Effect of Pender's health promotion intervention on nail biting among school age children and their mothers

Nagwa Ibrahim El dosoky [1], Amal Mohamed El-Dakhankhny[2] , and Rasha Abd Elateef Abd Elaziz Ramadan [3]

(1) Teaching Instructor at specialized kafr shokr Secondary Technical Nursing School,Egypt
(2) Professor of Pediatric Nursing Faculty of Nursing- zagazig University,Egypt and
(3) Lecturer of Pediatric Nursing– Faculty of Nursing- zagazig University,Egypt

Abstract

Background: *Nail biting is one of the most prevalent oral habits, and commonly observed in school age children.* ***Aim of the study:*** *was to evaluate the impact of Pender's health promotion intervention on nail biting among school age kids and their mothers.* ***Research design:*** *A quasi-experimental design has been utilized.* ***Setting:*** *this research has been performed in El-Naseria primary school at El-Zohor and Kafr Mohammed Hussein primary school in Zagazig city Al-sharkia governorate, Egypt.* ***Subjects:*** *this research has been performed on a purposive sample of 80 school age children and their mothers who were randomly selected.****Tools of data collection:*** *Five tools have been utilized as follows: questionnaire interview sheet, observational assessment screening sheet, nail biting likert scale, Pender's health promotion structured questionnaire and measuring tape.* ***Results:*** *the study showed that the total mean scores of children and their mother's knowledge were significantly improved following implementation of the program.* ***Conclusion:*** *Pender health promotion intervention was effective in improving children and their mother's knowledge.* ***Recommendations:*** *Pender's health promotion intervention is highly recommended for preventing nail biting habits at schools when possible, ongoing in-service health education programs depend on the application of Pender's health promotion model for children with nail biting.*

Keywords: *School age children, Nail biting, Mothers, Pender's health promotion model*

Introduction

Children aged from 6 to 12 years , known as school-age children, are in a crucial phase of development where they gain essential skills and knowledge that influence their future. This stage is characterized by notable physical, cognitive, and social advancements. They start formal schooling, which not only boosts their intellectual capabilities but also encourages social interactions and the formation of friendships. Throughout these years, children learn vital life skills like problem-solving, critical thinking, and teamwork. Extracurricular activities such as sports and arts significantly contribute to their holistic development, enhancing physical health and fostering creativity (**de Bree et al., 2024)**.

Bilkhiwal et al., (2024) reported that nail biting is a persistent condition characterized by repetitive and compulsive behavior, commonly observed in the pediatric and young adult populations. The etiology of nail biting involves a multitude of factors, encompassing genetic predisposition and concomitant psychiatric disorders. Consequences of persistent and compulsive nail biting encompass evident deformity of the nail bed, along with susceptibility to both nail and oral infections. Individuals with nail-biting tendencies typically exhibit sub optimal oral hygiene practices, resulting in potential dental issues such as tooth fractures, notches, and

gingiva inflammation.

Worldwide, Nail biting is a common condition affecting children n children 37% prevalence among those aged from 3 to 21 years. It usually begins around the ages of 3 to 4 and can persist through adolescence. It often emerges as a modified oral habit and can evolve into lip biting as a coping mechanism for increasing stress **(Lawal et al., 2024)**.

Lee & Lipner (2022) defined nail biting as the persistent chewing of the nail folds, nail plate, nail bed, and/or cuticle. It is believed to impact roughly twenty to thirty percent of the general population and up to forty-five percent of individuals aged between ten and puberty. Nail biting prevalence generally diminishes with age, although certain people may persist in or initiate this habit during adulthood . Specific demographics, including college students suffering elevated stress levels, are especially susceptible to this tendency. The true prevalence is likely underestimated, as patient can feel shame and thus avoid seeking medical assistance. Certain people may fail to recognize nail biting as an incurable illness or may be unaware that healthcare experts might provide support in its management.

Nail biting is a common issue encountered by physicians across various specialties such as dermatology, pediatrics, psychiatry, and internal medicine. Onychophagia, as it is known, is considered a type of compulsion that results in nail damage. This habit can lead to complications in the nail unit and oral health, which can greatly diminish the quality of life. Additionally, it can have detrimental psychological and social impacts on individuals (**Shin et al., 2021)**. Onychophagia involves the act of biting the nails of either the hands or feet after placing thumbs, fingers, or toes in the mouth. Conversely, the term onychophagia is misleading as it implies not only nail biting but also nail consumption. While some nail biters may consume the nail plate, most do not engage in this behavior (**Cohen, 2022)**.

The Health Promotion Model(HPM) pinpoints elements that affect health behaviors. Pender's Health Promotion Model (PHPM) is extensively utilized to detect and modify unhealthy habits while encouraging health. The model predicts and explains health behaviors through factors like self-efficacy, barriers, perceived benefits, behavioral emotions, and both interpersonal and situational effects. Recent studies have highlighted these constructs as the most significant predictors of nutritional and self-care behaviors **(Gomez, 2024)**.

The PHPM is widely used to address and alter harmful behaviors while promoting health. Numerous studies have shown the effectiveness of PHPM in reducing detrimental habits. It is based on the theory of social cognition, which posits that participation in wellness-promoting activities is affected by cognitive and perceptual factors like perceived benefits, barriers, and self-efficacy. These factors interact to shape cognitive and perceptual processes. Additional influencing factors include socioeconomic characteristics, interpersonal influences, as well as behavior **(Amiri et al., 2023)**.

pediatric nurse practitioners,School nurses, and public health nurses have distinct chances to spot students with nail-biting habits early on through various activities. These include health screenings and enrollment examinations. A visual check of the hands can reveal potential signs of nail damage associated with biting **(Kaushik & Sood, 2024)**.

Nurses might implement various interventions to mitigate potential risks associated with nail-biting, such as skin damage, infections, and dental issues. These interventions can be grounded in behavioral change models, like the health improvement model. They can promote behavioral change by devising a plan that includes educating and counseling students and their families,

conducting motivational interviews, offering nail care, and managing cases with appropriate referrals **(Azizi et al., 2024 &Baghchechi et al.,2021)**.

Both mothers and nurses play crucial roles in addressing nail biting behavior. Mothers, as primary caregivers can help by providing emotional support, identifying triggers and fostering healthy coping mechanisms for stress. School nurses play a crucial role in managing biting incidents and providing education in school settings **(Kamer et al., 2023&Collins et al., 2019)**.

Significant of the study

Nail biting unhealthy oral habits influences children health ,it was reported that many complications are associated with nail biting as cosmetics purpose, social impairment, emotional suffering and if it is neglected case deteriorates. Nail biting adversely impacts both the mental and physical health of children. Physical complications include problems with dentistry like painful blisters,malocclusion, abscesses, and gum injuries, as well as pain in the jaw joint **(Pacan et al., 2014; Halteh et al., 2017)**.Nail biting also cause malformed nails, and parasitic infections. Therefore, it is important that nail biting in school age children to be accurately identified and appropriately managed for protective adverse effects in the long term (**Winebrake et al., 2018).**

Aim of study:

Identify the effect of Pender's health promotion intervention on nail biting among school age children and their mothers.

Research Hypothesis

- Pender's health promotion intervention program improves mothers knowledge about nail biting.
- Intervention program enhances mothers practices in management of children with nail biting.
- The Pender's health promotion intervention program improves clinical outcomes of children with nail biting and minimizes complications.

Subjects and Methods:

study Design

A quasi-experimental design has been conducted for this research. There were three periods of data collection: pre, post and follow up three months later to determine the stability and changes in nail biting behavior.

Sample and Setting

A purposive sample of school age children aged from six to twelve years old with nail biting habits and their mothers were included after their acceptance to participate in the study .

The study has been performed in El – Naseria primary school at El- zohor and kafr Mohammed Hussein primary school in zagazig city.

Measures tools for data collection

Five tools have been utilized to collect pertinent data related to the study purpose as follow:

Tool (I): An interview questionnaire sheet :It has been developed by the researchers to collect data about social characteristics of studied children, characteristics of their parents and mother's knowledge about nail biting habits.It includes the following:-

Part 1: Characteristics of the studied subjects:

Characteristics of children include gender, age, education level, class number, order of child in family, hobbies.

Characteristics of mothers it includes age, education, occupation, number of family members,

telephone number and address .

Part 2: A: Mother's knowledge assessment about nail biting habit:

This part of questionnaire has been developed by the researcher base on literature reviews and guided by **Wolter (2020)** . It was included mother's knowledge about nail biting, self- efficacy of participating mother in stopping of nail biting habits.

Part 2:B: Children knowledge assessment about nail biting habit:

This part of questionnaire has been developed by the researchers base on literature reviews and guided by **Wolter (2020).**It was included children's knowledge about nail biting.The items scores are summed to produce a total score range (0-31).

Scoring system for each question:-

Items Score

- Don't know 0
- Incomplete 1
- Complete 2

Total score will be established as follows:(0-31)

Items Score

- Poor knowledge < 60%
- Good knowledge > 60%

Tool (II): **Observational Assessment Screening Sheet for nails abnormality:**

The researchers were developed it and it was guided by **(Siddiqui, 2017).**It was contained children's name, telephone number and shape of nails, color of skin around nail, blood around nail or not.

Tool (III): Nail biting likert scale questionnaire:

The questionnaire was adopted from the Massachusetts General Hospital (MGH) ,hair pulling scale **(Keuthen et al., 1995)**. The design was adopted by the researcher to collect data about intensity and frequency of urges of nail biting, ability to control this urges, attempts to resist nail biting , in addition to control over nail biting. The items scores are summed to produce a total score range (0-28).

Scoring system for each question:-

Items Score

- Never 0
- Rarely 1
- Sometimes 2
- Often 3
- Always 4

Total scoring system for nail biting (0-28):

Items Score

- None <7
- Mild 7<14
- Moderate 14<21
- Severe More than 21

Tool (IV): Pender's Health Promotion Structured Questionnaire:

The questionnaire has been based on Pender's Health Promotion Model. It was developed by **Pender (2011)** and adopted by the researchers to collect data about mothers and children

perceptions about nail biting repetitive habits experience, perceived benefits and barriers, interpersonal influences and situational influences ,as well as behavioral outcomes.

Total score will be determined as follow:-

Items Score

- Mild < 40%
- Moderate 40<70%
- Severe > 70%

Tool (V): Measuring tape:

It is a long ,soft and flexible ruler used to measure size or length of things. It is made from plastic or fiber glass with linear measurement markings. There is a centimeter scale on the back which is printed in centimeters. It is ranging from 0 to 150 centimeters. Nail length will be quantified in millimeters. The lengths of all children fingernails will be measured . The length is defined as the maximum distance from the base of the nail to its tip. **(Twohig & Woods., 2001)**.

Content validity and reliability

To ensure validity, the tolls have been evaluated by three experts professors in pediatric nursing, who evaluated them for clarity, applicability, relevance, comprehensiveness, understanding, and simplicity of use. The modifications have been implemented according to the feedback from the three specialists, and the final versions have been prepared for utilization. Validation has been attained through an agreement among most reviewers.

Reliability test by cronbach alpha test:

Tool	Score	Interpretation
1-Total child knowledge	0.851	Good reliability
2-Total mothers' knowledge	0.876	Good reliability
3-Total severity of nail biting	0.832	Good reliability
4-Total children perception of nail biting	0.811	Good reliability
5-Total mothers` perception of nail biting	0.835	Good reliability

Ethical Considerations

A Formal approval for the research has been gotten from the ethics committee of the faculty of Nursing , Zagazig university, Egypt. Also, formal agreement has been acquired from the dean of the faculty of nursing and the administration approval for collection from El – Naseria primary school at El- zohor and kafr Mohammed Hussein primary school in zagazig city, Egypt. Oral consent was secured from studied children and their mothers before participation. During initial interview, the study's purpose and procedures were clearly explained .participants were assured of confidentiality, with all information handled securely to protect their privacy.It was emphasized that participation was entirely voluntary ,and individuals could withdraw or decline to participate at any time with consequences.It was emphasized that information will be utilized for the research purpose only. Additionally, it was clarified that there were no associated costs for participating in the research. The study questionnaire was administered directly by the researchers to both the children and their mothers , they have been informed about the study's purpose and encouraged to share their feelings openly.

Field of Work

Data collecting was conducted six months from the beginning of October 2023 to the end of March 2024. children and their mothers were met by the researcher 2 days weekly from 9 am to 1 pm. The researchers interviewed the children and their mothers individually and in small groups according to their availability(children and their mothers was divided into small groups; each groups was consisted of 15-20 children's and their mother). Following the acquisition of formal permission , the pilot testing of the study tools has been conducted and examined. (after the children entrance into school or before their going to home in the end of the school day).

Phases of the Program

(I) Assessment Phase (preparatory phase)

The educational program has been designed to evaluate the knowledge, reported practices, and attitudes of children and their mothers prior to the program's implementation. The evaluation has been conducted before the program's implementation by individually interviewing each mother to evaluate their knowledge, practices, and attitudes (pretest) utilizing Tool 1, following an explanation of the study's objectives and obtaining their consent to participate. The evaluation step illuminated deficiencies in mothers' knowledge and practices , facilitating the identification of their educational needs.

(II) Planning Phase

Based from the results of the evaluation phase, pilot study, and pertinent literature review, the researchers devised and structured the intervention. Identified needs, requirements, and deficiencies have been converted into the aims and objectives of the program, which have been assembled into a booklet prepared by the researchers.The content was validated by a scientific committee consisting of three experts in pediatric nursing and was subsequently planned for distribution to mothers as a learning guide. Teaching approaches have been chosen for small group teaching through lectures, group discussions, and demonstrations. Teaching materials have been developed in the form of a handbook, brochures, videos, and colored posters that involved both theoretical and practical knowledge.

(III) Implementation Phase lasted 3 months

The educational program of this study has been carried out through eight sessions, six sessions for children and two for the mothers given the program individually or in groups regarding their availability. The extent of each session varied according to the content of the session and the mother's responses and it varied from 15-30 minutes.Each child received a handbook(translated into Arabic).

The sessions covered the following topics:

The first session: In this initial session the researchers introduced themselves , clarified the aim of the program, determine the timetable that was two days/week for each children and their mothers.

The second session: This session involved providing knowledge about definition of nail biting and anatomy of nails to children.

The third session: This session involved the children can mention the signs and symptoms of nail biting and identify the most common factors that increase the incidence of nail biting.

The fourth session: This session about causes of nail biting.

The fifth session: This session about complications of nail biting.

The sixth session: This session about the methods of prevention of nail biting.

The seventh session: This session about improving the children and their mothers knowledge about management of nail biting.

The eighth session: By the end of this session the mothers and their children able to discuss all items related to program. The researchers acknowledge the mother's role and wish all the best in her life with their children. The researchers asked the mothers for their phone number to contact them to complete the post-test and monitoring regarding their reported practices and attitude.

Each session started with a summary of the preceding session and the objectives of the current one, while considering the usage of Arabic language appropriate for the children's proficiency and their mothers' educational background. Motivation and reinforcement have been utilized throughout the session to improve the learning of both children and their mothers.

(IV) Evaluation Phase

In this phase evaluation of Pender's health promotion intervention program for mothers and their children were interviewed individually immediately following implementation of the educational program to reported practices and attitude.

The Follow up phase: is the second evaluation using the same tools three months later after the implementation period.It began after all children and their mothers attended all sessions of the program.

Pilot Study

The pilot study has been carried out involving ten percent of the total sample of children and their mothers to evaluate the applicability, consistency, clarity, and feasibility of the tools, as well as identify the time required to complete the tools. Participants in the pilot study have been incorporated into the main study sample, as no significant modifications were necessary for the study tools.

Statistical Analysis

The data gathered from the sample analyzed has been reviewed, encoded, and input utilizing a Personal Computer (PC). Data entry and statistical analysis have been conducted utilizing version 22 of the Statistical Package for Social Sciences (SPSS). Data has been presented utilizing descriptive statistics, including frequencies, percentages, and mean standard deviation. A correlation coefficient the "Pearson correlation" is a quantitative metric that indicates the statistical correlation among two variables. A t-test is a statistical procedure utilized to compare the means of two groups. Chi-square (χ^2) is a statistical test utilized to ascertain the association among categorical variables. ANOVA, or Analysis of Variance, is a statistical technique utilized to compare the means of three or more groups. Linear regression is a statistical technique utilized to characterize the association among a dependent variable as well as one or more independent variables.

Significance of the results:

- Highly significant at p-value < 0.01.
- Statistically significant was considered at p-value < 0.05
- Non-significant at p-value ≥ 0.05

Results

Table (1): Characteristics of the Studied children(n=80)

Table (1) clarifies the characteristics of the studied children. It was found that, 42.5% have been aged from 11 to 12 years with mean of age 7.42±(3.77) years, 97.5% of them living with father and mother. Regarding hobbies, 67.5% did not have preferred hobbies,73.1% mentioned drawing as their preferred hobby, and 64.8% cited that they had no time as the reason for not having preferred hobbies.The same table also revealed that 51.3% of children did not practice any sport, 53.8% did not have academic achievement problems, while 45.9% of those who had

problems cited the curriculum as the cause of academic achievement problems. Furthermore, 85.0% of children had a bad relationship with their family, and 75.0% experienced problems among their family members.

personal characteristics of the studied mothers were portrayed in **table (2)**, It has been discovered that 72.5% of mothers were aged from 31to 40 years old with mean of age 33.87 **±(** 9.29)years, 48.75% had a university educational level, and 67.5% were working , as well as 91.25% did not have enough monthly income. Also, 62.5% of parents did not suffer from nail-biting habits, as well as 98.75% of parents did not suffer from psychiatric disorders.
Table (3) illustrates Personal history of the studied children , it was found that, 86.25% of studied children reported that their mother and father did not have good relationship , 71.25% of the children started nail biting for the first time at school, in addition to 91.25% of them did not suffer from chronic diseases, as well as 75.0% of them did not suffer from psychological problems. The same table showed that 55.0% of the children had problems related to academic achievement and 78.75% of the children experienced a bad relationship with their family.

Total mothers' and children' knowledge score regarding nail biting habits was presented in **table (4)** , it was found that, there was highly statistically significantly improved of the mothers' knowledge about nail-biting habits, demonstrating both effectiveness and sustainability. Initially, 96.25% of the mothers had poor knowledge before implementation of the intervention. This percentage significantly decreased to 1.25% in the post-test and further to 2.5% in the follow-up. Also, it was found a highly statistically significant improvement in the children's knowledge about nail biting habits from the pre-test to the post-test and follow-up stages. Initially, 100% of the children had poor knowledge about nail biting habits prior to implementation of the program. This percentage significantly reduced to 42.5% in the post-test and further to 33.75% in the follow-up.

Table (5) indicates nail biting among the studied children , it was found that a highly significant improvement in children's nail-biting behaviors post-intervention. The frequency of feeling the urge to bite nails significantly decreased, with 70% of children reporting "never" feeling the urge at follow-up ($p = .000$). The ability to control these urges improved, with 53.75% always able to control the urge at follow-up ($p = .000$). The frequency of actual nail-biting also decreased, as 53.75% rarely biting their nails at follow-up ($p = .000$).
Also, 55% of children never attempted to resist nail-biting before the intervention , which dropped to 1.25% and 0% after the intervention and at follow-up ($p = .000$). Conversely, the percentage of children always attempting to resist nail bitting increased from 0% before the intervention to 33.75% after the intervention and 80% at follow-up ($p = .000$). Additionally, control over nail-biting improved significantly, as 51.25% having no control pre-test, reducing to 3.75% post-test, and 0% at follow-up ($p = .000$). Distress associated with nail-biting also decreased markedly indicating the intervention's efficacy.

Distribution of the studied children and their mothers regarding total perception of nail biting throughout the study phases was illustrated in **table (6)**, Concerning the children's overall perception of nail biting, a statistically significant enhancement has been observed across the three stages of program implementation (before, after, and follow-up), with means of 1.45±0.46,

2.79±0.23, and 7.01±0.24, respectively. The difference were statistically significant (p=0.000).Also, studied mother total perception scores improved markedly from 1.8 before the intervention to 5.9 at follow up .

Figure (1) shows Percentage distribution of the studied children according to their mean length of their nails in millimeters throughout the study phases, it was found that there was an improvement in nail length through the three study phases of implementation of the program (before, after and follow up) with mean 3.25+ of 0.38 ,3.79+ 0.34 and5.27+ 0.26 respectively. The differences were statistically significant ($p < 0.0001$).)

The effect size of Pender's Health Promotion Model on various studied variables was portrayed in **figure (2)** , It was found asignificant effect size on total children knowledge about 9.46%, total mothers' knowledge is 7.59%, total severity of nail biting is 7.61%, total children perception of nail biting is 8.43%, total mothers' perception of nail biting is 6.76%, and the length of children's nails is 5.32%.

Assessment screening for nails abnormality of the studied children was presented in **Figure (3),** It was found that 58.75% of studied children had skin color around their nails that was not pink, 53.75% had normal nail shape, as well as 72.5% did not had blood around their nails.

Table (7) outlines relation among characteristics of the examined mothers , their total mean knowledge and total perception of nail biting it was found that mother age shows a highly significant impact on both total knowledge ($p < 0.01$) and total perception ($p < 0.01$), with older mothers (>40 years) having higher scores, urban mothers showing significantly higher knowledge and perception scores compared to rural mothers ($p < 0.01$), also mothers with university education had the highest scores in both knowledge and perception ($p < 0.01$).

Correlation between the studied variables post intervention was illustrated in **table (8)** which reflects significant positive association among total child knowledge and total mothers' knowledge ($r = .439$, $p = .04$). There was also a strong negative association among total severity of nail biting and total mothers' perception of nail biting ($r = -.537$, $p = .05$). Additionally, a very strong positive correlation exists between total children's perception of nail biting and total child knowledge ($r = .878$, $p = .000$), highlighting the impact of knowledge on perceptions post-intervention. Finally, the correlation between total mothers' perception of nail biting and total mothers' knowledge was highly significant ($r = .812$, $p = .000$), indicating that mothers' knowledge significantly influences their perception of their child's nail-biting behavior.

Table (9) shows the results of a multivariate regression analysis on the total knowledge of studied children. Age negatively impacts knowledge ($B = -1.184$, $p = .005$), and had academic achievement problems also shows a negative effect ($B = -0.487$, $p = .001$). Conversely, a positive relationship with the family significantly improves children's knowledge ($B = 1.135$, $p = .000$). The overall regression model is significant ($F = 2.678$, $p = .000$), indicating the model's predictors effectively explain the variations in children's total knowledge.

Multivariate regression analysis to illustrate total studied children` nail biting severity was presented in **table (10)** , it was found that multiple factors significantly influence the severity of nail-biting among the studied children. Age had a significant impact ($p = .012$), indicating that as children get older, the severity of nail-biting decreases. Had preferred hobbies ($p = .02$) and practicing certain sports ($p = .000$) also significantly reduces nail-biting severity. Conversely,

academic achievement problems (p = .01) and family relationships (p = .001) significantly affect nail-biting severity negatively. The overall model was significant with F=2.413F = 2.413F=2.413 and p=.02p = .02p=.02, showing that these variables collectively explain a significant portion of the variance in nail-biting severity.

Table (1): Characteristics of studied children (number=80).

Characters	N	%
Age (Years)		
-6-	18	22.5
-8-	28	35.0
-11-12	34	42.5
Mean ± SD= 7.42±3.77		
Living with		
-Father and mother	78	97.5
-Grandfather or grandmother	2	2.5
Having preferred hobbies		
-Yes	26	32.5
-No	54	67.5
In case of yes, the hobby is (No:26)		
-Drawing	19	73.1
-Playing music	5	19.2
-Singing	2	7.7
In case of no, the reasons are (No: 54)		
-No time	35	64.8
-No guidance	19	35.2
Practicing certain sport		
-Yes	39	48.8
-No	41	51.2
Having academic achievement problems		
-Yes	37	46.2
-No	43	53.8
In case of yes, the problems causes are (No:37)		
-Curriculum	17	45.9
-Teachers	5	13.5
-Friends	3	8.1
-Don`t know	12	32.4
Relationship with the family		
-Good	12	15.0
-Bad	68	85.0

Table (2): Personal characteristics of the studied mothers (n=80).

Characteristics	N	%
Age (Year)		
-20-	10	12.5
-30-	58	72.5
>40	12	15.0
Mean± SD= 33.87 ± 9.29		
Educational level		
-Illiterate	2	2.5
-Primary education	8	10.0
-Elementary	7	8.75
-Secondary	24	30.0
-University	39	48.75
Monthly income		
-Enough	7	8.75
-Not enough	73	91.25
Parents suffered from nail biting habits		
-Yes	30	37.5
-No	50	62.5
Parents suffered from psychiatric disorders		
-Yes	1	1.25
-No	79	98.75

Table (3): Personal history of the studied children (n=80).

Items	N	%
Good relationship between father and mother		
-Yes	21	26.25
-No	69	86.25
Child nail biting first time		
-Preschool	23	28.75
-At school	57	71.25
Child suffering from chronic diseases		
-Yes	7	8.75
-No	73	91.25
Child suffering from psychological problems		
-Yes	20	25.0
-No	60	75.0
Problems related academic achievement of child		
-Yes	44	55.0
-No	36	45.0
Relationship of the child with his family		
-Good	17	21.25
-Bad	63	78.75

Table (4): Total children and mothers' knowledge score regarding nail biting habits (n=80).

Items	Pre- test		Post- test		$X^2$1 P1	Follow-up		$X^2$2 P2
	No	%	No	%		No	%	
Total mother Knowledge (n=80)								
Poor	77	96.25	1	1.25	29.17 .000**	2	2.5	28.46 .000**
Good	3	3.75	79	98.75		78	97.5	
Total children Knowledge(n=80)								
Poor	80	100	34	42.5	17.26 .000**	27	33.75	23.58 .00**
Good	0	0.0	46	57.5		53	66.25	

(**) Highly significant at p<0.01 (*) statistically significant at p≤0.05 ($X^2$1&P1) between pre and post ($X^2$2&P2) between pre and follow up.

Table (5): Nail biting among the studied children (n=80).

Items	Pre- test		Post- test		$X^2$1	Follow-up		$X^2$2
	No	%	No	%	P1	No	%	P2
Frequency of feeling the urge to bite nails:-								
-Never	0	0	30	37.5	7.89	56	70	28.03
-Rarely	2	2.5	21	26.25	.003**	13	16.25	.000*
-Sometimes	12	15	20	25		10	12.5	
-Often	33	41.25	7	8.75		1	1.25	
-Always	33	41.25	2	2.5		0	0	
Ability to control the urges to bite nails :-								
-Never	63	78.75	42	52.5	13.42	0	0	27.45
-Rarely	14	17.5	26	32.5	.001**	0	0	.000*
-Sometimes	3	3.75	9	11.25		11	13.75	
-Often	0	0	3	3.75		26	32.5	
-Always	0	0	0	0		43	53.75	
Frequency of nail biting:-								
-Never	0	0	0	0	8.06	24	30	21.58
-Rarely	0	0	3	3.75	.002**	43	53.75	.000*
-Sometimes	13	16.25	42	52.5		13	16.25	
-Often	35	43.75	29	36.25		0	0	
-Always	32	40	6	7.5		0	0	
Attempts to resist nail biting:-								
-Never	44	55	1	1.25	12.37	0	0	23.15
-Rarely	23	28.75	3	3.75	.000**	0	0	.000*
-Sometimes	13	16.25	25	31.25		0	0	
-Often	0	0	24	30		16	20	
-Always	0	0	27	33.75		64	80	
Control over nail biting/ successful at actually stopping biting nails:-								
-Never	41	51.25	3	3.75	11.23	0	0	12.03
-Rarely	29	36.25	26	32.5	.000**	0	0	.000*
-Sometimes	10	12.5	51	63.75		2	2.5	
-Often	0	0	0	0		26	32.5	
-Always	0	0	0	0		52	65	
Associated distress/ uncomfortable feeling because of nail biting :-								
-Never	53	66.25	33	41.25	8.03	0	0	29.58
-Rarely	21	26.25	23	28.75	.001**	0	0	.000*
-Sometimes	6	7.5	14	17.5		20	25	
-Often	0	0	6	7.5		27	33.75	
-Always	0	0	4	5		33	41.25	

Table (6): Distribution of the children and their mothers regarding total perception of nail biting throughout the study phases (n=80).

Items	Pre- test		Post- test		Follow-up		Anova	P val
	Mean	SD	Mean	SD	Mean	SD		
Children total perception of nail biting (n=80)								
-Perceived benefits	0.2	0.01	0.53	0.02	1.0	0.01	14.15	.000*
-Perceived barriers	0.4	0.12	1.03	0.08	2.8	0.02	13.87	.000*
-Interpersonal influences	0.8	0.34	1.23	0.15	3.2	0.03	15.42	.000*
Total perception	1.45	0.46	2.79	0.23	7.01	.24	17.36	.000*
Mother total perception of nail biting (n=80)								
-Perceived benefits	0.95	0.0	1.0	0.0	1.0	0.0	5.234	0.42
-Situational influences	1.2	0.56	3.24	0.41	4.7	0.03	17.24	.000*
Total perception	1.8	0.45	3.68	0.23	5.9	0.15	15.84	.000*

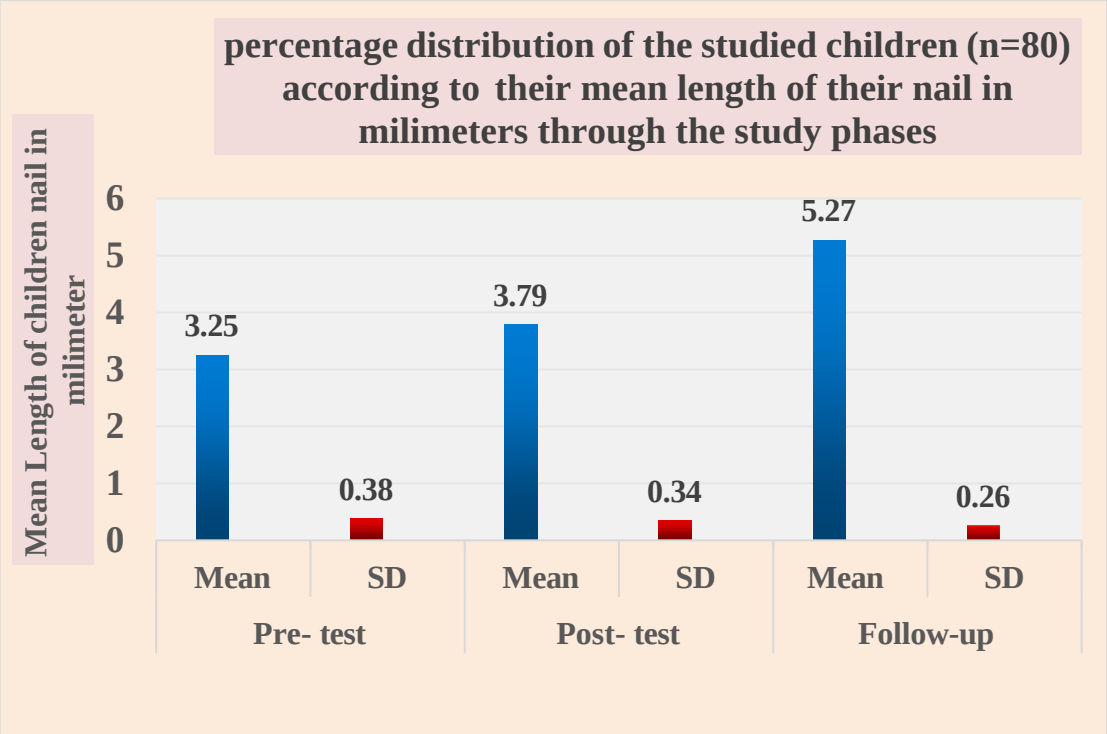

Figure (1) Percentage distribution of the studied children regarding their mean length of their nails in millimeters throughout the study phases (n=80).

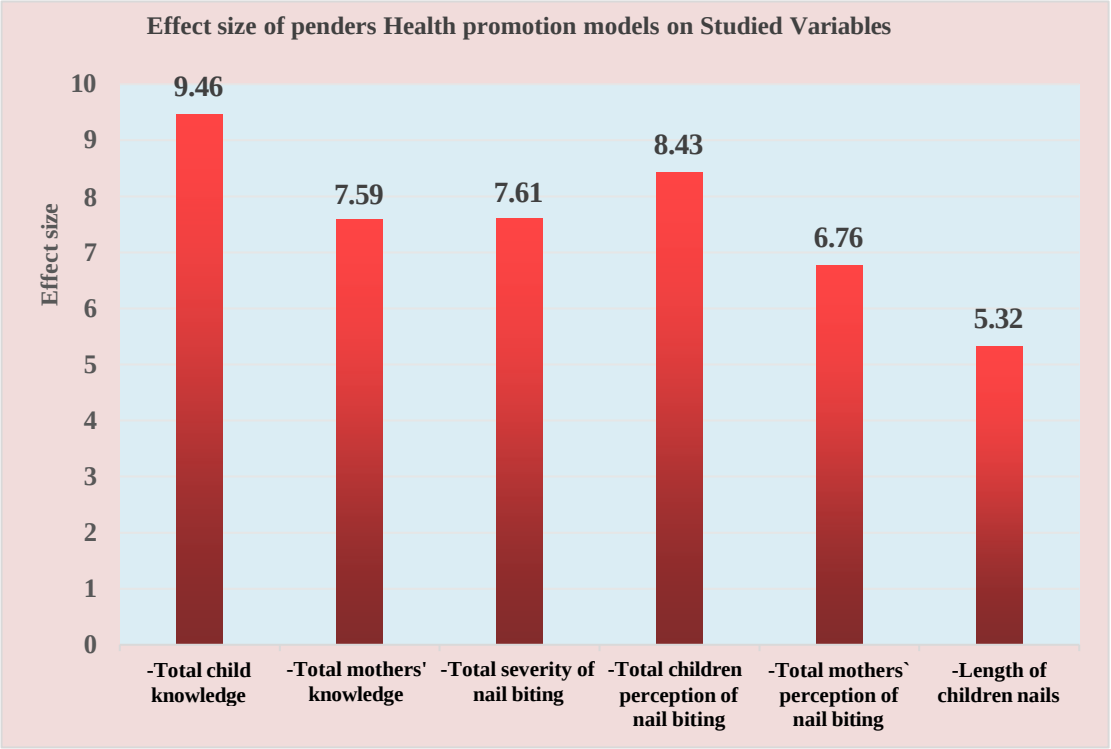

Figure (2): Effect size of Pender's health promotion model on the studied variable. **Effect size of Pender's health promotion model on the studied variable.**

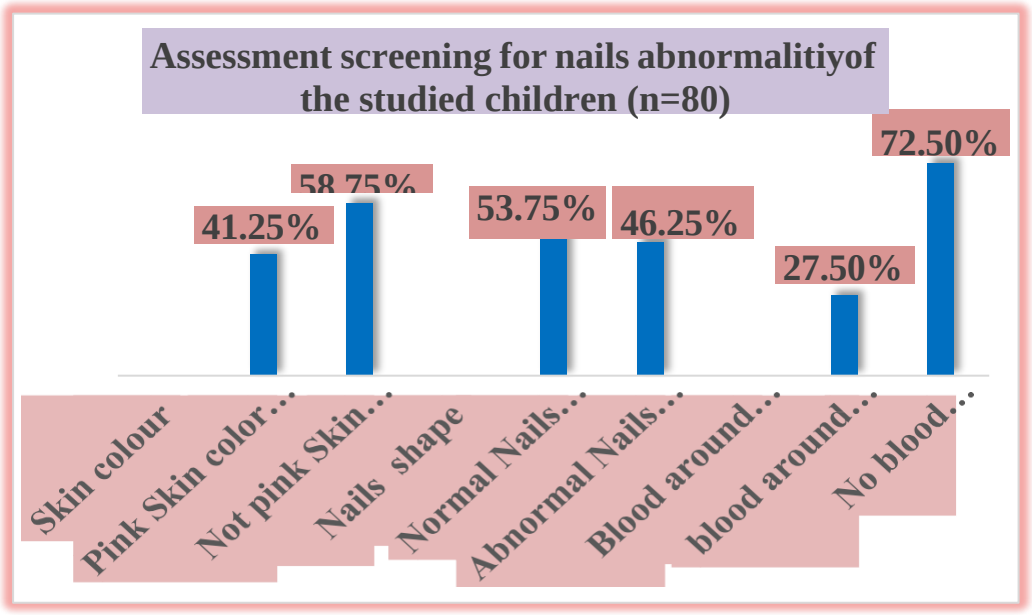

Figure (3)Assessment screening for nails abnormality of the studied children (n=80). **Assessment screening for nails abnormality of the studied children (n=80).**

Table (7): Correlation among characteristics of mothers and their total mean knowledge and total perception of nail biting (n=80).

Socio-demographic data		Total knowledge Mean± SD	Test P value	Total perception Mean± SD	Test P value
-Age	20-	14.23±2.84	15.39 .000**	17.53±1.06	11.49 .002**
	31-40	17.23±2.06		18.24±2.08	
	>40	21.75±1.23		20.12±2.34	
-Marital status	Married	18.72±2.04	6.02 .12	17.25±2.01	5.23 .34
	Widowed	17.98±1.75		18.23±1.98	
	Divorced	18.34±1.98		17.86±1.85	
-Residence	Rural	17.65±2.45	13.45 .001**	17.89±2.11	14.59 .000**
	Urban	20.13±1.32		21.14±1.47	
-Educational level	Illiterate	16.42±2.43	15.78 .000**	16.87±2.24	14.99 .000**
	Primary education	16.99±2.32		17.41±2.06	
	Elementary	17.42±2.09		18.32±1.99	
	Secondary	18.43±1.97		18.99±1.84	
	University	21.43±1.96		20.41±1.67	
-Working condition	Working	18.64±2.03	4.89 .41	18.97±2.14	5.41 .39
	Not working	19.04±1.94		19.21±2.03	
-Monthly income	Enough	19.24±1.78	11.58 .003**	17.54±1.98	7.23 .08
	Not enough	16.34±2.03		18.03±1.76	
-Parents suffered from nail biting habits	Yes	21.34±1.25	16.23 .000**	20.98±1.09	15.74 .000**
	No	17.250±2.43		16.49±2.41	
-Parents suffered from psychiatric disorders	Yes	15.34±0	14.65 .000**	16.24±0	9.42 .05*
	No	19.34±2.03		18.65±1.87	

Table (8): Correlation among the studied variables post intervention (n=80).

Items		1	2	3	4	5
1-Total child knowledge	r					
	p					
2-Total mothers' knowledge	r	.439				
	p	.04*				
3-Total severity of nail biting	r	.712-	-.537			
	p	.000**	.05*			
4-Total children perception of nail biting	r	.878	.707	-		
	p	.000**	.000**	.574 .03*		
5-Total mothers` perception of nail biting	r	.265	.812	-	.278	
	p	.41	.000**	.537 .04*	.31	

Table (9): Multivariate regression analysis to illustrate total knowledge of the studied children (n=80)

Items	Unstandardized Coefficients *B*		standardized Coefficients B	T	P. value
-Age	-1.184-		-28.181-	-3.131-	.005*
-Have academic achievement problems	-.487-		-22.470-	-2.227-	.001**
-Relationship with the family	1.135		18.075	3.467	.000***
ANOVA					
Model	**R^2**	**Df.**	**F**	**P. value**	
Regression	0.358	5	2.678	.000*	

a. Dependent Variable: total children knowledge
b. Predictors: (constant): Age, having academic achievement problems and relationship with the family.
***Significant P≤0.05** ****Highly significant P≤0.01**
Df= degree of freedom **F=One Way Anova**
T=Independent samples t-test **R^2= Coefficient of multiple determination**

Table (10): Multivariate regression analysis to illustrate total studied children` nail biting severity (n=80)

Items	Unstandardized Coefficients *B*		standardized Coefficients B	T	P. value
-Age	-1.124		-27.421	-5.123	.012
-Have preferred hobbies	-1.145		-23.133	-4.235	.02
-Practicing certain sport	-2.153		-24.568	-3.984	.000
-Have academic achievement problems	-1.871		-25.348	-4.851	.01
-Relationship with the family	-2.452		-23.123	-4.259	.001
ANOVA					
Model	**R^2**	**Df.**	**F**	**P. value**	
Regression	0.257	4	2.413	.02*	

Discussion

Nail biting is a prevalent oral practice for alleviating stress. Nail biting is frequently reported in both children and teens. The impulse of biting fingernails is associated with an anxious psycho-emotional state. A child who bites their nails demonstrates an evolutionary disruption associated with the oral phase of psychological development. Various therapy strategies for reducing nail biting either stress behavioral modifications or implement physical barriers. To mitigate the nail-biting tendency, the youngster must be motivated **(Thakur & Sharma, 2020)**.

The Pender Health Promotion Model (PHPM) is a widely utilized structure for identifying and altering detrimental behaviors while promoting health. A plethora of studies has evidenced the efficacy of PHPM in mitigating detrimental behaviors. The PHPM has been developed based on the theory of social cognition, which posits that engagement in wellness-promoting activities is affected by cognitive perceptual factors, including perceived benefits, barriers, and self-efficacy. Pender Health Promotion Model is a methodology that nurses may utilize to formulate behavior management strategies. Nursing prioritizes the promotion of healthy behaviors. This idea enables nurses to optimize health promotion for their patients and the public **(El-Aal et al., 2022)**.

Studied mother's knowledge about nail biting habits.

Concerning the mothers' understanding of nail biting tendencies, the current study's findings indicated that over fifty percent of the mothers questioned lacked knowledge about nail biting prior to the intervention program. While, all of them had a higher level of knowledge regarding nail biting following the program and during the follow-up phase. This finding aligns with **Al-Darwish (2021)**, who observed a statistically significant distinction in mothers' knowledge before and after the intervention, as well as follow up .

The current research results were compatible with study performed by **Rockey (2022)**, who founded that many mothers have inadequate knowledge about habitual problems including habits of nail biting. Conversely, the results of the current study were differed from **Thakur andSharma (2020)**, who reported that most of the mothers had knowledge regarding management of nail biting with behavior modification before the intervention program.

Concerning source of information about nail biting , it was found that three quarters of studied mothers who had knowledge about nail biting mentioned the social media as the main source of their information before the intervention program.From the researchers opinion,this may be due to studied mothers were highly educated and informed of the latest events.This results was consistent with **Salama et al(2020),** who reported that a lot of information obtained through social media.

The current study's findings indicated that approximately three-quarters of the participating mothers lacked knowledge about the etiology of nail biting prior to the program's implementation, whereas nearly all of them possessed knowledge about the etiology of nail biting following the program's implementation. This result goes in line with **Sigita and Kamile (2021)**, who discovered that many questioned moms ignore the information regarding nail biting.

The findings of the present study contrasted with those of **Abd-Elsabour et al. (2022)**, who indicated that nail biting was the predominant practice among children with habitual behaviors. This may different from **Egido and García (2020)**, who indicated that both thumb sucking and nail biting stem from difficulties with the progression of the oral stage of psychological growth in children.

Regarding the situation in which a child resort to the habit of nail biting. The present results indicated that three-quarters of mothers were unaware of the circumstances under which their children engaged in nail-biting behavior prior to the program's implementation. This outcome

resulted from the absence of a prolonged health education program on nail biting. After the program's implementation, all participating mothers are aware of the conditions that lead their children to engage in nail-biting habits.

The results of the present study align with those of the previously conducted study by **Dumitrascu & Enache (2024)** , who reported that about two fifth of mother did know the situations when the children resort to nail biting habit.

As notice from the results of the present research, three quarter of studied mothers didn't know side effects of the nail biting prior to application of the program. While following application of the program and at follow up phase all of the studied mother's had knowledge about side effects of the nail biting. This indicating the improvement of the mothers knowledge based on the intervention programme.

This findings were agreed with **Thomas (2023)**, who conducted a study at India and revealed that minority of the participants knew the side effects of the nail biting. On the other hand , the results of current stydy was disagreed with **Badwaik & Maurya (2021)**, who found that about two fifth of them had known side effects of the nail biting.

Total Studied children's and mothers knowledge score regarding nail biting habits.

The present study demonstrated a statistically significant improvement in the overall knowledge of the children regarding nail-biting habits throughout the study phases.From researchers opinion , this outcome may stem from the mother's insufficient understanding on nail biting.

Various research, like **Upeniece and Beltiņa (2021),** have revealed similar effects of educational interventions on enhancing children knowledge, highlighting that general population education is essential to address this issue, which could worsen nail changes

Concerning the total knowledge score of children about nail biting habits, the findings of the present study demonstrated that all participants exhibited a deficient knowledge score prior tothe program's implementation. This percentage significantly diminished to over one third post- program and further to approximately one third during the follow-up. From the researchers opinion, the intervention might have been effective initially, leading to an improvement in knowledge. However, as time passed, there might have been a decline in knowledge retention or application of that knowledge, which could explain the reduction in the score in the follow-up phase.

This finding similar to the results of the study carried by **Kamer et al (2023)**, who revealed that knowledge score regarding nail biting habits significantly and statistically compared with pre-test, first and second observation, and post-test .Also, this result was similar to **Hoyte et al. (2020)**, who reported that less than half of examined children`s had knowledge regarding nail biting habit.

As notice from the results of the current study a significant improvement in total mothers' knowledge about nail-biting habits across study phases, which increased nearly to all at post-test and follow-up. Using different teaching approaches has been approved to increase mothers' knowledge and compliance with education. This result aligns with **Sadeghi et al. (2022)**, who demonstrated that an educational intervention depending on the Pender health promotion model enhanced women's knowledge scores. Consequently, it is imperative to design and implement educational interventions aimed at enhancing health promotion behaviors based on this model. The results were in great agreement with **Tahani et al. (2022)**, who revealed a considerable improvement in mean pre-test knowledge (7.8±1.7) across three schools following the program.

Nail biting among the studied children.

The results of the present study clarified that a highly significant improvement in children's nail-biting behaviors after implementation of the program, nearly half of children often had frequency of feeling of the urge to bite nails before the program and significantly decreased with more than two thirds reporting "never" feeling the urge at follow-up. In researchers opinion, parental guidance on managing and reinforcing positive behaviors at home, creating a supportive environment that encourages children to break the habit. The findings of the present study matched with those of **Mansoori et al. (2023)**, who indicated that children exhibited nail-biting desires with a frequency of 1.86±1.44 and an intensity of 1.60±1.37.

Also, concerning children attempts to resist nail biting, the current study revealed the percentage of children always attempting to resist increased from 0 prior to application of the program to about one third after implementation of the program and the majority at follow-up . Additionally, control over nail-biting improved significantly, as more than half never control nail biting before implementation of the program, and this percentage reducing to the minority after implementation of the program, and at follow-up respectively.

The outcome of the present study consistent with **Mansoori et al. (2023)**, who demonstrated that attempts to resist nail biting at a mean score of 2.08±1.6, with a perceived control over nail biting behavior at 2.06±1.21. As well as **Deibler & Reinardy (2023)**,who demonstrated that the majority of children had attempts to resist nail biting.On the other hand, the results of p resent study was differed from **Badenoch et al (2020)**, who revealed that attempting to resist before biting reported by two thirds of nail biters.

Total perception of the studied children and their mothers about nail biting. Regarding total perception of the studied children about nail biting it was found that there was highly statistically significant improvement in total perception throughout implementation of the program. The mean score for perceived benefits increased significantly from 0.2 before implementation the program compared to 0.53 following implementation of the program. Also, the mean score for perceived barriers increased significantly from 0.4 prior to implementation the program compared to1.03 after implementation of the program . Interpersonal influences improved from 0.8 prior to implementation the program compared to 1.23 following implementation the program .

This might be due to that studied children became more aware of the positive aspects of reducing or stopping nail-biting. This improvement suggests that the educational content effectively presented the benefits of stop nail biting, such as better nail health, reduced risk of infections, and improved personal appearance.

This finding was consistent with **Hsueh and Chen (2022)**, who reported a statistically significant changes have been observed in children's perceptions regarding nail biting.

Concerning studied mothers total perception of nail biting ,it was found a statistically significant improvement has been observed in total perception of the studied mother through the study phases. The mean score of total perception 1.8 ± 0.45 before implementation of the program and this score raised to 3.68 ± 0.23 and 5.9 ± 0.15 after implementation and follow up respectively. This results highlighting the effectiveness of the intervention applying during the study.

In researchers opinion, this might be due to mothers understood the benefits of stopping nail-biting, this stability suggests that the perceived benefits were recognized early and remained consistent.

This study findings were consistent with **Redwan (2024)**, who carried out a study and clarified that there were significantly improvements higher when compared to the pre-test scores .

By assessing children according to their mean length of their nails in millimeters throughout the study phases, it was found a statistically significant increase has been observed in the mean length of children's nails across the study phases. The mean of nail length was

3.25±.38 before implementation of the program and this increased to 5.27±0.26 mm at follow-up .In researchers opinion, this may be due to nail-biting is often a response to stress or anxiety. An increase in nail length could suggest that children were able to manage their stress or anxiety better, reducing the urge to bite their nails.

The results of the present study agrees with **Shin et al (2022),** who revealed a study and showed that short nails with ragged distal borders were the most common presentation. Also, this similar to **Spahi & Taha (2024**), who assessed nail biting, among Primary School Students and signified that length of their nails in were short from nail biting.

Effect size of Pender's health promotion model on the studied variable.

The result of the current study indicated that there were statistically significant effect of Pender Health Promotion Model on the studied variable as following, total child knowledge ,total mothers knowledge, total severity of nail biting, total children perception of nail biting,and total mothers perception of nail biting, as well as length of children nails .In researchers opinion , Pender's Health Promotion Model emphasizes individual characteristics and experiences, behavior-specific cognitions and effects , in addition to behavioral outcomes. This result was consistent with **Patel et al. (2023)**, who demonstrated a significant effect on the instructional program on numerous variables.

Relation between socio- demographic characteristics of the studied mothers and their total knowledge , as well as total perception of nail biting.

The current study results demonstrated that several significant relationships among socio-demographic factors of the studied mothers and their total knowledge , as well as perception of nail biting.Older mothers (>40 years) having higher scores. Also, urban mothers showing significantly higher knowledge and perception scores compared to rural mothers , mothers with university education had the highest scores in both knowledge and perception .

This might be due to the age of the mother might impact her knowledge and perception. For instance, older mothers might have different perspectives or more experience compared to younger mothers. Also, the level of education can greatly influence a mother's knowledge about nail biting. Educated individuals are often more likely to seek information and understand the implications of behaviors such as nail biting.

This finding was agreed with **Alkalash et al. (2020)**, who observed a statistically significant correlation between mothers' knowledge levels and their education, occupation, and socioeconomic position. **Abdat and Ramayana (2020)** revealed significant correlation among maternal knowledge and conduct regarding children's dental health status .**Emadian et al. (2020)** indicated a significant association among maternal age and knowledge level.

On the other hand, this results disagree with **Ranggang &Armedina (2020)**, who reported that there was no correlation between the level of parental knowledge and the severity of malocclusion caused by bad habits, showed no relationship between parent's knowledge level with child malocclusion.

Correlation between the studied variables after implementation of the program.

The present study results revealed that there was a significant positive correlation between total child knowledge and total mothers' knowledge .Also, there is a strong negative correlation between total severity of nail biting and total mothers' perception of nail biting .This could imply that as the severity of the nail-biting behavior in children increases, mothers might perceive the problem as less significant or might be less aware of its severity. Alternatively, the intervention might have led to a change in how mothers perceive the issue, possibly underestimating the severity despite actual increases.

This result was consistent with **Yasir et al., (2021)**,who demonstrated that there was a positive

correlation between low parenting and over protection parenting with Body focused repetitive behavior disorders among adolescents. Conversely, this result was contrasting with **Abdat and Ramayana (2020),** who showed that there was strong correlation between total child knowledge and total mothers' knowledge coefficient and sufficient correlation coefficient to behavior .

Conclusion

Based upon the findings of the present study, it was concluded that Pender's health promotion intervention on nail biting among school age children and their mothers had improved their knowledge and practice regarding nail biting as there was a statistical significant difference throughout the three phases of the study.

Recommendations

Based upon the results of this study, the following are recommended:

- Ongoing in-service health education programs based on application of Pender's health promotion model for children with nail biting should be designed and implemented into schools to improve management of children with nail biting habits.
- Ongoing in-service training for school nurses and other primary care workers who have regular contact with young children on early identification of high risk groups among school children is required.
- Libraries containing books, written booklets, electronic media and internet access for all parents should be established at schools, pediatric and community health care settings which provide scientific materials regarding treatment of common behavior problems of school age children.
- Further studies must be conducted on a larger cohort of children and their parents throughout several pediatric departments to establish generalizability.
- Different methods of teaching and learning such as group discussion, presentations, demonstration and re-demonstration should be used to improve mother's knowledge about common behavior problems such as nail biting habit in schools.

References

1. *Abdat, M., & Ramayana, I. (2020).* Relationship between mother's knowledge and behaviour with oral health status of early childhood. Padjadjaran Journal of Dentistry, 32(3), 166. https://doi.org/10.24198/pjd.vol32no2.24734.
2. *Abd-Elsabour, M. A., Hanafy, R. M., & Omar, O. M. (2022).* Effect of self-perceived oral habits on orofacial dysfunction and oral health-related quality of life among a group of Egyptian children: A cohort study. European Archives of Paediatric Dentistry, 23(6), 935- 944.
3. *Al-Darwish, R., (2021).* Evaluating the effect of Pender's health promotion model on self- efficacy and treatment adherence behaviors among patients undergoing hemodialysis. Journal of education and health promotion, 9(1), 197.
4. *Alkalash, S., Salama, A., & Konsowa, E. (2020).* Mothers' knowledge, attitude, and practice regarding their primary school children's oral hygiene. Menoufia Medical Journal, 33(1), 11. https://doi.org/10.4103/mmj.mmj_300_19.
5. Amiri, M., Heidari, N., Rajati, M., Mahaki, B., & Rajati, F. (2023). The effect of educational intervention based on Pender's health promotion model on calcium consumption among pregnant women. https://doi.org/10.21203/rs.3.rs-2343454/v2.
6. Azizi, A. A., Hargrave, D., Passos, J., Wolkenstein, P., Rosenbaum, T., Santoro, C., ... & Hernández, H. S. (2024). Consensus recommendations on management of selumetinib- associated adverse events in pediatric patients with neurofibromatosis type 1 and plexiform neurofibromas. Neuro-Oncology Practice, npae038.
7. *Badenoch, J., Searle, T., Watson, I., & Cavanna, A. E. (2020).* Sensory symptoms in body- focused repetitive behaviors, restless legs syndrome, and Tourette syndrome: An overlap? Neuroscience & Biobehavioral Reviews, 119, 320-332. https://doi.org/10.1016/j.neubiorev.2020.10.008.
8. *Badwaik, A., & Maurya, A. (2021).* Effectiveness of Self-Instructional Module on Knowledge Regarding Selected Habit Disorders in Children among Mothers of Preschooler. Journal of Pharmaceutical Research International, 33(47B), 140-145.
9. Baghchechi, M., Pelletier, J. L., & Jacob, S. E. (2021). Art of Prevention: The importance of tackling the nail biting habit. International Journal of Women's Dermatology, 7(3), 309–313
10. Bilkhiwal, E., Inamadar, A. C., & Janagond, A. B. (2024). Clinical and Onychoscopic nail findings in preschool children: An observational study. Clinical Dermatology Review, 8(3), 216-220. https://doi.org/10.4103/cdr.cdr_56_23.
11. Cohen, P. R. (2022). Nail-Associated Body-Focused repetitive behaviors: Habit-Tic nail deformity, onychophagia, and onychotillomania. Curēus. https://doi.org/10.7759/cureus.22818
12. de Bree, E., Wiefferink, K., & Gerrits, E. (2024). Characteristics of Children and Youth Referred for Language Assessment at Different Ages. Journal of Speech,

Language, and Hearing Research, 1-16.
13. *Deibler, M., & Reinardy, R. (2023).* The BFRB Recovery Workbook: Effective Recovery from Hair Pulling, Skin Picking, Nail Biting, and Other Body-Focused Repetitive Behaviors. Jessica Kingsley Publishers.
14. *Dumitrascu, M., & Enache, R. G. (2024).* Psychological intervention program for an adolescent with onychophagia.
15. Egido, A., & Garcia, R. (2020). Impact of a healthy nails program on nail biting in turkish school children: Acontrolled pretest-posttest study. The journal of school nursing,29(6), 416- 424.
16. *El-Aal, B. G., Salman, A. H., & Amer, H. M. (2022).* Effect of Educational Intervention Based on Pender Health Promotion Model on Osteoporosis Preventive Behaviors among Employed Women. Menoufia Nursing Journal, 7(2), 177-194.
17. *Emadian, M., Shafaroudi, A. M., Mesgarani, A., Afkhaminia, F., & Nahvi, A. (2020).* Mother's Knowledge Regarding Oral Health among Their Preschool Children. International Journal of Pediatrics, 8(8), 11681–11689. https://doi.org/10.22038/ijp.2019.43931.3651.
18. Gomez, E. D. (2024). Prevalence of oral parafunctional habits in children:an observational cross sectional study.international journal of clinical pediatric dentistry,16(4),305.
19. *Halteh P., Scher R.K.,& Lipner S.R. (2017).* Onychophagia: A nail biting conundrum for physicians. J Dermatolog Treat. 2017; 28(2), p:166-196.
20. *Hoyte, T. A., Ali, A., & Bearn, D. R. (2020).* A cross-sectional survey to ascertain the prevalence of oral habits among eleven- to twelve-year-old children in Trinidad and Tobago. Pediatric Dental Journal, 30(2), 86–91. https://doi.org/10.1016/j.pdj.2020.03.003.
21. *Hsueh, C. W., & Chen, C. W. (2022).* Prevalence of nail biting and its chronological relationship with tics in child and adolescent outpatients with Tourette syndrome: a single- centre, retrospective observational study. BMJ open, 12(9), e063874.
22. Kamer Gur PhD,R.N.,&Incir,R.N.(2023). The effectiveness of a nail biting prevention program among primary school students. Clinics in Dermatology, 41(1), 49-55.
23. Kaushik, M., Tuli, A., & Sood, S. (2024). Reconnoitering the Dental Knowledge and Attitude of Pediatricians in the Western Uttar Pradesh Region of India. Cureus, 16(5).
24. *Keuthen N. J., Baer,L., O'Sullivan,R.L., Ricciardi, J.N., Shera,D.,Savage, C.R., Borgmann,A.S.(1995).* The Massachusetts General Hospital hairpulling scale: development and factor analyses. Psychotherapy and psychosomatics, 64(3-4), p: 141-145.
25. Lawal, F. B., Idiga, E., Fagbule, O. F., Ajayi, I. J., Amusa, F., Adejumo, O., & Lawal, T. A. (2024). Association between self-reported oral habits and oral health related quality of life of adolescents in Ibadan, Nigeria. PLOS Global Public Health,

4(5), e0003218.

26. Lee, D. K., & Lipner, S. R. (2022). Update on Diagnosis and Management of Onychophagia and onychotillomania. International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health, 19(6), 3392. https://doi.org/10.3390/ijerph19063392
27. *Mansoori, N., Zafar, S., Ahad, M. A., Javed, S., & Mubeen, S. M. (2023)*. Presence of Enterobacteriaceae and its association with mental health among school going nail-biting
students: A comparative study. Journal of Oral Health and Oral Epidemiology, 12(3), 118–
122. https://doi.org/10.34172/johoe.2023.20.
28. *Pacan, P., Reich, A., Grzesiak,M., &Szepietowski, J.C.(2014*).Onychophagia is associated with impairment of quality of life. Acta dermato-venereologica, 94(6), P:703-706.
29. *Patel, R., Baria, J., Paramar, J., Patel, A., & Patel, R. (2023).* A Study to Assess the Effectiveness of Planed Teaching Program in a Terms of Knowledge and Attitude on Selected Habit Disorders Among Mothers of Under Five Children at Selected Area in Vadodara. Journal of Coastal Life Medicine, 11, 3015-3019.
30. *Pender, N.J. (2011).* Health promotion model manual. Retrived from Deep blue. University of Michigan Library: Available at https://deepblue.lib.umich.edu/bitstream/handle/health- promotion-manual. Ann Arbor, MI. accessed on 1\12\2022.
31. *Ranggang,B & Armedina, R. (2020).* Comparison of parents knowledge of bad habits and the severity malocclusion of children in schools with different social levels.Journal of Dentomaxillofacial Science.5.48.10.15562/jdmfs.v5il.1052.
32. *Redwan, A. K. H. (2020).* Transforming Inter-Professional Dental Care: Assessment of Non- Dental Healthcare Workers' Knowledge and Attitudes Towards Children's Oral Health (Doctoral dissertation, Boston University).
33. Rockey, I. (2022). A study to assess the knowledge on habitual problems of school age children among their mothers in a selected rural community at bangalore with a view to develop an information booklet on mangement of habitual problems of school age children. International Journal of Nursing Education and Research, 10(2), 153-156.
34. *Sadeghi, A., Rayyani,M., Tirgari,B.(2022).*The effect of pender's health promotion model based educational intervention on physical activity in office staff.Sport science for health,16(1),31-38.
35. *Salama,A. A., Konsowa, E.M., & Alkalash, S.H.(2020).* Mother's knowledge, attitude and practice regarding their primary school children's oral hygiene.Menoufia Medical Journal, 33(1), 11.
36. *Shin, J. O., Roh, D., Son, J. H., Shin, K., Kim, H. S., Ko, H. C., ... & Kim, M. B. (2022).*

Onychophagia: detailed clinical characteristics.

37. Shin, J., Roh, D., Son, J., Shin, K., Kim, H., Ko, H., Kim, B., & Kim, M. (2021).
Onychophagia: detailed clinical characteristics. International Journal of Dermatology, 61(3), 331–336. https://doi.org/10.1111/ijd.15861
38. *Siddiqui, J.A., Qureshi, S.F., Marei, W.M., & Mahfouz,T.A. (2017).* Onychophagia (Nail biting): A body focused repetitive behavior due to psychiatric comorbidity. JMood Disorder; 7(1): P: 47.
39. *Sigita,A., &Kamile, D.(2021).*Nail tic disorders.manifestation,pathogenesis and management.Indian journal of dermatology,83; 19-26.
40. *Spahi, H. A., & Taha, S. S. (2024).* Effect of Finger Sucking, Nail Biting, and Salivary Level of Growth Hormone on Type of Malocclusion among Primary School Students: An Analytical Cross-Sectional Study. Dental Hypotheses, 15(1), 5-7.
41. Tahani, B., Asgari, I., Golkar, S., Ghorani, A., Hasan Zadeh Tehrani, N., & Arezoo Moghadam, F. (2022). Effectiveness of an integrated model of oral health-promoting schools in improving children's knowledge and the KAP of their parents, Iran. BMC Oral Health,
22(1). https://doi.org/10.1186/s12903-022-02644-x.
42. *Thakur, P., & Sharma, A. (2020).* Assessment of knowledge regarding nail biting, eating disorders and mental retardation among selected government primary school teachers: A
descriptive study.
43. *Thomas, S. (2023).* A case study on Bipolar Affective disorder Current episode Manic without psychotic symptoms. International Journal of Clinical Case Reports and Reviews, 13(1), 01–07. https://doi.org/10.31579/2690-4861/290.
44. *Twohig, M.P.,&Woods, D.W.(2001)*. Evaluating the duration of the competing response in habit reversal: A Parametric analysis. Journal of applied behavior analysis 34,P:517-520.
45. Upeniece, D., & Beltina, M. (2021). Exercise prescription to foster health and well-being: a behavioral approach to transform barriers into opportunities. International journal of environmental research and public health, 18(3), 968.
46. *Winebrake, J.P., Grover, K., Halteh, P., &Lipner, S.R. (2018).* Pediatric onychophagia: ASurvy- based study of prevalence, etiologies and co- morbidities. American journal of clinical dermatology,19 (6), P: 1-5..
47. *Wolter, L., (2020).*The role of school nurse presence in parent and student perceptions of helpfulness, safety and satisfaction with type 1 diabetes care. The Journal of school Nursing, 38(2), P:161-172.
48. *Yasir, W., & Kazmi, S. F. (2021).* The role of parenting behavior in body focused repetitive behavior disorders among adolescents. Harf-o-Sukhan, 5(4), 116-128.