervention group (64.70%) had never been read to from a picture book, 58.82% in the control group had never participated in a picture book reading (Table 1).

For the of **grandmothers' knowledge of language development**, the mean scores in the intervention group continuously increased from pre-test to post-test and follow-up (17.94, 20.94, and 21.59 points, respectively). Statistical significance was found when scores at post-test and follow-up were compared with that of pre-test (*P*-value < 0.001 for both comparisons, with marginal mean differences of -3.00 and -3.65 points, respectively). A similar increase was found in the control group with a smaller margin (18.65, 19.71, and 19.76 points, respectively) with no statistical significance for within-group comparisons (Table 2).

**Table 1** Demographic characteristics of grandmothers and grandchildren (N = 34).

Characteristics	Intervention group (n = 17)		Control group (n = 17)		P-value
	n	%	n	%	
<b>Grandmothers</b>					
Age (years)	M = 53.82 (SD = 5.04, range 46 - 62)		M = 54.82 (SD = 6.07, range 45 - 64)		0.605*
Education					0.500†
Primary school	15	88.23	16	94.12	
Secondary school	2	11.77	1	5.88	
Knowledge from health personal					0.486†
Received	9	52.94	11	64.70	
Never received	8	47.06	6	35.30	
<b>Grandchildren</b>					
Age (months)	M = 14.59 (SD = 2.24, range 12-18)		M = 15.29 (SD = 2.02, range 12-18)		0.342*
Gender					1.000†
Boy	10	58.82	10	58.82	
Girl	7	41.18	7	41.18	
Watching screen (TV, smart phone or tablet) (minutes/day)					0.178†
0	4	23.52	6	35.30	
1 - 30	6	35.30	9	52.94	
31 - 60	6	35.30	1	5.88	
61 - 120	1	5.88	1	5.88	
History of picture book use					0.724†
No	11	64.70	10	58.82	
Yes	6	35.30	7	41.18	

\* Independent t test.

† Independent t test.

**Table 2** Mean scores of outcome variables between the intervention and control groups over time (N = 34).

Variable	Week	Intervention (n = 17)		Control (n = 17)		P-value*
		Mean	SD	Mean	SD	
<b>Grandmothers' knowledge of language development</b>						
	0 (pre-test)	17.94	1.60	18.65	2.18	0.289
	5 (post-test)	20.94†	2.16	19.71 <sup>#</sup>	1.69	
	9 (follow-up)	21.59 <sup>††</sup>	1.54	19.76 <sup>††</sup>	1.09	
ANOVA test		P-value: Between-group comparison: 0.052 With-group comparison: Time: < 0.001 Time*Group: 0.006				
<b>Grandchildren's language development</b>						
	0 (pre-test)	8.18	5.43	12.00	5.27	0.045
	5 (post-test)	13.47 <sup>#</sup>	5.70	16.00 <sup>#</sup>	4.64	
	9 (follow-up)	16.53 <sup>††</sup>	4.80	18.06 <sup>††</sup>	3.86	
ANCOVA test		P-value: Between-group comparison: 0.327 With-group comparison: Time: < 0.001 Time*Group: 0.872				

\* Independent t test comparing pre-test scores between the two groups.

† P-value < 0.001, paired t test, post-test compared with pre-test scores (marginal mean difference = -3.00).

<sup>#</sup> P-value < 0.001, paired t test, follow-up compared with pre-test scores (marginal mean difference = -3.65).

<sup>†</sup> P-value > 0.05, paired t test, score at the corresponding time-point compared with pre-test score.

†† P-value > 0.05, paired t test, score at follow-up compared with post-test.

At baseline or week 0, the scores of grandmothers' knowledge of language development of the two groups were not different (17.94 and 18.65 points, respectively) (Table 2). As a result, repeated measure ANOVA was carried out and the results showed that the difference between groups was not statistically significant (*P*-value = 0.052), while the overall change over time was significant (*P*-value < 0.001). In addition, the interaction term Time\*Group was statistically significant (*P*-value = 0.006). This significant change was based on the overt change from 17.94 ± 1.60 points at baseline to 21.59 ± 1.54 points at follow-up in the intervention

group and a small change from  $18.65 \pm 2.18$  points at baseline to  $19.76 \pm 2.09$  points at follow-up in the control group. Statistical significance was achieved in part because standard deviations from these measures were relatively small compared to the measures themselves.

For the of **grandchildren's language development**, the mean scores in the intervention group continuously increased from pre-test to post-test and follow-up (8.18, 13.47, and 16.53 points) with no statistical significance when scores at post-test and follow-up were compared with that of pre-test (Table 2). A similar increase with no statistical significance was also found in the control group with a smaller margin (12.00, 16.00, and 18.06 points, respectively). There was a significant difference in the scores of grandchildren's language development at baseline (8.18 and 12.00 points, in the intervention and control groups, respectively,  $P$ -value = 0.045). As a result, repeated measure ANCOVA was conducted and the results revealed that no significant difference between groups was found. However, scores of grandchildren's language development significantly changed over time ( $P$ -value for Time < 0.001). The interaction term (Time\*Group) was not statistically significant. It was worthy noting that standard deviations of mean scores of grandchildren's language development in both groups and at all time points were relatively larger than those of the mean scores of the grandmothers' knowledge of language development. Hence less significant differences were found (Table 2).

In terms of two types of grandchildren's language development, receptive and expressive ones, the ANCOVA results revealed that overall scores of both groups combined increased over time significantly ( $P$ -value < 0.001) (data not shown). However, no significant differences between the two groups were not found. In addition, the interaction term (Time\*Group) was not statistically significant (data not shown).

## Discussions and Conclusion

After the implementation of the Grandmother Language Intervention (GLI) program, the grandmothers' knowledge of language development scores at post-intervention and follow-up were significantly higher than that at baseline; while such significant differences were not found in the control group. In addition, the significant Time\*Group interaction effect meant that when over time, the participants in the intervention group

significantly improved their grandmothers' knowledge of language development scores than those in the control group.

The beneficial effects of the GLI seen above could be due to its participant-specific approach. The program started with assessing the grandmothers' understanding of language development. This was followed by evaluating the grandmother's perception and knowledge of language development. The researcher gave grandmothers the needed knowledge and information reinforced by mutual discussions of the information. Then, the researcher provided each participant a handbook to support an easy home self-learning. Moreover, this program is an individual teaching based on the principle of individual differences at participant home. It would help the researcher analyze individual knowledge and provide suitable and effective suggestions that respond to individual differences. It would improve each participant to achieve learning goals. That was effective for teaching caregivers new skills to support their child's development.<sup>22</sup>

The results in this study are congruent with the study of a program to enhance children's development.<sup>18</sup> In that study, it was found that mothers who received training were significantly more likely to improve the parent's knowledge about child language development. This is also similar to a study that compared mothers and infants who received the training program by small groups for discussion and home visit. The outcome showed mothers who received training program had higher scores of maternal knowledge about child development than those in the control group.<sup>23</sup>

For grandchildren's language development, the intervention group's mean scores were higher than those in the control group though no statistical difference was found. The scores of sub-aspects of receptive and expressive language development between the two groups were also not significant. Our results could be consistent with language development nature. As a continuous and complex process, it requires a relatively long time to develop. Language is received and processed centrally via the five senses and then expressed using motor skills for speech production.<sup>24</sup> Change in language development may require more time than the 5 weeks of 3 GLI sessions and another 4 weeks of follow-up.

This explanation is supported by the aforementioned meta-analysis<sup>25</sup> that concluded there is an intervention dosage effect related to children's language development. Children's language development benefits significantly when a caregiver takes part in an intensive intervention.<sup>26</sup> Researchers of



another meta-analysis on the impact of shared book reading on children's language skills recommend that an intervention should be at a higher dose (6 – 12 months) to allow more time to demonstrate that interventions have a positive effect on children's language outcomes.<sup>27</sup> Based on our study results and conduct, the GLI could be used as a guideline to increase knowledge of language development. However, more GLI sessions and follow-up time are needed for future research to obtain more reliable outcomes of language development.

In conclusion, the Grandmother Language Intervention (GLI) program was successful in increasing grandmothers' knowledge when compared with no intervention. Grandchildren's language development was developed but with no statistical significance. The positive effectiveness of GLI could be considered by nurses and health professionals as a guideline to promote children's language development. Moreover, this program could be modified to stimulate other aspects of child development in future research.

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