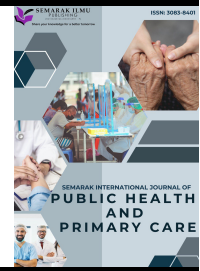




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The Impact of Nursing Care Intervention Program on Knowledge, Attitude, and Practice Influence Personal Hygiene Behaviours Towards Pediculosis Capitis among Orphaned Children in Malaysia: A Quasi-Experimental Study

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ABSTRACT

Pediculosis capitis (head lice infestation) remains a common public health issue among institutionalized children, linked to poor hygiene and limited preventive education. However, research in Malaysia remains limited, particularly in terms of evidence-based intervention design, longitudinal follow-up, and comprehensive evaluations of program outcomes. This study aimed to evaluate the effectiveness of a nursing care intervention program in improving the knowledge, attitude, and practice (KAP) of orphans regarding the prevention of Pediculosis capitis and personal hygiene. A quasi-experimental pre-test and post-test design was conducted among 61 orphans aged 12–17 years at Darul Kifayah, Selangor, Malaysia. Participants completed a validated KAP questionnaire before and after attending a nursing care intervention program that included health education sessions, practical demonstrations, and interactive discussions. Data were collected from November 2022 to February 2023 using a universal sampling method. Statistical analysis was performed using paired t-tests and ANOVA at a significance level of $p < 0.05$. Post-intervention analysis revealed significant improvements in knowledge ($p < 0.001$), attitude ($p < 0.001$), and practice ($p < 0.001$) scores compared to the pre-intervention scores. The nursing care intervention effectively enhanced the orphans' knowledge, attitudes, and practices related to Pediculosis capitis prevention. Incorporating regular health education and preventive nursing care programs into orphanage care systems can reduce infestation rates and promote better personal hygiene practices among institutionalized children.

1. Introduction

Pediculosis capitis (PC), commonly known as head lice infestation, is a contagious parasitic infection that affects millions of school-aged children worldwide [1,2]. Head lice infestation also represents a significant public health concern among orphaned children, particularly those living in institutional care settings. Although it is not life-threatening, PC can cause psychological, social, and

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physical discomfort due to itching, sleep disturbance, and visible scalp lesions [3,4]. Children in orphanages are particularly vulnerable due to overcrowding, limited resources, and inconsistent hygiene practices [5].

Close physical contact among children, sharing of personal items such as combs or towels, and limited access to hygiene facilities contribute to the rapid spread and recurrence of infestations [6]. Overcrowded living spaces create ideal environments for lice transmission, especially in orphanages where shared living spaces and a lack of regular health screenings are common [7].

Lack of individualised care and poor knowledge on lice prevention can further hinder children's understanding of how to prevent infestation [8]. These conditions not only increase the risk of lice infestation but also negatively affect children's self-esteem and social interaction [9]. Common complications include secondary infections, sleep disturbances, and emotional distress for both children and caregivers [10]. Caregivers often face challenges in maintaining consistent health checks and follow-up treatments, leading to recurring infestations [11].

1.1 Research Background

PC, or head lice infestation, remains a persistent public health problem worldwide, particularly among school-aged children. Head lice infestation is primarily transmitted through direct head-to-head contact or indirectly via shared personal items such as pillows, hats, or combs [12]. Globally, the prevalence ranges from 5% to 60%, depending on age group, hygiene level, and environmental conditions [13]. Despite available preventive measures, awareness and control strategies remain limited, especially in developing countries.

In Malaysia, PC continues to affect children from both urban and rural areas, with moderate to high infestation rates reported among school-aged children [14]. Children living in institutional settings such as orphanages are at particularly high risk due to shared living spaces, inadequate hygiene practices, and limited access to health education [15]. These conditions facilitate the persistence and recurrence of infestations, making this vulnerable population in need of targeted interventions. Regular hair washing, avoidance of sharing personal items, and early detection of infestation are essential preventive behaviours [16]. However, many children lack knowledge of appropriate hygiene practices. Health education and behavioural interventions have been identified as effective strategies to reduce infestation rates by increasing awareness and promoting preventive actions [17].

Nurses have a critical role in promoting health and preventing communicable diseases through education and behaviour modification programs [18]. In institutional care settings, nursing interventions play a vital role in improving children's hygiene practices through structured education, regular monitoring, and consistent reinforcement of preventive measures. However, in Malaysia, limited research has examined how nursing interventions influence hygiene behaviours related to PC among orphaned children [19].

Most available research focuses on epidemiological aspects and associated risk factors, with limited emphasis on evaluating the effectiveness of nursing care interventions for lice prevention. Therefore, there is a critical need to assess the impact of structured nursing interventions in improving personal hygiene behaviours among orphans. Understanding how such nursing intervention care programs can enhance evidence-based hygiene practices may provide valuable insights for sustainable control of head lice infestations in institutional care settings. This study aimed to evaluate the impact of a nursing care intervention program on hygiene behaviours related to PC among orphaned children in Malaysia, thereby addressing a significant gap in national and international literature.

1.2 Literature Review

1.2.1 Epidemiology of *Pediculosis Capitis* (PC)

PC is among the most common ectoparasitic infestations affecting humans, particularly school-aged children under thirteen years old. It is caused by *Pediculus humanus capitis*, an obligate human parasite that feeds on blood from the scalp [20]. Globally, its prevalence varies significantly depending on socioeconomic status, cultural practices, hygiene level, and access to healthcare services [21]. In developing countries, prevalence tends to be higher due to limited awareness, inadequate hygiene practices, and crowded living conditions [22].

In the Southeast Asian region, studies show infestation rates remain high, particularly in low-income and rural communities. Research from Indonesia, Thailand, and the Philippines indicates prevalence ranging from 1.5% to 45% among schoolchildren [23]. In Malaysia, reported infestation rates range between 10% and 30% in various populations, with girls more frequently affected than boys due to longer hair and grooming habits. [24] This finding highlights that *Pediculosis capitis* remains a persistent public health concern in Malaysia and requires greater focus in both research and community-based interventions.

1.2.2 Risk Factors and Transmission

Head lice are transmitted primarily through direct head-to-head contact, though indirect transmission via shared personal items is also common. Risk factors include long or thick hair, infrequent hair washing, and sharing of combs, pillows, or towels. Environmental and socioeconomic factors such as overcrowding, inadequate sanitation, and poor personal hygiene also contribute to the infestation [25].

In institutional settings like orphanages, these risks are further exaggerated due to close physical interaction and limited hygiene supervision. Children without parental guidance may lack awareness of proper hygiene habits or the importance of early detection and treatment. Consequently, lice infestations can spread rapidly and become chronic if preventive measures are not consistently implemented.

1.2.3 Consequences of *Pediculosis Capitis* (PC)

Although PC is not associated with severe morbidity, it can cause discomfort and secondary bacterial infection due to scratching. Sleep disturbances, loss of concentration, and psychological distress are also common consequences that can affect children's daily functioning and academic performance. Children with visible infestations may experience social embarrassment, isolation, and reduced self-esteem [26]. Furthermore, persistent infestations can lead to school absenteeism and withdrawal from social activities, thereby affecting academic performance and social participation. These consequences highlight the importance of prevention and control strategies focusing on hygiene promotion and health education.

1.2.4 Health Education and Nursing Care Interventions

Health education interventions are a cornerstone in controlling PC. Several studies have demonstrated that structured educational programs can improve knowledge and preventive behaviours among children, parents, and caregivers [27]. For instance, school-based health education programs that include visual demonstrations and interactive learning activities have been

shown to significantly reduce infestation rates [28]. Nursing interventions also play a vital role in planning, implementing, and evaluating such programs. Nurses are well-positioned to assess hygiene needs, provide individualised education, and monitor behavioural outcomes over time. Studies from other regions have shown that health education and regular screening can effectively reduce infestation recurrence rates [29]. However, evidence from Malaysia especially within orphanage settings remains limited, highlighting the need for experimental or quasi-experimental research to assess behavioural change and intervention effectiveness.

1.2.5 Knowledge, Attitude, and Practice (KAP) Framework

The Knowledge, Attitude, and Practice (KAP) framework provides a conceptual basis for understanding behavioural change related to hygiene and disease prevention. According to this model, increasing awareness and knowledge about a health issue leads to the development of positive attitudes, which subsequently translate into improved practices [30]. In the context of Pediculosis capitis, the KAP framework can foster responsible hygiene behaviours that minimise infestation risk by enhancing children's understanding of transmission, prevention, and treatment. [31].

Several studies have validated the KAP approach in promoting personal hygiene and behavioural change. For example, educational interventions focusing on proper grooming and discouraging the sharing of personal items have shown measurable improvements in hygiene practices [32]. However, consistent reinforcement and supervision are essential to sustain these positive behaviours, emphasising the critical role of continuous nursing care and health education.

1.2.6 Research Gap and Significance

Although PC is recognised as a preventable public health concern, there remains a lack of interventional research in Malaysia assessing the effectiveness of nursing care programs among institutionalised children [33,34,35]. Most existing studies have focused on prevalence and associated risk factors; however, evidence regarding intervention outcomes remains limited. Moreover, the orphanage environment presents unique challenges, limited resources, shared living spaces, and inconsistent hygiene supervision, which heighten infestation risk. This study addresses these gaps by implementing and evaluating a nursing care intervention designed to improve hygiene-related behaviours among orphaned children in Malaysia.

Using a quasi-experimental pre- and post-test design, the research provides evidence on the effectiveness of structured nursing interventions in promoting sustained behavioural improvements. The findings are expected to contribute to the development of evidence-based nursing practices and enhance community health outcomes.

2. Methodology

2.1 Study Area

In these sections, the method of conducted of nursing care intervention program will be described briefly. Complex Orphanage Darul Kifayah MAIWP is located at Batu Caves in Gombak District, Selangor Darul Ehsan. This study was conducted from October 2022 to January 2023.

2.2 Study Design

This quasi-experimental study with a one-group pre-test and post-test design with a time-series follow-up to assess changes in knowledge, attitudes, and practices (KAP) related to *Pediculus humanus capitis*. Post-test 1, involving head lice detection, was conducted one week after the intervention, followed by Post-test 2 one month later. The study design allowed comparison of pre- and post-intervention data within the same group, providing a practical and ethical approach to evaluate the effectiveness of the intervention over time.

2.3 Study Setting

This study involved a total of 202 orphaned children, aged between 11 and 17 years, who resided at the Darul Kifayah MAIWP Orphanage Complex. Universal sampling methods were used for sample collection. This design was selected as it allows for the assessment of intervention impact in a real-world setting without requiring randomization, which was not feasible in the institutional environment. The inclusion criteria in this study were all children infested with head lice. All the children were screened. The exclusion criteria were children who were not infested with head lice.

2.4. Physical Examination

A comprehensive head and scalp examination was performed on all children using fine-toothed metal lice combs for accurate detection. A total of 212 children (112 girls, 90 boys) were examined. Sixty-one girls, infested with head lice out of 112 total girls detected through physical examination, became the samples. Infected children received appropriate treatment and health education on hygiene and disease prevention by emphasizing cleanliness and avoidance of item sharing.

2.5 Research Instruments.

2.5.1 Structured Questionnaire

A structured questionnaire was developed based on previously validated instruments, adopted and adapted from prior health education studies on PC (36). It was translated into the local language according cultural and educational background of the respondents. The questionnaire assessed knowledge, attitude, and practice (KAP) related to the prevention and control of head lice. It also included socio-demographic information. The questionnaire comprised four sections (A–D): Section A: Socio-demographic data, Section B: Knowledge and risk factors, Section C: Attitude, and Section D: Practice.

2.5.2 Section A: Socio-Demographic Data

Section A consists of seven (7) items: gender, age, education level, hair characteristics, scarf-wearing habits, history of head lice, and prior treatments. It also recorded the name of each dormitory to identify infestation distribution among dorm groups. This data was used to determine the socio-demographic and environmental factors contributing to PC among orphanage girls.

2.5.3 Section B: Knowledge and Risk Factors

Section B was divided into two parts:

2.5.4 Part I – Risk Factors (4 items):

This part measured hygiene and lifestyle practices (behavioural, risk factors) such as frequency of washing clothes, sharing personal items, sleeping arrangements, and checking the scalp for lice. Responses were scored using a 4-point Likert scale, allowing the researcher to evaluate personal hygiene and preventive behaviours influencing infestation risk.

2.5.5 Part II – Knowledge about Head Lice (12 items):

This section used *True/False/Do not know* questions to assess understanding causes, transmission, symptoms, treatment, and prevention. Each correct answer scored one point (0–12 total). Scores of 0–4 indicated low, 5–8 moderate, and 9–12 high knowledge levels. The findings were used to develop health education materials that emphasized participants' learning needs to improve awareness and preventive behaviours.

2.5.6 Section C: Attitude

Section C evaluated participants' attitudes toward head lice prevention and management. 10 statements were rated on a 3-point Likert scale (3 = Agree, 2 = Disagree, 1 = not sure). Negatively worded statements were reverse-scored. This section explored perceptions, beliefs, and motivation to adopt preventive behaviours, such as maintaining good personal hygiene and stigma related to infestation.

2.5.7 Section D: Practice

Section D assessed preventive practices for head lice prevention. It consists of seven items with four response options, Always (4), Sometimes (3), Rarely (2), and Never (1) to assess the frequency of preventive actions such as hair washing, wash clothes, scalp care, and avoidance of sharing personal items (combs, towels, hats). Data were obtained through both self-report and direct observation to enhance the validity and accuracy of reported behaviours. This section measured the behavioural changes that occurred following the intervention program.

2.5.8 Pre-Intervention Procedures and Questionnaire Distribution

Before the intervention, participants were briefed on the objectives of the study and given approximately 30 minutes to complete the questionnaire under the researcher's supervision to ensure accuracy. A similar procedure was conducted in post-test one month after the intervention using the same tool for comparison and to assess program impact, such as improvement in KAP scores. Scalp examinations were conducted to evaluate the program's effectiveness and confirmed a reduction in infestation rates.

2.5.9 Implementation of Nursing Care Intervention Program

Nursing care Intervention program was based on KAP Model for implementation at school level. The KAP model well known as Rational Model was used as theoretical framework for implementation of nursing care intervention program in Darul Kifayah orphanages. There are three constructs in KAP Model consists *Knowledge, Attitude and Practice* [37]. The KAP Model proposed that any practices are influenced by two constructs of attitude and knowledge. All the material and contents for teaching purposes were adapted and adopted the previous study and integrated with Bloom's Taxonomy to enhance understanding [38].

Approximately 202 children (girls and boys) participated in a nursing care intervention program was designed to enhance participants' knowledge, attitudes, and practices regarding PC. Both infested and non-infested children participated to promote comprehensive awareness to sustain behavioural change and reduce PC prevalence among orphaned children. The program comprised three interactive health education sessions that included lectures, demonstrations, and group discussions. The program duration was approximately five hours, consisting of a two-hour health education session and a three-hour demonstration.

The health education focuses on head lice biology, causes, symptom identification, transmission, prevention, and management of head lice. through interactive lectures. The KAP components emphasized understanding PC (knowledge), improved attitudes, and adopting good personal hygiene practices. A quiz was conducted to encourage the respondents' interest and active participation. A prize was given to those who provided the correct answer. Detailed explanations were subsequently provided for each correct response to reinforce key learning points and enhance understanding among all participants. Explanations and discussions were provided to enhance participant engagement. At the end of the session, informational pamphlets in Malay were distributed to the children and their caregivers."

The demonstration session involved practical training focused on hair inspection, effective combing, application of treatment shampoo, and strategies to maintain good personal hygiene and promote healthy behaviours. Infested children received medicated shampoo with supervised application guidance. The aim was to strengthen knowledge and promote sustainable good hygiene behaviours to prevent reinfestation among orphans.

An environmental hygiene drive was also attempted in this programme. Forty student nurses were involved in this programme. They were divided into four teams. Team A, B, and C thoroughly clean the Hostel blocks. Inmates of the orphanages were also involved in the cleaning of their dorms. All furniture, carpets, and floors are vacuumed thoroughly to pick up any hair the person with head lice has shed. Then the walls and floor of the domiciliary were cleaned and mopped with Chlorhexidine 0.05%. Washed all clothes, blankets, towels, pillowcases, and sheets of linen, followed by sunlight exposure, was carried out. In the same method, for other items such as hair accessories, headphones, and other personal items, we seal the objects in plastic bags and keep the bags sealed for two weeks to make sure the adult lice and newly hatched lice die within two weeks. While the brushes and combs were soaked in hot water for 10 minutes. Five student nurses with lecturers were assigned to provide treatment to the infested children.

The effectiveness of the intervention was evaluated using a pre-test and post-test KAP questionnaire, assessing improvements in knowledge, attitude, and hygiene practices. Data were analysed to determine significant behavioural changes and a reduction in PC prevalence following the intervention.

3. Result

3.1 Total of Respondents

Figure 1 illustrates the overall proportion of participants infested and non-infested with head lice. A total of 202 respondents participated in the program, consisting of 112 females and 90 males. Out of these, 61 female students (30.1%) were infested with head lice, while 141 (69.9%) were free from head lice. All 90 male students were free from infestation.

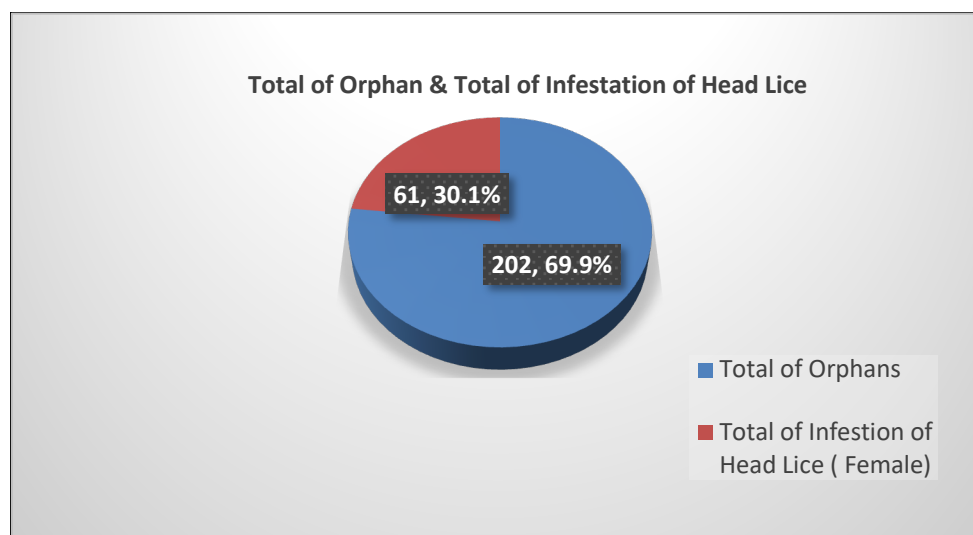


Fig. 1. Total of Respondents

3.2 Respondents' Demographic Data

Table 1 presents the demographic characteristics of respondents. The total number of female orphans infested with head lice was 61 out of 202 (30.1%). Among the 112 girls, 61 (54.5%) were affected, while none of the boys reported infestation (0%). The highest infestation rate occurred among secondary school students (67.2%), followed by high secondary students (21.3%) and primary school students (11.4%). All participants reported wearing headscarves (100%), and most had straight hair (67.2%), while 32.8% had curly hair. Regarding previous infestation history, 29 participants (45.9%) reported having experienced head lice previously, while 22 (36.1%) reported no prior infestation, and 11 (18%) were unsure.

Table 1
Respondents' demographic data

Category	Option	n	(%) of Total	Cumulative %
Gender	Female	61	100.00%	100.00%
Level of Education / Age	Primary School (11-12 years old)	7	11.40%	11.40%
	Secondary School (13-15 years old)	41	67.20%	78.60%

	High Secondary School (16-17 years old)	13	21.30%	100.00%
Characteristic of Hair	Gurley Hair	20	32.80%	32.80%
	Straight Hair	41	67.20%	100.00%
Types of Hair	Short	15	24.60%	24.60%
	Medium	25	41.00%	65.60%
	Long	21	34.40%	100.00%
Wearing Scarf	Yes	61	100.00%	100.00%
History of Head Lice Infestations	Do Not Know	11	18.00%	18.00%
	No	22	36.10%	54.10%
	Yes	29	45.90%	100.00%
Sharing Personal Items	No	10	16.40%	62.30%
	Yes	51	83.60%	100.00%

3.3 The Factors Influencing PC

Table 2 shows that the main factors influencing Pediculosis capitis (PC) are environmental and behavioural in nature. Environmental factors such as overcrowding and shared sleeping spaces were identified as the most critical contributors to head lice infestation, reported by 61 participants (100%). Crowded living environments and shared bedding arrangements were also highly prevalent, affecting 58 participants (95.1%). Personal hygiene practices, such as sharing personal items (e.g., combs, towels, or scarves), were reported by 51 participants (83.6%) and significantly contributed to infestation risk. Additionally, infrequent hair washing (reported by 45 participants, 73.8%) and poor combing habits (42 participants, 68.9%) were among the major behavioural factors associated with infestation. Knowledge-related issues were also significant. Limited understanding of preventive measures was reported by 47 participants (77.0%), while incorrect application of treatment products affected 49 participants (80.3%). Caregiver-related factors, such as limited supervision (38 participants, 62.3%) and inadequate health monitoring (41 participants, 67.2%), were also identified as contributing to the persistence of head lice infestations among orphans.

Table 2
The factors influencing PC

Category	Factors	Frequency	Percentage (%)
Environmental Factors	Crowded living conditions	61	100
	Shared sleeping areas	58	95.1
Personal Hygiene Practices	Infrequent hair washing	45	73.8
	Poor combing practices	42	68.9
	Sharing personal items	51	83.6
Knowledge-related Factors	Limited understanding of prevention	47	77
	Incorrect treatment application	49	80.3
Support System	Limited caregiver attention	38	62.3
	Lack of regular health monitoring	41	67.2

3.4 Attitude Factors contributed to PC

Table 3 presents the findings on attitude related factors contributing to Pediculosis capitis (PC). The major risk factor identified was sleeping in close proximity, which affected 55 respondents (90.2%). Another significant behavioural factor was the habit of sharing personal items such as combs, hats, or scarves, reported by 49 participants (80.3%). A high percentage of respondents also admitted poor hair-hygiene practices (46 participants, 75.4%) and long hair without proper management (43 participants, 70.5%). Furthermore, a previous history of head-lice infestation was reported by 37 participants (60.9%), suggesting a recurring cycle of re-infestation due to inadequate preventive behaviours. The findings indicate that both environmental and behavioural factors, particularly sleeping arrangements and sharing of personal items, are the primary contributors to head-lice infestation among orphaned children.

Table 3
Attitude factors contributed to PC

Risk Factor	Frequency	Percentage (%)
Sharing personal items	51	83.6
Sleeping in close proximity	55	90.2
Poor hair hygiene	46	75.4
Long hair without proper management	43	70.5
Previous history of infestation	37	60.7

3.5 Practice Factors Contributed to the Risk of PC

Table 4 presents the practice related factors that contributed to the risk of PC. The results indicated that most respondents, 38 (62.3%), washed their clothes at least once a week, while 13 (21.3%) washed them daily. However, 8 (13.1%) washed clothes twice a month, and only 2 (3.3%) washed them rarely. Sleeping together was a daily practice among 45 respondents (73.8%), while 16 (26.2%) reported never sleeping together. In terms of personal-item sharing, 53 respondents (86.9%) shared personal belongings daily, whereas 8 respondents (13.1%) did not engage in this behaviour. When it came to head-checking routines, 29 respondents (47.5%) checked their heads twice a month, while 25 (41.0%) performed checks at least once a week, and 7 (11.5%) rarely checked their hair. These findings suggest that frequent close contact, poor hygiene habits, and lack of regular head-checking contributed to the high rate of infestation among respondents.

Table 4
Practice Factors contributed to the Risk of PC

Risk Factor	Everyday	At least once a Week	Twice a Month	Rarely	Never
Wash clothes (R1)	13 (21.3%)	38 (62.3%)	8 (13.1%)	2 (3.3%)	0 (0%)
Sleep Together (R2)	45 (73.8%)	0 (0%)	0 (0%)	0 (0%)	16 (26.2%)
Share Personal Items (R3)	53 (86.9%)	0 (0%)	0 (0%)	0 (0%)	8 (13.1%)
Checking the head (R4)	0 (0%)	25 (41.0%)	29 (47.5%)	7 (11.5%)	0 (0%)

3.6 Knowledge, Attitude, and Practice Scores Pre Intervention

Table 5 presents the pre-intervention levels of knowledge, attitude, and practice (KAP) related to PC among participants. For the knowledge component, scores ranged from 0–12 and were categorized as low (0–4), medium (5–8), and high (9–12). Results showed that 35.1% of respondents had low knowledge, 52.5% most of them had medium knowledge, and 12.4% had high knowledge, with a mean score of 5.67 (SD = 2.34). These findings indicate that more than half of the participants possessed only a moderate understanding of head lice infestation.

For the attitude component, scores ranged from 10–40, classified as poor (10–20), fair (21–30), and good (31–40). About 18.2% of respondents demonstrated a poor attitude, while the majority, 54.5% had a fair attitude, and 27.3% had a good attitude toward head lice prevention, with a mean score of 28.9 (SD = 5.67). This suggests that most participants had a fair attitude, though some exhibited positive perceptions toward prevention and management.

The practice component used a score range of 4–16, categorized as poor (4–8), fair (9–12), and good (13–16). Results showed that 15.8% of respondents demonstrated poor practices regarding PC prevention and management, while the majority, 45.6%, exhibited fair practices. Approximately 38.6% of respondents displayed good practices, reflecting strong adherence to proper hygiene and effective preventive strategies. With a mean score of 12.3 (SD = 2.89), indicate that while many respondents practiced moderate preventive measures, consistent hygiene and lice control behaviours were still lacking. This indicates that although some preventive behaviours were adopted, consistency and reinforcement remain limited.

Overall, respondents demonstrated moderate levels of knowledge, attitude, and practice before the intervention, highlighting the need for structured health education programs to strengthen awareness, foster positive attitudes, and encourage sustained preventive behaviours against PC.

Table 5

Pre-Intervention Knowledge, Attitude, and Practice (KAP) Scores among Participants

Component	Score Range	Category	Percentage (%)	Mean (SD)	Interpretation
Knowledge	0–4	Low	35.1	5.67 (2.34)	A significant proportion has low knowledge.
	5–8	Medium	52.5		Most participants fall in this range.
	9–12	High	12.4		Only a small fraction has high knowledge.
Attitude	10–20	Poor	18.2	28.9 (5.67)	A minority has a poor attitude.
	21–30	Fair	54.5		The majority exhibit a fair attitude.
	31–40	Good	27.3		A notable proportion shows a good attitude.
Practice	4–8	Poor	15.8	12.3 (2.89)	A small group has poor practices.
	9–12	Fair	45.6		Many participants demonstrate fair practices.
	13–16	Good	38.6		A significant proportion exhibit good practice.

3.7 Pair T-Tests for Knowledge, Attitude, and Practice Scores

Table 6 presents the paired t-test results comparing pre-intervention, first-month, and second-month scores for knowledge, attitude, and practice regarding PC. The findings demonstrate statistically significant improvements ($p < 0.001$) across all components following the intervention. Knowledge scores showed the largest increase, with mean differences of 45.90 at one month and 60.66 at two months, indicating a sustained enhancement in understanding over time. Similarly, attitude scores improved significantly (40.98 at one month; 52.46 at two months), reflecting a more positive perception toward head lice prevention and management. Practice scores also increased notably (43.17 at one month; 55.19 at two months), suggesting improved behavioural implementation of learned strategies. The consistently high t-values confirm the effectiveness of the educational intervention in enhancing knowledge, attitude, and practice among participants, supporting the positive impact of structured health education on PC control.

Table 6

Pair T-Tests for Knowledge, Attitude, and Practice Scores

Component	Comparison	Mean Difference	SD	t-value	df	p-value
Knowledge	Pre vs. 1st Month	45.90	12.3	29.13	61	<0.001
	Pre vs. 2nd Month	60.66	11.8	40.13	61	<0.001
Attitude	Pre vs. 1st Month	40.98	11.5	27.82	61	<0.001
	Pre vs. 2nd Month	52.46	10.9	37.56	61	<0.001
Practice	Pre vs. 1st Month	43.17	12.7	26.51	61	<0.001
	Pre vs. 2nd Month	55.19	11.4	37.76	61	<0.001

3.8 Analysis of the Impact of Nursing Care Intervention Program on Knowledge, Attitude, and Practice of Pediculosis Capitis among Orphans

Table 7 analysis revealed a significant reduction in PC infection rates following the intervention ($F = 78.3$, $p < 0.001$), indicating the program's effectiveness in controlling infestation. Substantial improvements were also observed in knowledge, attitude, and practice (KAP) across both post-intervention periods. Knowledge scores increased significantly at the first ($t = 15.2$) and second month ($t = 22.7$), demonstrating sustained learning retention. Similarly, attitude scores improved notably ($t = 14.8$; $t = 20.3$), reflecting positive behavioural shifts toward prevention and management. Practice scores showed strong enhancement ($t = 16.5$; $t = 23.1$), indicating improved application of preventive measures. Overall, the findings confirm the health education intervention's significant and lasting impact on reducing infection and improving KAP among participants

Table 7

Analysis of the Impact of Nursing Care Intervention Program on Knowledge, Attitude, and Practice of Pediculosis Capitis among Orphans

Analysis Type	Statistic		Result
Infection Rates	F-statistic = 78.3		Significant reduction ($p < 0.001$)
KAP Improvements	1st Month	2nd Month	
Knowledge	$t = 15.2$	$t = 22.7$	($p < 0.001$)
Attitude	$t = 14.8$	$t = 20.3$	($p < 0.001$)
Practice	$t = 16.5$	$t = 23.1$	($p < 0.001$)

3.9 Comparison of Practice Scores Changes Improvements After Nursing Care Intervention

Figure 2 illustrates the improvement in practice scores following the nursing care intervention. The average practice score for hair washing increased from 3.54 in the pre-test to 4.00 in post-test 1, maintaining a perfect score of 4.00 in post-test 2. This finding indicates that participants fully adopted

and consistently maintained the recommended hair-washing practice after the intervention. Similarly, the average score for clothes washing rose from 3.93 pre-test to 4.00 in post-test 1 and remained stable in post-test 2, reflecting complete adherence to proper hygiene behaviour. These results highlight the intervention's effectiveness in reinforcing hygiene habits related to clothing cleanliness. Regular head-checking practices also improved steadily, increasing from 3.18 in the pre-test to 3.54 in post-test 1, and further to 4.00 in post-test 2. This gradual yet consistent increase suggests that the intervention successfully instilled long-term compliance and awareness regarding self-inspection and early detection. In contrast, the practice of sharing personal items showed a slightly different pattern. The average score increased modestly from 1.52 in pre-test to 1.57 in post-test 1, but declined to 1.00 in post-test 2. This trend indicates that although immediate behavioural change was minimal, continuous intervention eventually discouraged the sharing of personal items, a key factor in preventing head lice transmission.

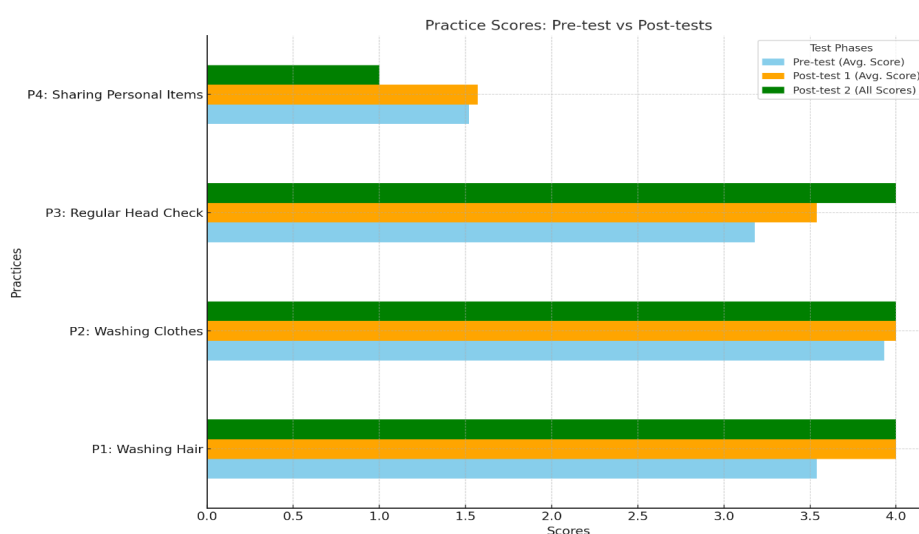


Fig. 2. Comparative on Practice Changes after Healthcare Intervention

3.10 The Impact of Nursing Care Intervention Program of Practice-Related Behaviours

Table 8 presents the findings on improvements in practice-related behaviours among orphans with Pediculosis capitis following the nursing care intervention program. The mean score for washing hair (P1) increased from 3.52 ± 0.50 (pre-intervention) to 4.00 ± 0.00 (post-intervention), showing a mean difference of 0.48. The Wilcoxon signed-rank test produced a Z-score of -3.742 ($p < 0.001$), indicating a statistically significant improvement. The effect size ($r = 0.38$) suggests a moderate effect, showing that the intervention effectively enhanced hair-washing behaviour. For washing clothes (P2), the mean score rose from 3.85 ± 0.36 to 4.00 ± 0.00 , with a mean difference of 0.15. The Z-score (-2.236 , $p = 0.025$) also shows a significant improvement, although the effect size ($r = 0.23$) indicates a small impact compared to other practices. Regarding head checking (P3), the mean score increased from 3.12 ± 0.82 to 4.00 ± 0.00 , yielding a Z-score of -4.123 ($p < 0.001$) and a moderate effect size ($r = 0.42$). This finding suggests that the intervention significantly reinforced the habit of regular head-checking, a critical behaviour for early detection of head-lice infestation. For sharing personal items (P4), a decrease in mean score from 1.52 ± 0.89 to 1.00 ± 0.00 was observed. The Z-score (-3.891 , $p < 0.001$) indicates a statistically significant reduction, with a moderate effect size ($r = 0.40$). This demonstrates that the intervention effectively discouraged the sharing of personal items, a key behaviour linked to lice transmission.

Table 8

The Impact of Nursing Care Intervention Program on Practice-Related Behaviours After Intervention

Practice	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	Change	Z-Score	p-Value	Effect Size (r)
P1 (Washing Hair)	3.52 ± 0.50	4.00 ± 0.00	↑ 0.48	-3.742	<0.001	0.38
P2 (Washing Clothes)	3.85 ± 0.36	4.00 ± 0.00	↑ 0.15	-2.236	0.025	0.23
P3 (Head Check)	3.12 ± 0.82	4.00 ± 0.00	↑ 0.88	-4.123	<0.001	0.42
P4 (Sharing Items)	1.52 ± 0.89	1.00 ± 0.00	↓ 0.52	-3.891	<0.001	0.40

4. Limitations and Recommendations

This study has several limitations that should be acknowledged. The absence of a control group limits the ability to attribute behavioural changes solely to the intervention. The relatively small sample size ($n = 61$) and focus on a single institutional setting restrict the generalisability of the findings to other populations or contexts. Additionally, the short follow-up period may also restrict the assessment of long-term sustainability of behavioural changes over time.

Future research should include larger and more diverse samples across multiple institutions to enhance generalisability and external validity. Adopt controlled or randomised longitudinal designs and include extended follow-up assessments allows stronger and strengthen causal inference and validate the effectiveness of similar interventions across different settings on PC prevention. Additionally, integrating mixed-method approaches such as qualitative interviews and observational assessments could provide deeper insights into behavioural factors influencing reinfestation and the sustainability of preventive efforts.

While the findings offer valuable insights for improving Pediculosis capitis management, their applicability should be interpreted within the context of the study setting. As this research was conducted in a single institutional site, the results may not fully represent all institutional or regional contexts in Malaysia. Nonetheless, the findings can serve as a foundation for further studies and may inform future policy development once validated in larger, multi-site investigations. Given the single-site quasi-experimental design, the results should be viewed as preliminary evidence rather than generalizable conclusions. Future multi-centre studies are recommended to confirm these findings across diverse institutional environments and enhance the external validity of the intervention model.

5. Conclusion

This study highlights that sustainable management of Pediculosis capitis requires more than knowledge enhancement; it demands consistent behavioural reinforcement supported by structured nursing interventions. The nursing intervention program proved effective in healthcare education, combining education, skills training, and motivational reinforcement to enhance children's self-efficacy and hygiene practices into practical behavioural change, demonstrating measurable improvements in hygiene practices and reduced infestation rates among institutionalised children.

The quasi-experimental design enabled systematic assessment of behavioural changes over time, providing empirical evidence that educational nursing care interventions can significantly foster sustained preventive behaviours and reduce lice infestation rates. However, the results should be interpreted cautiously due to methodological constraints, including the absence of a control group, small sample size, single-site design, and short follow-up period, which may limit generalisability of

the results beyond the study setting. Despite these limitations, the study offers valuable preliminary insights for strengthening preventive programs and supporting policy development, integrating routine health education into institutional care in a similar environment.

Expanding the study across multiple sites with longer follow-up and controlled designs is recommended to validate and reinforce these findings. Future initiatives should emphasise community engagement and long-term evaluation to sustain head lice prevention efforts in Malaysia and similar contexts. This study provides a practical, evidence-based model for integrating behavioural and educational interventions into public health programmes, demonstrating measurable improvements through a low-cost nursing care approach. The findings offer actionable insights for policymakers, supporting the inclusion of similar interventions within national child health initiatives to enhance institutional hygiene and reduce parasitic infections and promoting overall child well-being. Overall, the research contributes to advancing child health promotion and informs policy development through structured, school- and institution-based educational strategies that empower both caregivers and children.

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