ORIGINAL ARTICLE

Effectiveness of Child-rearing Information Booklet among Adolescent Mothers: A Quasi-experimental Non-equivalent Pre-test-Post-test Control Group Study

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ABSTRACT

Background. Child-rearing is challenging for adolescent mothers at risk of providing limited care to their children because of the challenges and demands of simultaneously being an adolescent and a mother. Children aged 0-2 years depend on caregivers like their young mothers to promote their physical, emotional, social, and cognitive growth and development.

Objective. The study aimed to determine the effectiveness of the Child-rearing Information Booklet (CRIB) among adolescent mothers with children aged 0-2 years on the three dimensions of knowledge, attitude, and practices.

Methods. The study utilized the quasi-experimental non-equivalent pre-test-post-test control group design to investigate 30 intervention and 30 comparison adolescent mothers with children aged 0-2 years who met the study criteria in Baguio City from January 2019 to January 2021. The fishbowl sampling technique was used in selecting the population and the specific barangays. A validated self-made questionnaire (I-CVI of 0.95 with Cronbach's α of 0.96) determined both groups' knowledge, attitude, and practices (KAP). The study used the weighted mean for adolescent mothers' KAP while an independent sample t-test analyzed the significant change in the scores of both groups and to answer the significant difference in the pre- and post-test scores between the two groups.

Results. The results revealed that both groups are knowledgeable about child-rearing skills. Both groups have a favorable attitude when caring for their children and have a very satisfactory practice in childcare. The study also yielded a significant difference in the change of scores in the pre- and post-test scores of the two groups, specifically in knowledge and practice, while no significant difference in their attitude. It also presented a significant difference in the post-test scores between the two groups along with their knowledge (large effect size), attitude (medium effect size), and practices (large effect size).

Conclusions. Adolescent mothers have pre-existing KAP in child-rearing. The CRIB effectively enhances adolescent mothers' child-rearing knowledge and practice. Also, the increase of scores in KAP in child-rearing during the post-test may not be solely caused by the CRIB but also influenced by their age, level of education, living environment, experience in child-rearing, and age of their child. The CRIB has a high practical significance in improving the knowledge and practices among adolescent mothers but not in their attitude.

Keywords: Child-rearing, adolescent mothers, knowledge, attitude, practice, physical, social, emotional, cognitive

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INTRODUCTION

Background of the Study

Children must receive positive child-rearing practices to promote their growth, development, and survival. The first two years of life require the best and most effective care from adolescent mothers to meet their healthy physical, social, cognitive, and emotional developmental needs. Erikson explained that newborn processes information by receiving cues from caregivers around them and establishing new connections based on the child's perceptions. Infants need more comfort from cuddling, playing, and talking, as these will give a perception that the world is safe and people are helpful and dependable while toddlers build their new motor and mental abilities by doing everything independently.[1] If the care is inconsistent, inadequate, and rejective, the infant fosters mistrust while toddlers develop a sense of shame and doubt.[1] These needs of children aged 0-2 years are essential for adolescent mothers to understand to provide appropriate child-rearing practices acceptable for their child's growth and development. Child-rearing is challenging and refers to the preservation of life and maintenance of the health and well-being of children. These include: (a) physical well-being by keeping the child safe and free from harm and illness, providing shelter and clothing, feeding, and bathing,[2] (b) promoting psychological well-being by providing emotional security, socialization, nurturing and giving affection, (c) promoting cognitive development by interaction, stimulation, and play, and (d) facilitating child's social skills with others outside the home, within the community, health clinics, and school.

The transition from childhood to adulthood is measured thru physical, social, cognitive, and emotional domains. The physical domain refers to the body changes in a child.[3] The cognitive domain is how children learn and think from one period to another. The social developmental domain refers to the child's learning process to interact with others within their environment while the emotional domain is the ability to recognize, express, and manage feelings at different stages of life and to have responsiveness to the feelings of others.[4] The child-rearing practices of mothers shape these developmental aspects.

An adolescent mother is a woman marked by the onset of puberty, is between the ages of 13 to 19, and has care responsibilities for her biological offspring.[4,5] Young mothers are at risk for problems in parenting because of the challenges and demands they face as adolescents and parents simultaneously.[6] According to Mangeli et al., adolescent mothers need more parenting skills since they struggle to balance their roles as parents.[7] According to Erikson, it is during adolescence that they experience dual development crises resulting in less prioritized parenting roles.[1] Moreover, Letourneau et al. explained that adolescent mothers suffer from psychological, social, economic, and coping difficulties, as supported by Paquette et al. claiming that teenage mothers have mild mood disturbance in parenting and are short-tempered which increases the risk of abusing the child.[8,9] Further, Osofsky and Thompson described very young children with inadequate parental care as depressed, withdrawn, with extreme fearfulness, helplessness, and hopelessness when cared for by adolescent parents.[10] While some studies reveal the negative effect of child-rearing practices by adolescent parents, other studies showed positive results. Iglesias, for instance, concluded that children of adolescent parents become successful in academics and careers because some adolescent parents abandon their aspirations and focus to the success of their child.[11] These conflicting findings imply that early parenting nonetheless influences the child's growth and development. The researcher believes that the use of Child-Rearing Information Booklet (CRIB) can address the child-rearing learning needs among teenage mothers.

According to Gupta et al., an information guide provides people with the information they need to make informed choices about adopting and continuing healthy lifestyles.[12] However, the Department of Health – Cordillera Administrative Region (DOH-CAR) discussed that no prototype IEC material on child-rearing is provided by the DOH central office to adolescent mothers. The agency also enumerated that one of the issues in the region is that adolescent mothers lack information booklets that are appropriate to their age about child care. In the study, the researcher utilized the CRIB as an information booklet to address the learning needs of adolescent mothers in child-rearing. Moreover, no specific study was found regarding the use of an evidence-based child-rearing information booklet among adolescent mothers during health education. Hospitals and health centers provide leaflets that are for the general population while Public Health Nurses, midwives, and Barangay Health Workers educate all mothers regardless of age about breastfeeding, cord care, administration of solid foods at six months, and immunization. The KAP of young mothers is not comprehensively evaluated to determine if they understood and applied what the healthcare workers have taught. Based on observations and literature from different countries and across the Philippines, the KAP is not focused on identifying an information booklet's effectiveness for behavior change toward safer child-rearing practices. Hence, the researcher conducted a study to add to the knowledge of the effectiveness of the CRIB based on the KAP of adolescent mothers. Further, no studies were conducted on the effectiveness of the CRIB for adolescent mothers, the researcher investigated its effect on the three dimensions of knowledge, attitudes, and practices among adolescent mothers.

Since adolescent mothers have issues in parenting, it is vital that their knowledge, attitudes, and practices (KAP) on child-rearing be appropriate. Knowledge is defined as understanding developmental norms and milestones, processes of child development, and familiarity with caregiving skills. In the study, knowledge is the understanding

of newborn, infant, and toddler care practices that mediates the relationship between experience and practice and, in turn, influences the child's growth and development. Mercer defined maternal attitude as beliefs about child-rearing.[13,14] In the study, measuring maternal attitude toward child-rearing is likewise attractive because of its relationship to parent-child interaction, which affects the child's physical, emotional, cognitive, and social aspects. Further, practice is applying or using an idea, belief, or method.[15] In the study, practice is performing the child-rearing skills that are learned from the booklet. The researcher observed in the hospital and health centers that adolescent mothers do not receive any information guide, and their KAP is not evaluated nor followed up in their homes after receiving health education from the midwives, nurses, or doctors in health centers and other health agencies. Moreover, as per clinical experience in the delivery room, Obstetric Wards, and nursery room, the researcher did not observe the dissemination of an information guide containing best practices in child-rearing. Likewise, the KAP is not focused on identifying the effectiveness of an information booklet for behavior change toward safer child-rearing practices. Hence, the researcher conducted a study to add to the knowledge of the effectiveness of the CRIB based on the KAP of adolescent mothers.

While previous studies show that health education is vital among mothers, no studies have formulated the CRIB and determined its effectiveness specifically in the KAP of adolescent mothers in Baguio City. The researcher believes that the CRIB will enhance the KAP of adolescent mothers because health education requires an evidence-based approach rather than only relying on the usual health teaching of healthcare providers. Further, the use, appropriateness, and feasibility of a child-rearing information booklet for adolescent mothers have yet to be explored. Thus, the need to investigate the effectiveness of the CRIB on the KAP on child-rearing among adolescent mothers.

Research Questions

The study sought to determine the effectiveness of a child-rearing information booklet among adolescent mothers with children aged 0-2 years. Specifically, the study sought to answer the following questions: (1) What are the baseline scores along the knowledge, attitude, and practice of adolescent mothers on rearing their child aged 0-1 month, 2-12 months, and 13-24 months; (2) Is there a significant difference in the change of the pre-test and post-test scores of the intervention and comparison groups?; and (3) Is there a significant difference in the pre-test and post-test scores on child-rearing between the intervention and comparison groups, along with their knowledge, attitude, and practice?

Conceptual Framework

The researcher used Pender's Health Promotion Model (HPM) and the Systems Theory as the study frameworks. HPM has three major concepts. First, is the varied characteristics of adolescents as a primary caregiver of her child, civil status, living environment, being an out-of-school youth, and willingness to participate in the study. The second concept is behavior-specific cognitions and affects, which include perceived benefits of action, perceived barriers to action, perceived self-efficacy, activity-related affect, and interpersonal influences. The perceived benefits of action in the study are healthy growth and development of the child and improved knowledge, attitude, and skill in child-rearing among adolescent mothers. Because of early parenthood, the barrier among adolescent mothers is their need for knowledge on child-rearing. Further, perceived self-efficacy is an individual's capability to organize and perform a health-promoting behavior that influences perceived barriers to action to increase efficacy. In the study, the perceived self-efficacy is a positive attitude toward the adolescent mother's capability to learn from the information booklet and apply the principles in child-rearing.

Moreover, the interpersonal influence in the study is the CRIB which the researcher provided to the intervention group. While the last major concept is the behavioral outcome which is achieved when the adolescent mothers commit to a plan of action linked with motivation and confidence resulting to a positive change of behavior towards health. In the study, the behavioral outcome is the use of CRIB by the young mothers. Further, Bertalanffy's Systems Theory is composed of structural and functional components that interact within an environment. The theory has: (a) input, (b) throughput, (c) output, and the (d) impact. In the study, the inputs are the independent variables influencing the mother's knowledge, skills, and attitudes toward child-rearing. The throughput is the appraisal of the adolescent mother on using the CRIB as excellent and beneficial, confidence in their ability to utilize the CRIB, and a solid motivation to comply will lead to compliance use of CRIB. The output of this study is the improved child-rearing practices along knowledge, attitude, and practice of adolescent mothers. Lastly, the impact of this study is the use of the CRIB and sharing of its contents with other young and adult mothers. The booklet can be recommended to the Mother and Child Nurses Association of the Philippines (MCNAP) for dissemination, the academe, and the hospital, specifically in the OB ward, the delivery room, and clinics to be included in health education classes.

Significance of the Study

Public health nurses can utilize the child-rearing information booklet in educating and assisting adolescent mothers in achieving the healthy development of their children. Further, the DOH-CAR can use the booklet as an IEC material that can be disseminated in addition to its existing programs that address the needs and concerns of teen mothers in child-rearing. In addition, the booklet can be endorsed by different nursing organizations, such as the MCNAP.

In the nursing academe, educators can utilize the evidence-based child-rearing practices in introducing the concept of maternal and child health to student nurses in the classroom and in all settings, including the community. Further, outcomes of this research may also be used as a basis for developing modules to address the learning needs of adolescent mothers, which can be utilized by student nurses, educators, and health care workers in the clinical or community setting.

Further, adolescent mothers' knowledge, attitude, and practices in responding to the needs of their children can be enhanced using the best practices in the child-rearing information book for positive child development and parental satisfaction. In addition, teenage mothers who received the CRIB can competently educate other mothers with child-rearing concerns. Likewise, the CRIB is intended for the adolescent mothers to encourage them to verbalize their insights on child-rearing and share these best practices to others.

Lastly, the study results serve as a basis for future research studies in uncovering areas that the researcher cannot explore, such as the effectiveness of a child-rearing information booklet among children with developmental disorders or the relationship of information booklets to the self-efficacy of single parents.

METHODS

Research Design

The researcher used a non-equivalent pre-test-post-test control group design because random assignment is difficult. The study was conducted in the natural setting of the respondents thus the identified potential confounders were the living environment, experiences, age, educational attainment, and ethnicity. Since it was impossible for the researcher to randomly select adolescent mothers due to their varied profiles, settings, and experience in child-rearing, matching was complex. Thus, the researcher chose adolescent mothers from a very similar population.

Locale and Population

The study was conducted from January 2019 to January 2021 in 20 barangays in Baguio City. The researcher chose Baguio City because it has healthcare facilities that provide reproductive care services and also cater to young mothers. The city is the most accessible setting for this study as it serves as the primary source from which the researcher can readily obtain participants.

Respondents in both groups must be: (a) aged thirteen to nineteen years, (b) who are married or unmarried, (c) with one biological child aged 0-2 years, (d) as primary caregiver of her child, (e) who are breastfeeding, (f) living with her parents, any immediate family member, or partner, (g) who are out of school, (h) who are not employed, (i) willing to function in partnership with the researcher, and (j) emotionally ready to assume responsibility for their learning. These criteria are key features of the target population that the study utilized in answering the research questions. Young mothers with critical illness, physical, and mental disability; with a child sent for adoption; with a child who has a critical illness, physical, and mental disability; who are pregnant; and who are not living with their child were excluded because these are additional characteristics of the respondents that could increase the risk of an unfavorable result. The area sampling technique was used to determine the barangays while the fishbowl technique was used to alternately assign the respondents to the intervention and comparison groups of each district. Purposive sampling technique was used to select adolescent mothers for the intervention and comparison groups based on the inclusion and exclusion criteria. Identified key persons from the health centers and barangays assisted the researcher in locating the respondents who are eligible to participate in the study. Since randomization is impossible in this study, necessary matching was done to prevent confounders. The researcher had minimal control over the respondents' eligibility criteria. Further, the researcher assigned adolescent mothers with newborns (n-10), infants (n-10), and toddlers (n-10) to the comparison group and the intervention group to at least have the potential result in confounding.

Using the G*Power 3 Statistical Power Analysis, the sample size of 42 adolescent mothers was computed through a two-group t-test with an estimated effect size of 0.80, a power of 0.80, and a minimum significance level of 0.05. However, the researcher considered the possible withdrawal of subjects during the study process, increasing the study subjects to 60, wherein 30 adolescent mothers per group were consigned.

Development of the Child-Rearing Information Booklet (CRIB)

An exhaustive literature review of Mother and Child books, journals and studies from Medline/Pubmed, CIHNAL, and databases was done in developing the CRIB. Evidence-based child-rearing practices and child-rearing testimonies were collated and organized per age group of 0-1 month, 2-12 months, and 13-24 months. The CRIB underwent content and ace validity index (CVI) using the Patient Education Materials Assessment Tool (PEMAT) which revealed an understandability score of 91.06% and an actionability score of 83.34%.

Data Gathering Tool

A self-made, structured KAP questionnaire was used. The items in the KAP questionnaire were constructed in English and Tagalog and were drawn out based on the contents of the CRIB. The questionnaire underwent Content Validity Index for Items (I-CVI) and Face Validity with a score of 0.95. For the face validity of the questionnaire, the reviewers agreed that most items in the KAP tool were simple, straightforward, and related to the objectives

of the study. Further, the tool underwent reliability testing utilizing Cronbach's alpha which yielded a good reliability as manifested by Cronbach's α of 0.96.

Data Gathering Procedure

During the pre-test, adolescent mothers in the intervention and comparison groups were scheduled for a pre-test according to their preferred date. An assent and informed consent were first obtained before administering the questionnaire. Some respondents answered the questionnaire in the clinic while others answered it in their homes. Questions regarding the tool were entertained and were answered immediately. The researcher waited for the questionnaires to be completed, collected, and re-checked if all items were answered. The respondents were acknowledged for sharing their time in the study. All questionnaires obtained were kept in envelopes, data gathered was tallied and was encoded in Excel for statistical treatment. The intervention group immediately received the CRIB after their pre-test and was oriented about its use. They were reminded to continue receiving the existing health information from healthcare workers. To help eliminate confounding variables, the mothers were informed that the researcher would conduct a weekly follow-up via home-visit or personal message. Meanwhile, the comparison group was prompted to continue their routine child-rearing practices based on their present knowledge of childcare.

The timing of the post-test can be a bias. This means that the post-test should not be taken immediately or too long after the intervention due to the recency effect and the time-lapse that may affect the study outcomes. Therefore, the adolescent mothers in both intervention and comparison groups were asked to have the post-test after one month based on their preferred date and time. Home visits were done to administer the post-test procedure of the study.

Treatment of Data

The R license-free statistical software was used to answer the research questions. The weighted mean of the ratings of each respondent to all the items was utilized in the knowledge, attitude, and practices while independent samples T-test was used to answer questions 2 and 3. The study calculated the effect size wherein the r effect size for the Wilcoxon Rank Sum test was obtained by dividing a statistic Z or the standard score by the square root of the total observations.

Ethical Considerations

The study was approved by the Research Ethics Committee of Saint Louis University, Baguio City (Protocol number SLU-REC # 2019-026). The researcher explained to the respondents and their parents or legal guardians the nature and objectives of the study and had them sign the consent and assent forms. The benefits and risks involved were discussed with the respondents. Debriefing was provided to ease physical discomfort. Further, their voluntary participation in the study and their right to withdraw at any time without negative consequences were explained. The researcher assured that their identity was concealed by not writing their names, addresses, and contact numbers in the questionnaire. Lastly, the researcher respected the decision of the two respondents' refusal of the post-test due to their disinterest in the study and their geographical differences. The researcher did not meet the respondents who did not want to continue filling up the questionnaire.

RESULTS

Child-rearing Knowledge, Attitude, and Practices without the use of the CRIB

Most respondents have the same degree of knowledge in child rearing of children 0-24 months old. Except for the 13-24-month-old children, where the intervention group has a higher degree of knowledge than the comparison group, the degree of knowledge of the two age groups, namely 0-1 and 2-12 months old, is the same. Interestingly, both groups had the highest score in the emotional domain, even without intervention. For the other domains, during the pre-test, results revealed that groups with 0-1, 2-12, and 13-24-month-old children are most knowledgeable in the physical, social, and cognitive areas. Though the intervention group's scores are higher, most values are nonetheless interpreted as knowledgeable. Interestingly, young mothers with newborns in the intervention group have a very high score in enhancing the socio-cognitive development of their newborns (Table 1).

It is likewise apparent from Table 1 that although there are differences in the pre-test mean scores between the two groups, the descriptive interpretation is still the same for both groups, which is a favorable attitude. While, the average pre-test mean scores of both the intervention and comparison groups along practice are very satisfactory except in the comparison group of mothers with 2-12-month-old children (2.32) and the intervention group of mothers with 13-24-month-old children (2.33) that fall under satisfactory practice.

Child-rearing Knowledge, Attitudes, and Practices Before and After the Use of the CRIB

Table 2 displays the knowledge, attitudes, and practices of adolescent mothers before and after the use of the CRIB. Looking at the "Knowledge" aspect of child-rearing, the analysis result provided a p-value lesser than the 0.01 significance level, implying a highly significant difference in the mean change in pre-test and post-test scores between the intervention and comparison groups. The descriptive measures show that a greater difference exists in the change of the pre-test and post-test scores among those in the "Intervention" group than those in the "Comparison" group. The results show that the CRIB influenced the knowledge of the respondents about child-rearing.

Table 1. Baseline Scores along the Knowledge, Attitude, and Practices of Adolescent Mothers on Rearing 0-24-month-old Children between the Intervention and Comparison Groups

	Age Group in Months											
	0-1				2-12				13-24			
	Intervention		Comparison		Intervention		Comparison		Intervention		Comparison	
	$\bar{X}$	DE	$\bar{X}$	DE	$\bar{X}$	DE	$\bar{X}$	DE	$\bar{X}$	DE	$\bar{X}$	DE
Knowledge												
Physical	0.69	K	0.67	K	0.67	K	0.64	K	0.78	VK	0.67	K
Social	0.95	VK	0.73	K	0.70	K	0.64	K	0.74	K	0.60	K
Cognitive					0.75	K	0.58	K	0.60	K	0.65	K
Emotional	0.83	VK	0.87	VK	0.95	VK	0.80	VK	0.85	VK	0.93	VK
Average	0.75	K	0.70	K	0.71	K	0.64	K	0.76	VK	0.69	K
Attitude	3.39	F	3.57	F	3.58	F	3.52	F	3.79	F	3.55	F
Practices												
Physical	2.64	VSP	2.37	VSP	2.54	VSP	2.27	SP	2.33	SP	2.42	VSP
Social	2.50	VSP	2.50	VSP	2.50	VSP	2.33	SP	2.22	SP	2.32	SP
Cognitive					2.20	SP	2.47	VSP	1.77	SP	2.20	SP
Emotional	1.00	UP	1.50	UP	2.56	VSP	2.38	VSP	2.90	VSP	2.65	VSP
Average	2.54	VSP	2.36	VSP	2.50	VSP	2.32	SP	2.33	SP	2.40	VSP

Numerical Rating	*Descriptive Rating*
0.76 – 1.00	*Very Knowledgeable*
0.51 – 0.75	*Knowledgeable*
0.26 – 0.50	*Moderately knowledgeable*
0.01 – 0.25	*Slightly knowledgeable*
3.01 – 4.00	*Favorable*
2.01 – 3.00	*Moderately Favorable*
1.00 – 2.00	*Least Favorable*
2.35 – 3.00	*Very Satisfactory Practice*
1.68 – 2.34	*Satisfactory Practice*
1.00 – 1.67	*Unsatisfactory Practice*

In the "Practice" aspect, there is a significant difference in the mean change from pre-test to post-test practice scores between the adolescent mothers in the intervention group and those in the comparison group. The intervention group obtained the highest mean change in pre-test and post-test practice scores, with a value of 0.34, compared to the mean change value for the comparison group, which is 0.01. This indicates that there has been a decrease in the practice scores of the adolescent mothers of the comparison group in the post-test. Results revealed that the adolescent mothers in the intervention group have significantly improved. An improvement in practice means that the respondents present excellence in the performance of a skill. Looking at the results, the increase in knowledge of the mothers helps them change their behavior. And with the use of the CRIB, the behavior is more enhanced compared to not having the CRIB.

Table 2. The Difference in the Change of the Pre-test and Post-Test Scores between the Intervention and Comparison Groups

Area/Aspect	Mean Change in Pre-Test to Post-Test Score		Difference	*p*-value
	Intervention	Comparison		
Knowledge	0.18	0.03	0.16	0.00
Attitude	0.34	0.11	0.23	0.11
Practices	0.34	0.01	0.34	0.00

p-value ≤0.05 – Significant at the 5% level (*)
p-value ≤0.01 – Highly Significant at the 1% level (**)

Unlike the aspects of knowledge and practice, the analysis performed on the aspect of "Attitude" shows no significant difference in the mean change in pre-test and post-test attitude scores between adolescent mothers in the intervention group and those in the comparison group to childrearing. The results show optimism among young mothers toward rearing children aged 0-24 months.

Effectiveness of the Child-rearing Information Booklet among Adolescent Mothers

Table 3a. shows a significant difference in the pre-test scores between the intervention and comparison groups in terms of knowledge (55.22,-2.09), wherein the computed p-value is lower than the 0.05 level of significance. The hypothesis, which states that there is a significant difference between the pre-test scores of the intervention and comparison groups along with knowledge, is accepted. Looking at the mean difference between the two groups, the intervention group has a slight mean difference which

Table 3a. Difference in the Pre-test Scores between the Intervention and Comparison Groups in terms of Knowledge, Attitudes, and Practices

Aspect	Mean Pre-Test Score		Difference	df	t	Significance
	Intervention	Comparison				
Knowledge	0.74	0.68	0.06	55.22	-2.09	0.04
Attitude	3.59	3.55	0.03	24	-0.54	0.51
Practices	2.46	2.36	0.10	44	-1.44	0.17

p-value ≤0.05 – Significant at the 5% level (*)
p-value ≤0.01 – Highly Significant at the 1% level (**)

Table 3b. Difference in the Post-Test Scores between the Intervention and Comparison Groups in terms of Knowledge, Attitudes, and Practices

Aspect	Mean Post-Test Score		Difference	df	t	Effect Size	Significance
	Intervention	Comparison					
Knowledge	0.92	0.71	0.22	48	-5.50	0.79	0.000
Attitudes	3.92	3.66	0.26	24	-7.47	0.41	0.001
Practices	2.77	2.38	0.39	48	-7.87	0.80	0.000

p-value ≤0.05 – Significant at the 5% level (*)
p-value ≤0.01 – Highly Significant at the 1% level (**)

The scale of effect:

0.50 or higher	*Large effect*
0.30 – <0.50	*Medium effect*
0.10 – <0.30	*Small effect*

presents that the group has a significant change in knowledge compared to the comparison group. Though both groups did not receive the CRIB, findings show that the respondents in the intervention group are more knowledgeable than those in the comparison group; however, this difference still shows almost equal values at the start. Before using the CRIB, the adolescent mothers in both groups received the usual health teachings from health caregivers, information from friends, families, and the internet, which crafted their knowledge about childrearing.

The acceptance of the null hypothesis at a 5% significance level according to the attitude of the young others is presented in Table 3a. This means that no significant difference is found between the pre-test scores of the intervention and comparison group on their attitude (24,-0.54) toward child-rearing. The results provide a more precise understanding that young mothers have the same expression of love for their children. They highlight their enjoyment of becoming mothers in establishing their child's physical, emotional, cognitive, and social functioning.

Moreover, Table 3a presents the differences in the pre-test scores between the intervention and comparison groups regarding practice (44,-1.44). Utilizing the independent t-test, results at a p-value of <0.01 rejects the hypothesis that there is a significant difference between the intervention and comparison groups. The result implies that the extent of the practice of the intervention group and comparison group are equal at the start of the conduct of the study. Mothers in the intervention and the comparison groups perform the same child-rearing practices that they know based on the usual health teachings from health caregivers, information from friends, families, and the internet. Also, these child-rearing practices, such as breastfeeding, burping, handwashing, feeding infants with mashed foods, and cord care, are primarily found in educational materials. This attributes the same level of performance between the intervention and comparison groups, as stated earlier, wherein the respondents hinged on the usual health teachings of healthcare workers and learned from the child-rearing experiences of others.

Table 3b shows a high significant difference (p=<0.01) in the post-test scores between the intervention and comparison groups in terms of the knowledge (48,-5.50). This means that the CRIB progressively influenced the knowledge of young mothers about child-rearing. Most practices are not found in the teaching materials disseminated in health centers, hospitals, and private clinics. Instead, this information was gained from reading the CRIB. The comparison group, on the other hand, may continue to believe what information they have and what they need about parenting. Furthermore, using Cohen's *d*, the result showed a large effect size of 0.79. This indicates that the intervention has practical significance in increasing the respondents' knowledge about child-rearing. This means the booklet has a meaningful application in the real world.[16] In terms of the attitude of young mothers, Table 3b shows that at a 0.001 level of significance (p=<0.01), a highly significant improvement in the post-test attitude scores of the intervention is implied compared to the post-test scores of the comparison group (24,-7.47). Hence, the

null hypothesis is rejected. This means that the CRIB affects the change of attitude of young mothers, as evidenced by a higher mean post-test score of the intervention group compared to the comparison group. The effect size of 0.41 implies that the CRIB has a moderate association with the attitude of young mothers in the intervention group. As discussed earlier, the CRIB has positive testimonies of young mothers regarding child-rearing. This probably increased the readers' positive attitude and motivated them to continue caring for their child using the practices stated in the CRIB because of its beneficial effect on their child's physical, social, emotional, and cognitive aspects. In return, the mothers know they will also benefit from the effects.

The differences in the post-test scores between the intervention and comparison groups regarding practice are shown in Table 3b. Utilizing the independent t-test, results at a p-value of <0.01 accept the hypothesis that there is a highly significant difference between the practice scores of the intervention and comparison groups (48, -7,87). The results imply that the intervention group performed significantly better than the comparison group. The relative size of the intervention booklet shows a large effect, as evidenced by the computed effect size of 0.80. This means that the CRIB is highly effective in enhancing the practices of young mothers, making it meaningful for adolescent mothers to utilize.

DISCUSSION

Knowledge

The knowledge of young mothers can be attributed to the knowledge acquired during their pre-natal and post-natal check-ups and during the vaccination of their child. Parenting programs in the community, firsthand information from health care providers, and influences of television, movies, books, and web sources can explain the result of their knowledge about child-rearing practices. Current technologies can even connect family members, where they can get child-rearing information. Most of the young mothers had the highest score in the emotional domain, even without intervention. The result can be attributed to maternal sensitivity which is the "caregiving instinct" of humans, a preconscious response that allows rapid detection of child cues.[17] This implies that adolescent mothers without informal or formal knowledge of child-rearing know how to nurture their children. Luciana cited the role of adolescents' early childhood experiences, specifically an effective mother-child relationship, as influential to the development of functioning attachment relationships seen in affective behaviors of adolescent mothers such as kissing, hugging, and cuddling their child.[18] This implies that young mothers use cuddling, hugging, and kissing their children to show affection because these were experienced during childhood. Iglesias argued that adolescent parents abandon their aspirations[11] and continue to mature and transform as they become mothers[19], while Erfina discussed that young mothers have a sense of maturity[20] and positive self-perceptions[21,22], and are eager to learn from their parenting challenges. Further, parents' sensitive behaviors are associated with maturity because of the transition from adolescence to motherhood. Together, sensitivity and maturity result in maternal competence needed for a positive attitude toward child-rearing.[23] The comparative study of parental sensitivity among adolescents by Paquette et al. further supports that the proportion of sensitive mothers was more significant among adolescents.[9] The results of the current study pointed out that the respondents are attentive to their children's physical development, mainly food, and safety. The results also disapproved of what was outlined in the literature review about the high incidence of child abuse, neglect, and unintentional injury among adolescent mothers.[24]

Attitude

The favorable attitude of young mothers can be attributed to their sense of harmony in child-rearing. Mercer explained that new mothers make psychological adjustments and prepare for the new role during pregnancy.[14] When new mothers give birth, they acquaint themselves with their children and learn to care for them. After which, the mothers adapt to their new role and lifestyle until they achieve their maternal identity resulting in harmony, competence, and confidence. Thus, the study does not support several studies showing that adolescent mothers experience an increased burden of responsibility and feelings of dissatisfaction during childcare.[7,25] Adolescent mothers are generally happy to have their children as their source of inspiration and motivation to mature and develop. Their sense of happiness, worth, and sensitivity are reflected in their favorable attitude. Further, the age of adolescent mothers can be one factor. Most of the respondents belong to the middle (15-17 years) and late adolescents (18-19 years). The attitudes of older adolescents changed as much in response to their personal experiences as those of younger teenagers. This can also be attributed to their openness to new ideas. Some authors have speculated that young mothers with a higher level of education tend to feel love and enjoyment in child-rearing. An implication of this is that child-rearing information can already be taught to junior and senior high school female students so that when they experience caring for children of others or of their own, they can easily relate and associate emotionally. Jones and Prinz explained that mothers have positive parenting attitudes as they age and gain experience in child-rearing, which influences child attachment quality[26] while DeVito explained that the emotional maturity of adolescent mothers affects their attitude toward child-rearing[27]. Overall, adolescents see problems objectively that are related to age. As adolescents get older, they mature more emotionally.

In addition, one of the Filipino cultures is close family ties. This means that even if the young mother gave birth at an early age, Filipino families prefer the mother and child to live with them for further guidance in child-rearing, which

is closely related to family collectivism, wherein Filipinos strongly value, prioritize, and bond each member of the family to promote smooth interpersonal relations. This fits the result of Sriyasak et al. and DeVito, revealing that teenage mothers receiving love, support, and guidance from their boyfriends and family members increased their sense of being mothers, feeling of responsibility, and feeling of love.[27,28] These imply that social and physical support positively impacts their emotional attachment to their children.

Practice

The practice of child care is a first-hand skill of mothers that even if they have limited knowledge of child care and despite their young age, the caring touch of these mothers comes out naturally, as supported by the study by Sriyasak et al. stating that young mothers can do basic infant care practices like feeding, bathing, and clothing; promote developmental care like talking, playing, and singing; protection from harm and diseases, and caring during sickness.[28] Moreover, the skills may also be due to their child-rearing experiences, where teenage mothers had earlier experiences in child-rearing their siblings or children of relatives and friends, as mentioned by Pillitteri above.[4] They learned about useful child-rearing and infant care from their mothers, who helped them gain confidence in infant care.[28] This also supports the idea explained by the Role Attainment Theory,[29] which is a process of leading the woman's achievement of maternal role identity. Young mothers of these children have progressive experiences that began in pregnancy as mimicry, role play, fantasy, introjection-projection-rejection, and identity. These mothers, during their pregnancy, sought information and mimicked observations until the maternal identity was incorporated into self and put into practice after birth. As a result, new young mothers continue to evolve into competent mothers as their child develops.[29] Furthermore, attitude is interrelated with practice. If young mothers have favorable attitudes about child-rearing, they are more likely to participate in child-rearing and continue to care for their children, the more parenting skills they learn, as supported by Mercer, who stated that maternity identity continuously evolves when there are continuously learned skills.[14]

According to behavior modification theory[30], a person's attitude often determines the likelihood of a person performing a behavior. Adolescents sometimes determine if they will perform the skill or not based on their mood, resources, and capabilities. Not all young mothers in both groups are fortunate to have good support from their families, health caregiver, friends, and neighbors. Some still experience a lack of money to buy healthy food and milk for their child, so sometimes they give junk food as an alternative to prevent their child from feeling hungry. For autonomous toddlers, some young mothers allow their child to use their cellphones to keep them still so they can do household chores and other personal activities. These imply that young mothers need high support to strengthen their coping abilities in child care, especially caring for infants and toddlers. Young mothers with 0-1-month-old children have a very satisfactory practice because of high socio-cognitive support. The health workers' support is better for pregnant young mothers up until delivery to relieve their anxiety and discomforts from physical changes and help them adapt to the needs of their newborn.[4] Constant assistance from health workers implies that adolescent mothers can care for their newborns. Likewise, young mothers with 13-24-month-old children have a very satisfactory practice because, at this age group, the young mothers have matured and adopted skills in childcare because of experiences and learning from parent lectures. These results contradict the earlier discussion of DePasquale and Gunnar that young mothers have poorer maternal sensitivity due to their young age.[31] Moreover, the results can be attributed to young mothers' confidence and ability to perform child-rearing practices, which are in contradiction that adolescent mothers lack parenting skills[7] and the discussion of DePasquale and Gunnar about poor maternal sensitivity among adolescent mothers[31] as there was a very satisfactory practice among adolescents in developing their child's wellness. Based on the results, the child-rearing practices of young mothers demonstrate commitment to caring for their children because women have a caring instinct.[32]

It is in the emotional domain of both groups with 0-1-month-old children where unsatisfactory practice on kangaroo mother care (KMC) for two hours or more is determined. This can be attributed to post-partum blues. With the respondents' age, transition to motherhood, and sleepless nights, postpartum blues decrease their ability to perform KMC. Further, the results in this area imply that despite their knowledge to care for their children, some teenage mothers are stubborn to practice what they already know.[33] This entails that young mothers who do not believe in or value knowledge are less likely to perform the skill.

Effectiveness of the CRIB on the Knowledge of Adolescent Mothers

New information from the CRIB attracted the interest of adolescent mothers, so the result is to read the CRIB and understand its effect. Piaget discussed that adolescents could understand the concept of health and illness, the causes of disease, and the influence of factors on health status.[4,19] Since the respondents are mothers, the heightened awareness of the need to care for their child may have been attributed to their interest in learning from the CRIB, especially since they perceive the CRIB as relevant and impacting them as a mother and their children. As observed, the respondents started to show interest in learning when the CRIB was given to them. They probably have an existing need for childcare, so they showed eagerness to learn to provide more nurturing care to their child. This assumption is strengthened by the Health Belief Model, wherein the respondents' belief that adhering to the CRIB contents will enhance their child's

physical, emotional, cognitive, and social development. This is supported by Fonteles Furtado on the effect of new knowledge and the interconnectedness of knowledge wherein new knowledge that is linked to prior knowledge will be better retained.[34] Pilliteri discussed that adolescents consider themselves knowledgeable in childcare because they have babysat for a neighbor's child or a younger sibling and were recipients of parenting skills during their childhood years.[4] This prior knowledge was linked to what they have read from the CRIB because they are already mothers, which could be a factor in increasing their knowledge. Further, positive child-rearing testaments of young mothers in the booklet are documented. Moran discussed that testimonies are an essential source of knowledge and a form of communication in diffusing knowledge.[35] When the respondents read the testimonies in the CRIB, they relate it to their current knowledge, confirming what they already know. Other than testimonies, Gantt and Alvermann discussed that adolescents competently use instructional materials with specific and detailed content.[36,37] The authors added that teenagers comprehend more if the learning material has illustrations, organized information, and a summary. Ma et al. support the idea that images involve the readers and contribute to knowledge acquisition because the readers are more engaged.[38] In addition, a large percentage of the human brain uses visual processing.[39] This means that respondents better understand the contents of the CRIB if guided with images. The CRIB has child-rearing practices derived from reliable sources and was organized into newborn, infant, and toddlerhood. Appropriate images were illustrated to further describe the care of the child. It also has a summary per age group, and the contents are organized accordingly. The CRIB's layout is appropriate to the age of the respondents, and its features resulted in the knowledge retention of the mothers in the intervention group. According to Gantt, young mothers are enticed to simple, straightforward, and attractive information material.[36]

Moreover, Sustersic et al. explained that information booklets that are age-appropriate and have a high CVI can improve the knowledge of the readers.[40] In this study, the readers are adolescents described as logical and active thinkers. Adolescents can understand the cause and effect, reflect on the acquired information, and follow directions from what they read, watch, or hear.[41] The result implies that the contents of the CRIB increased the knowledge of young mothers in the intervention group.

Another factor is the desire of young mothers to learn more about childcare, especially if the source of information is appropriate to their age and interest. According to Gantt, teenage mothers with clear and age-appropriate reading materials exhibit better knowledge of childcare.[36] The CRIB's layout and features, as characterized earlier, seemed to impact the respondents' knowledge. Learning was reinforced after using the CRIB because it established a rapport between the material and the respondent. The interventional material allowed the respondents to comprehend, reflect, and clarify beliefs and misconceptions, giving them a more precise grasp of what was imparted. The Schema theory strengthens this "A text of information provides directions for readers as to how they should construct meaning of their acquired knowledge."[42] This theory allows readers to reflect on experiences and understanding through encoding texts or writing as supported by the Generation Effect, which explains that information is better remembered if it is created from one's reflection or insights.[43] After reading the CRIB, the intervention group could retain the information gained by writing insights. When an individual writes their thoughts, the greater chance that it is remembered.[44] Thus, providing an area in the CRIB where the mothers can write their child-rearing insights may have increased their retention of information as they gained a better understanding of their motherhood and can perform what they learned, which opt the mothers to remember and perform efficiently.

The result significantly improved the knowledge of the intervention group after reading the CRIB, which is similar to existing literature that showed that such intervention is helpful. Katmawanti et al. indicated the importance of information booklets in increasing the knowledge of young mothers about breastfeeding.[45] They showed the results that booklets were effective in increasing their knowledge about exclusive breastfeeding. Information booklets stimulated self-directed learning among adolescents. This is supported by Shatto and Erwin, who discussed that today's adolescents comprise Generation Z's generational cohort who excel with self-directed learning.[46] This implies that young mothers are not comfortable when members like health care workers teach and monitor how they care for their child because of fear of being humiliated, embarrassed, or guilty, especially if they could not adhere to what is being taught to them.

Effectiveness of the CRIB on the Attitude

The CRIB did not significantly increase the scores of the respondents because of the optimistic attitude of young mothers toward child-rearing and "caregiving instinct" that comes innately without any previous knowledge or experience.[17] This implies that adolescent mothers with no informal or formal knowledge of child-rearing have positive attitude towards childcare. Moreover, females are more concerned about the emotional well-being of their children. This attachment motivates them to engage in child-rearing.[47] This implies that young mothers have a sense of responsibility and that even if they are adolescents, they have affective skills that sustain their knowledge about child-rearing practices that develop their child's emotional aspects. As discussed earlier, respondents in both groups have favorable pre-test attitude score. Malinowska-Cieslik et al. discussed that a favorable attitude towards self and others is linked to optimism, which is related to self-confidence and stronger resilience.[48] After giving birth, young mothers have a positive attitude toward child-rearing due to support

from families, health workers, friends, and neighbors, caregiving instinct;[32] maternal sensitivity,[9,23,31] maturity,[20,27,49] and preparedness.[14] All these factors, as presented earlier, including the influence of the CRIB, have maintained the positivity within the respondents in child-rearing.

Evaluative conditioning or the process of forming an attitude from a stimulus because of its association with a positive or negative event explains the increase in post-test scores after the use of CRIB.[50] When young mothers (Unconditioned Stimulus) repeatedly read the written positive testimonies of young mothers in the CRIB (Conditioned Stimulus) about child-care, it likely increases the feeling of love and enjoyment of child-rearing. In this study, the young mothers were presented with a list of positive child-rearing testimonies about motivation, being a good mother, and love and caring, which are believed to have influenced their emotions. Hofmann et al. explained that favorable attitudes are formed when reading materials stimulate the readers' emotions.[50] Similarly, Fazio et al. discussed that readers develop attitudes as outcomes of their interaction with the attitude object (a person, place, or thing).[51] The authors further discussed that interaction between the reader and the attitude object could shape a sense of satisfaction, pleasure, and favorable attitude from written experiences. The young mothers in the intervention group associated themselves with the written positive experiences of adolescent mothers in the CRIB, which encouraged them to give a more positive answer. Further, the child-rearing practices in the CRIB have brief reasons for why the action is done. Gantt explained that giving a rationale in instructional materials helps adolescents feel a sense of control.[36]

The Yale Information Processing Model explains the change in attitude between the source and the receiver. The source in the study is the CRIB, while the receiver is the young mothers. The persuasive impact of a message is due to the effective message, engagement with the message, comprehension, acceptance of the message, retention, and behavioral change of the respondents. As mentioned earlier, the CRIB is neat, organized, creative, age-appropriate, and easily understood. These characteristics enabled the respondents to accept the message and get involved in childcare. This resulted in the retention of information regarding child-rearing that caused a positive impact resulting in a change in their attitude.

Furthermore, Bernaix et al. reported that an increase in knowledge positively impacts attitudes toward child-rearing.[52] This is explained by the cognitive response model that assumes the change in attitude because of what information the learners receive, process, or reflect.[53] The layout and contents of the CRIB provided persuasive information to the young mothers by reinforcing what information was already known. It shows that the more critical the topic to the young mothers, the stronger the relationship between the cognitive responses elicited to the amount of attitude change. As mentioned earlier, the respondents in both groups have a social support system and belong to the middle or late adolescents. When the respondents utilized the CRIB, their attitude toward child-rearing improved. This implies that the booklet has strengthened the information received from other resources when they were taught about childcare. This was confirmed by the booklet's contents and allowed them to write their learning insights about child-rearing in the CRIB.

Effectiveness of the CRIB on the Practice

The CRIB significantly increased the scores of the respondents. Teen mothers need realistic, helpful information about child-rearing. Since these respondents experience a transition to motherhood, at this time, they are open to receiving information through reading and put into practice because written materials are always ready to use and are kept for future use.[36] According to Pender's Health Promotion Model (HPM), people understand and choose to engage in health-promoting behaviors.[36] As presented earlier, Pender explained in her model that individuals have unique characteristics and experiences that affect actions. It also allows the person to be motivated and engaged in behaviors toward enhancing health. This research has shown that adolescent mothers' varied characteristics, a perception that the CRIB is beneficial to their children, self-efficacy, and interpersonal influences such as an orientation prior to the use of the CRIB are factors that would commit the respondents to practice the skills found in the CRIB.

Based on the idea of reinforcement by Skinner, the young mothers in the intervention group chose to perform the practices listed in the CRIB, such as temper tantrum management, because they knew that performing skills would promote their child development.[36] Further, the perceived self-efficacy of teen mothers as they transit to motherhood, along with their cognitive readiness, parental sensitivity, and a favorable attitude, were determinants of committing to a plan of action using the CRIB. In line with Theory of Planned Behavior, the current study designed the CRIB to change young mothers' health behaviors toward their children. The appraisal of adolescent mothers in the intervention group on using the CRIB is excellent and beneficial. Their use of the CRIB has led to improved child-rearing practices not only in knowledge and attitude but also in practice. The results imply that adolescents perform well when guided by instructional materials, especially if the material has a high evaluative index and some of its contents, such as stated above, are rare in other instructional materials. Also, especially since adolescents have a well-developed cognition, they can apply what they have read to their present situation.[36] The more these mothers see the benefit of the practice, the more consistent the mothers will perform.

Limitations of the Study

The matching of the respondents in the intervention and comparison groups is not impeccable. The researcher

could not objectively evaluate the emotional preparedness of young mothers since there were no signs of reluctance or emotional disturbance. Lastly, the study used a questionnaire with differences in the number of items per domain, limiting the researcher's use of a specific scale of interpretation per domain.

CONCLUSIONS AND RECOMMENDATIONS

Adolescent mothers with newborns, infants, and toddlers have equal knowledge and positive attitudes in child-rearing even without the CRIB, hence young mothers must continue to receive the usual child-rearing information from their external sources. In terms of practice, as the children of adolescent mothers increase in age, the likelihood of practicing child-rearing skills is lower. Hence, it is essential to provide prenatal and early postpartum education to enhance the practices toward child-rearing, especially for adolescent mothers with infants and toddlers. Also, the increase of scores in knowledge, attitude, and practice in child-rearing during the post-test may not be solely caused by the CRIB but also influenced by the respondent's age, level of education, living environment, experience in child-rearing, and age of their child.

The CRIB effectively enhances knowledge in child-rearing. Hence, the DOH-CAR should consider the CRIB as IEC material for utilization and dissemination. Student nurses can also use the booklet to give health education to adolescent mothers in all settings. On the other hand, the booklet does not influence the attitude thus, it is recommended that additional testimonies of young mothers in child-rearing must be added so the readers can relate. Likewise, coping strategies in child-rearing can be added to help young mothers to remain calm and reduce stress during child-care. Also, initial child-rearing education is recommended during the prenatal period of young mothers to prepare them for their new role as mothers.

The effect of the CRIB in enhancing knowledge and practices is meaningful to adolescent mothers. They practice what they have learned from the booklet to guarantee their child's growth and development. In addition, being a female and having the instinct for caregiving, the booklet can enhance the attitude of young mothers. Therefore, using the CRIB in health teaching and parenting programs is recommended in barangay health centers and hospitals.

Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

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