

Application Of PRECEDE- PROCEED Model to Promote Life Style for Deaf and Mute Girls at Puberty

¹Manal Salah Abd El-Halim, ²Shaimaa Hassan Mohamady.

³Neama Abd El-Fattah Abd Gwad

¹ Assistant lecture of Maternal and New born Health Nursing, Faculty of Nursing, Helwan University Egypt

² Professor of Maternal and New born Health Nursing, Faculty of Nursing, Helwan University Egypt

³ Professor of Maternal and New born Health Nursing, Faculty of Nursing, Helwan University Egypt

DOI: <https://doi.org/10.5281/zenodo.10549684>

Published Date: 22-January-2024

Abstract: Background: Deaf and mute girls are sensitive groups in Egypt and puberty is a critical stage in a deaf and mute girls' life. Aim of study: Was to evaluate the effect of application of PRECEDE-PROCEED model to promote life style for deaf and mute girls at puberty. Design: Diagnostic research design used to achieve the aim of the current study. Setting: El Amal school for deaf and mute in Helwan city- Egypt. Sample: A purposive sample consists of thirty deaf and a mute girl at puberty according to inclusion criteria. Tools: three main tools were use; tool I interviewing questionnaire sheet, tool II knowledge assessment sheets and tool III-healthy promotion life style assessment sheet, construction of PRECEDE-PROCEED model. Results: a highly significant improvement in health life style for deaf and mute girls at puberty. Conclusion: Most of deaf and mute studied girls have poor knowledge regarding puberty and life style as well as healthy promotion lifestyle in the pre-test, which is improved in the post-test and follow up. The results showed that the reason is due to the lack of enabling and reinforcing factors for deaf and mute girls. Recommendations: development educational guideline, design by sign language regarding reproductive health promotion for deaf mute girls and parents, focuses on simple text and images, delivered through different mass media such as YouTube channels.

Keywords: Deaf and mute -Lifestyle- PRECEDE - PROCEED model and puberty.

1. INTRODUCTION

Puberty is a combination changes resulting in reproductive capacity, psychophysical maturity that influenced by genetics and the environment factors. Puberty typically occurs between the ages of 9 and 13 years. During pubertal time, adaptive and functional skills incrementally develop and self-identity is established. Puberty begins with the activation of the hypothalamic pituitary-gonadal (HPG) axis. The anterior hypothalamus synthesizes and releases gonadotropin-releasing hormone (GnRH), which stimulates the anterior pituitary to release gonadotropin, luteinizing hormone (LH), and follicle stimulating hormone (FSH), which then stimulate gonadal steroid release and gamete production {1}.

Deafness is the inability to hear while mute is the inability to speak. The deaf and mute are people who are unable to hear, speak, and use sign language to communicate, which makes them unable to communicate inquiries or receive the necessary health education according to their age. The World Health Organization estimates that untreated hearing loss costs the world \$980 billion annually. This includes health sector costs not including hearing aid costs, educational support costs, lost productivity, and societal costs. 57% of all costs are borne by low- and middle-income countries {2}.

Lifestyle is additional daily habits and actions that affect the quality of healthy life in the short and long term. Lifestyle also reflects individual attitudes, lifestyle, values or worldview. Therefore, lifestyle is a way to create a sense of self and create

a cultural symbol that corresponds to personal identity. The quality of deaf and mute girl's lifestyle can affect the puberty process. Healthy lifestyle practices lead to crossing puberty safely and reduce the chance of developing any health problems {3}.

To achieve the pervious, PRECEDE-PROCEED model PPM was use. PPM one of the most useful theoretical frameworks for planning, conducting as well as evaluating health promotion programs and improve the quality of life. Green in 1970s developed the PRECEDE section which mean predisposing, reinforcing, and enabling constructs in educational diagnosis and evaluation for health diagnosis and education needs. In 1991, Later kurter added the PROCEED section which mean policy, regulatory, and organizational constructs in educational and environmental development to emphasize the effects of ecological aspects in the modified model {4}.

Nurse plays an important role in improving health during puberty. specially for deaf and mute girls because limited access to puberty information and school environments that are not supportive deaf and mute girls related puberty health needs may hamper girls' school attendance as well as academic performance, contributing to attrition that can result in early marriage, adolescent early pregnancy and multiple associated with negative health also economic impacts. So, nurse play an important role in disseminating health information where a large number of deaf and mute girls at pubertal age are easily reached at once {5}.

Significance of the study

According to WHO (2023), more than 5% of the world's population 430 million people require rehabilitation to treat disabling hearing loss 432 million adults and 34 million children. WHO is estimated that by 2050, more than 700 million people or one in ten percent of people will suffer from hearing loss {6}.

According to the international federation of the deaf (2018), there are more than seven and a half million deaf and mute people in Egypt, representing nearly ten percent of the number of deaf and mute people in the world, according to statistics issued by the United Nations in. Now (2022) the number of deaf and mute people in Egypt is approaching 8 million people {7}.

Changing from childhood to adulthood is a complex process in which many changes occur. UN adapt well with changes can lead to many health, psychological and social problems. Globally, one in seven people aged 10-19 years suffering from a mental disorder, which represents 13 percent of the global burden of disease in this age group {8}.

Aim of the study

The aim of this study was to evaluate the effect application of PRECEDE-PROCEED model to promote life style for deaf and mute girls at puberty. Through the following objectives

1. 1-Assess deaf and mute girl's knowledge regarding puberty.
2. Assess deaf and mute girl's knowledge regarding lifestyle
3. Assess deaf and mute girl's life style.
4. Design the PRECEDE-PROCEED model to promote life style for deaf and mute girls at puberty
5. Apply the PRECEDE-PROCEED model to promote life style for deaf and mute girls at puberty
6. Evaluate the effect of PRECEDE-PROCEED model on life style for deaf and mute girls at puberty.

Research Hypothesis

After implementation of an educational intervention based on PRECEDE-PROCEED model, the life style for deaf and mute girls at puberty will be promoted.

II. SUBJECT AND METHODS

Research Design

Diagnostic design was used in the study. pretest, posttest and follow up. Diagnostic research design is a type of research design which provide an accurate diagnosis of a problem and identifies areas of improvement also to Understanding the underlying causes of a problem and how to address. Consists of three steps: - **first step**: inception, which includes data collection and problem definition. **Second step**: diagnostics, which is, comprises data analysis, hypothesis testing. **Third step**: setting objectives and solutions, which define the best possible solutions

Study Settings

The study was conducted at El Amal School for deaf and mute in Helwan city- **Egypt**

Study sample**Type of sample**

A purposive sample was used in the current study.

Sample size

30 deaf and mute student's girls at puberty in the academic year 2023-2024, primary level (2 students), preparatory level (23 students) secondary level (5 students).

Tool for data collection

Tool one: -Interviewing questionnaire sheet.

Designed by the researcher in Arabic language to assess personal characteristics of the deaf and mute girls, includes age, educational level, weight, height, body mass index (BMI), level of education for deaf and mute girls' parent and menstrual history

Tool two: Knowledge assessment sheet based on PRECEDED - PROCED model

Designed by the researcher in Arabic language in form of open-ended question after reviewing the related researches (*Gamal, 2021*), to assess predisposing, reinforcing and enabling factor that effect on health promotion lifestyle for deaf and mute girls at puberty, **consist of three parts:**

Part one: -Assess the predisposing factor which include 3 sections (knowledge, attitude and self-efficacy): -

- **Section one:** - Asses of deaf and mute girl's knowledge regarding puberty, life style and healthy guidelines for coping well with the puberty changes through (23) items.

Category (1) was concerned with deaf and mute girl's knowledge regarding puberty. Consist of (9) items (definition of puberty, normal age, signs of puberty, causes of puberty, the most common factor that affecting on puberty and most common health problem as well as psychological problem). Question from (24-32).

Category (2) was concerned with deaf and mute girl's knowledge regarding health promotion life style, consist of (7) items (definition of life style, dimensions of life style, health screening, important as well as type of physical activity and appropriate nutrition) Question from (33-42).

Category (3) was concerned with deaf and mute pubertal girl's knowledge regarding follow healthy guidelines for coping well with puberty changes, consist of (3) items (menstrual problem, mood swings and sleeping disorder). Question from (43-45).

Scoring system for knowledge:

The questionnaire contained items related to the deaf and mute girls' personal characteristic as well as knowledge assessment (23) items. Each item had three points (0 – 2) as (0) for wrong answer and don't know, (1) for incomplete correct answer, and (2) for correct and complete answer. **2.4.2.1.1.5 The total score of knowledge regarding puberty** (9) items (Q24-32), evaluated by giving a score from (0-18). Classified as the following: -

- Unsatisfactory: - $\leq 50\%$ (0 - 9 points)
- Satisfactory: - $> 50\%$ (10 - 18 points)

The total score of knowledge regarding lifestyle (7) items(Q33-39), evaluated by giving a score from (0-7). Classified as the following: -

- Unsatisfactory: - $\leq 50\%$ (0 - 3 points)
- Satisfactory: - $> 50\%$ (4 - 7 points)

The total score of knowledge regarding follow health guidelines for coping well with the puberty changes (3) items (Q44-46), evaluated by giving a score from (0-6). Classified as the following: -

- Unsatisfactory: - $\leq 50\%$ (0 - 3 points)
- Satisfactory: $> 50\%$ (4 - 6 points)

• **Section (two):** - Deaf and mute girl's attitude toward puberty. Consist of (12) items (Q47-58), include positive attitude question such as, feeling free more after puberty, the occurrence of a positive change in the life style after puberty, became more confident in herself after puberty, Have better relations with her friends and family. Negative attitude question include puberty is an unpleasant period, puberty is a mysterious period that most girls don't understand and the change in life style after puberty is a matter of concern.

Scoring system for attitude

Each item had three points (0 – 2). According to positive attitude, (0) giving for disagree, (1) for sometimes, and (2) for agree, while in negative attitude (0) giving for agree, (1) for sometimes, and (2) for disagree.

The total score of attitudes regarding puberty for deaf and mute girls were evaluating by giving a score of (0-24). Classified as the following:

- **Negative attitude:** - $\leq 50\%$ (0 - 12 points)
- **Positive attitude:** - $> 50\%$ (13 - 24 points)

• **Section (three):** - Deaf and mute girls self-efficacy scale, consists of (14) items (Q59-72). Divided by three domains, cognitive as well as decision making behaviors (5 items), mobilizing resources also coping behaviors (4 items) and health adaptation (5 items).

Scoring system for self-efficacy

Self-efficacy scale designed to assess the strength of deaf and mute pubertal girl's belief if was able to carry out particular activity. Each item had three points (0 – 2), (0) for girls can't, (1) for girls can do some extent and (2) for girls can,

The total score of self-efficacy assessment were evaluating by giving a score of (0-28). Classified as the following: -

- Low self-efficacy: - $\leq 50\%$ (0 - 14 points)
- High self-efficacy: - $> 50\%$ (15 - 28 points)

Part II: -Reinforcing factors assessment

Designed to assess the deaf and mute girls reinforcing factors such as support of family member, friends and health care staff. Include (5) items. Question from (72-76).

Part III: - Enabling factors assessment

Designed to assess the deaf and mute girls enabling factors such as availability of information resources, attending workshops. Include (5) item. Question from (77-81).

Scoring system for reinforcing and enabling factors: -

Each item in reinforcing and enabling factors had three points (0 – 2), (0) giving for no, (1) for some extent, and (2) for yes.

2.4.2.3.2 The total score of reinforcing and enabling factors assessment for deaf and mute girls were evaluating by giving a score of (0-10). Classified as the following: -

- Poor: - $\leq 50\%$ (0 - 5 points)
- Good: - $> 50\%$ (6 - 10 points)

Tool III: -Deaf and mute girl health promotion life style assessment sheet

Adapted from (*walker et al., 1987*) in Arabic language for assess the health promotion lifestyle of deaf and mute girls at puberty. Consist of (37) items divided into six standers of lifestyle behavior, which is health responsibility (6) items, physical activity (3) items, nutrition (8) items, spiritual development (7) items, interpersonal relation (7) items and stress management (6) items. Question from (82-118).

Scoring system for health promotion lifestyle assessment: -

According to health promoting lifestyle assessment for deaf and mute girls at puberty, each item had three points (0 – 2), (0) giving for never, (1) for sometimes, and (2) for usually.

The total score of health promoting lifestyle assessment were evaluating by giving a score of (0-74). Classified as the following: -

- Poor: - $\leq 50\%$ (0 - 37 points)
- Good: - $> 50\%$ (38 - 74 points)

Reliability

The tool was assessed by tools knowledge & attitude. The study tools were subjected to assessment of internal consistency reliability using Spearman-Brown Prophecy Formula ($r^1=2(3)/1+r$), where r^1 estimated reliability of the entire test and r estimated correlation coefficient computed on the split halves. It was 0.896.

Validity

The study tools were tested for content and face validity by jury of three expertise's as expertise in maternal and new born health nursing and community health nursing to evaluate the items as well as the entire instrument as being relevant and appropriate to test what wanted to measure. The face validity of the questionnaire was calculate based on experts' opinion after calculating content validity index (percentage) of items and was 94%.

Ethical Considerations

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee faculty of nursing Helwan university. Participation in the study is voluntary and subjects were given complete full information regarding the study aim and the role before signing the informed consent. The ethical considerations will be include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

Pilot study

A pilot study conducted on 10% of studied sample, which were three students of study sample. The aim of pilot study was to determine the clarity, feasibility and applicability of the study tools as well as estimation of time needed for completing the questionnaires and to test the clarity of questions. Those participants of pilot study were included to study sample because there is no modification in the tool done.

Fieldwork

The filed work carried out through five months started at the beginning of March 2023 after obtaining all official permissions, completed in July 2023. The study sample included three level of education primary, preparatory and secondary grad; the primary grade included the seventh and eighth level (6student), preparatory grad includes the three level (20) girls and secondary grade include first level only (4) girls. The study was implemented according to PRECEED-PROCEED model: -which consist of 2 main part each part includes 4 phases.

Phase 1: - Social assessments

At this phase, after evaluating the relevant articles, and multiple data collection tools, in addition previous researcher experience in master thesis with deaf and mute girls and reviewing related literature the researcher determine the deaf and mute girls at puberty needs, desires as well as the factors that may be affecting on health promotion life style, with considers problem solving capacity, strengths, resources, and readiness to change.

Phase 2: - Epidemiological, behavioral and environmental assessment

The researcher used existing data sources such as vital statistics, census data, and medical, administrative to determine the most important health problems for deaf and mute girls at puberty through secondary data analyses.

Phase 3: Educational and ecological assessment:

After selecting the relevant behavioral and environmental factors, the predisposing, enabling and reinforcing factor is determined and the researcher designed questionnaire as such.

Phase 4: - Administrative and policy assessment

This phase aimed to identification of resources, policies, supports and facilities, which could facilitate or prevent proper implementation of health promotion program, there was nothing to prevent the program implementation, all necessary official permissions for data collection were obtain as mentioned in administrative design. written consent to obtain the agreement from guardian to participate in the study. Then, the researcher begins to collect the data.

The pretest questionnaire collected through four visits by help of the school's teacher, psychologists and sociologist's worker to translate the tool and program into sign language. At each visit collect the data from about eight deaf and mute girls, time spent for every questionnaire was about 30-45 min. Based on pretest data collection the educational program developed

Phase 5: - Implementation phase

The Researcher visited the study setting twice day /week from 9:00 Am to 1 pm. At first visit, met the deaf and mute girls to explain the aim of the study after get to know of each other. The study sample divided into two groups, first group included the primary grade (six deaf and mute girls), first and second stage in preparatory grade (ten deaf and mute girls), while second group included third stage of preparatory grade (ten deaf and mute girls) and (four deaf and mute girls) at first stage in secondary grade.

❖ Educational program implemented through six sessions; each session took about 45-60 minutes. The sessions were repeated to each group at the same day.

- At the beginning of each session the deaf and mute girls were oriented with the goal, objective and the content of the session.
- Each group was informed about the time of the next sessions at the end of session.
- The subsequent session, started by a feedback about the previous session and the objectives of the new session, using power point presentation, which translate to sign language.
- At the end of each session; deaf and mute girl's questions were discussed to correct any misunderstanding.
- The researcher asked the participants to transfer the educational program to families and peers to strengthening the reinforcing and enabling factors.

Session I: - under title of Puberty, to identify the puberty process, explain the physiological puberty changes and modify deaf and mute girls' attitude toward puberty. Teaching method was lecture by power point presentation. Time spent 60 min.

Session II: - under title of life style concept and health responsibility, to summarize the importance of follow healthy promotion lifestyle and articulate the health responsibility. Teaching method was group discussion. Time spent 60 min.

Session III: - under title of proper nutrition during puberty and physical activity, to estimate the benefit of follow healthy food, simplify the different sources for main nutritional elements and change the concept of physical activity. Teaching method lecture demonstration by picture and poster. Time spent 45 min.

Session IV: - under title of interpersonal relationship and spiritual development, to dramatize the interpersonal relationship stages and recommend how to minting interpersonal relationship and spiritual development. Teaching method was discussion. Time spent 60 min.

Session V: - under title of stress management, to provide different ways for deaf and mute girls regarding managing and adaptation stress life. Teaching method was discussion explaining experiences. Time spent 45 min.

Session VI: - under title of enabling and reinforcing factor. conducted to deaf and mute girl's mother, for the purpose of increasing the mother's awareness regarding puberty as well as a healthy promotion lifestyle and encouraging mothers to

continuously support girls when they experience positive change. Teaching method was questions and answers. Time spent 90 min.

➤ **Phase 6: Evaluation of the process:**

At each session, the application process such as methods of teaching, material and activities used was assessed, through considering the progression of the participants response based on predetermined educational objectives during implementation of the program.

➤ **Phase 7&8: - Evaluation of impact and outcome**

The purpose of the impact evaluation is to measure the effectiveness of the application in relation to the objectives, as well as to assess the modification in reinforcing and enabling factors for deaf and mute girls after the application. This was done through posttest for knowledge immediately and for attitude, self-efficacy and health promotion life style after one month, while follow up test after 3 months.

Statistical Analysis

Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using independent t test for comparison between mean total score of each six Life style sub-divisions, as well as for comparison between mean total life style two means pre, and post- intervention, and pre & follow up interventions as well. Qualitative data were presented in the form of frequency distribution tables, number and percentage. Data was analyzed by chi-square (χ^2) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used (if the table was 4 cells), or Likelihood Ratio (LR) test (if the table was more than 4 cells). Level of significance was set as P value <0.05 for all significant tests.

III. RESULTS

Table (1) shows that, 66,7% deaf and mute studied girls age were from 14-16 years old, while only 13.3% was less than 13 years, 66. 7% of them were at preparatory grade, while 20% were in primary grade. According to parent complained same disability, 93.3% of deaf and mute girls didn't have parent complained same disability while 6.6 % have one mother and one father are deaf and mute. Also, 40% of deaf and mute girls had siblings had the same disability.

Figure (1) shows that, 23.3% of the deaf and mute girls' fathers were preparatory educated, while 13.3% of them cannot read and write. Regarding mother level of education, 3.3% of the deaf and mute girls' mothers had intermediate educated, while 43.3% of the deaf and mute girls' mothers cannot read and write.

Table (2) clarifies that 90% of the deaf and mute studied girls had menarche at age from 11 to 13 and their duration from 5 to 7 days. The color of menstrual blood was dark red for 50%, while 10% had clotted blood. According to menstrual blood odor, 36.6 had unpleasant odor while 13.3 %not recognize. Regarding amount of menstrual blood, 56.7% of them had moderate amount, while 6.7% had severe amount. With regard intensity of the menstrual pain, 33.3% of deaf and mute girls had mild pain, 33.3% had moderate and 33.3% had severe pain, for methods of dealing with pain, the result of current study shows that 36.6% of deaf and mute girls didn't use anything for menstrual pain, 6.7% use warm showers during menstruation while 30% of deaf and mute girls use warm drinks and 20% used painkillers. Only 23% of deaf and mute girls who answer about signs of puberty that girl have.

Table (3) demonstrates that, 40% of the deaf and mute studied girls body weight from 51-60 kg and 63.3% of them the height from 161-170 cm. Concerning body mass index, 66.7% of them ranging from 18.1-25, while only 6.7% less than 18.

Table (4) presented that, the majority of the studied deaf and mute girls at puberty demonstrated wrong answer or were didn't know the puberty before application. 70%, were don't know or showed wrong answer regarding definition of puberty, 80% answer wrong answer regarding normal age, secondary signs and cause of puberty. While 90% of studied girls answer didn't know primary signs of puberty. However, only 6.7% of them know the factor affecting on puberty and most common health as well as psychological problem during puberty. The mean total score of deaf and mute studied girls at puberty knowledge regarding puberty before application was 4.2 ± 2.0 , which increased after post-application to $11.7 \pm$

3.6 and the difference was highly significant ($P < 0.0001$). Similar pattern was observed when compared pre-application mean total puberty knowledge with the follow up application, and also the difference was highly significant ($P < 0.0001$)

Figure (2) Indicates that, there was a highly statistically significant difference between deaf and mute studied girls regarding puberty knowledge pre, post and follow up the application with p -value = 0.000. Concerning total knowledge of puberty, 93.3% of the studied deaf and mute girls had unsatisfactory level of knowledge in pretest scores, while 83.3% of had satisfactory level of knowledge in posttest scores

Table (5) presented that, the majority of the studied deaf and mute girls at puberty demonstrated wrong answer or were didn't know the life style before application. Regarding health life style the definition, dimensions and periodic examinations as well as investigation ,93.3% of studied girl don't know or showed wrong answer. As regard normal rate of physical activity, and importance, 80% of studied of girls don't know. However, only 6.7% of them know the healthy and beneficial nutrition during puberty. The mean total score of studied deaf and mute girls at puberty knowledge about life style before application was 4.2 ± 2.0 , which increased after post-application to 11.7 ± 3.6 and the difference was highly significant ($P < 0.0001$). Similar pattern was observed when compared pre application mean total life style knowledge with that of the follow up application, and also the difference was highly significant ($P < 0.0001$).

Figure (3) reveals that, there was a highly statistically significant difference between the deaf and mute studied girls regarding life style knowledge pre, post and follow up the application with p -value = 0.0001. Most of studied girls 93% have unsatisfactory level of life style knowledge in pretest. while in posttest was only 16.7%.

Table (6) reveals that in pretest, 83.3 of deaf and mute studied girls not feeling free more after puberty while in posttest 53.3% of studied agree to some extent. Regarding occurrence of a positive change in the life style after puberty, 76.6% of deaf and mute girls disagree while on posttest only 13.3%.and only 10 % of studied girl's in pretest agree that girl became more concerned about health and following healthy lifestyle and in follow up was 50%

Table (7) shows that in pretest 73.3 of deaf and mute studied girls agree that puberty is an unpleasant period and 80% of girl tends to be isolated due to shyness from changes of body shape. While in posttest only 16.7 of studied girls agree that puberty is a mysterious period that most girls don't understand it and in follow up only 3.3 of studied girls who agree that change in lifestyle after puberty is a matter of concern and can predict the expect problems in puberty.

Table (8) shows that there was a highly statistically significant difference between the studied girls regarding attitude pre, post and follow up the model with p -value = 0.000. Regarding total attitude, only 16.7% of deaf and mute studied girls had a positive attitude in pretest scores, while 93.3% of them had a positive attitude in posttest scores and 73.3% a positive attitude in follow up

Table (9) Indicates that, there was a highly statistically significant difference studied girls regarding self-efficacy pre, post and follow up the application with p -value = 0.001.Regarding total self-efficacy, only 6.7% of studied girls had a low self-efficacy level in pretest scores, while 60 % of them had high self-efficacy level in posttest scores compared to 83.3% in follow up

Table (10) Illustrates that, there was highly statistically significant difference between the deaf and mute studied girls regarding reinforcing and enabling factors pre, post and follow up the program with p -value = 0.000. Concerning total reinforcing and enabling factors, only 13.3% of deaf and mute studied girls had good level of reinforcing and enabling factors in pretest scores, while 53.3 % of them had good level in posttest scores compared to 46.7% in follow up.

Table (11), and Figure. 4 shows highlight the efficacy of application of PRECEED- PROCEDE model on health promoting life style as well as grand total life style, among deaf and mute studied girls at puberty. Post and follow up application program revealed a highly significant improvement ($p < 0.0001$) in the five out of six dimensions of health promoting life style. The post program' good life style responses ranged from 33.3% to 66.7%. The follow up application program' good life style responses ranged from (21%) to 70%. This result approved the research hypothesis of this study which stated after implementation of an educational application based on PRECEDE-PROCEED model, the life style for deaf and mute girls at puberty well be promoted.

Figure 5. present the relation between post application grand total knowledge groups and grand total SE groups on grand total life style groups among studied deaf and mute girls at puberty. Although 64% of deaf and mute girls who have good

knowledge showed good life style compared to 40% of deaf and mute girls who have poor knowledge, there was no significant association between post application knowledge about puberty groups and life style groups ($p=0.32$). current result may be due to the small sample size of deaf and mute girls ($N=30$). Regarding self- efficacy groups, there was high significant association between post application self-efficacy and life style groups ($p<0.0001$). Eighty-eight-point nine percent (88.9%) of deaf and mute girls who have high self-efficacy showed good life style compared to 16.7% of deaf and mute girls who have low SE, and the association was high significant ($p<0.0001$).

Figure.6 demonstrated the non-significant correlation between grand total knowledge and grand total life style ($r=0.08$, $p=0.64$) among studied deaf and mute girls at puberty. The table also showed the high significant correlation between SE and life style ($r=0.67$, $p<0.0001$).

Table (1): Distribution of deaf and mute studied girls' personal characteristics (n=30).

Items	The studied girls (n = 30)	
	N	%
Age: Mean ± SD	14.33±1.53	
Age group:		
<13years	4	13.3
14-16 years	21	70
=16	5	16.7
Level of deaf and mute girls' education:		
Primary	6	20
Preparatory	20	66.7
Secondary	4	13.3
The parents have the same disability:		
No	28	93.3
Yes	2	6.7
The answer yes (n=2):		
The mother	1	50
The father	1	50
Sibling have the same disability:		
No	18	60
Yes	12	40

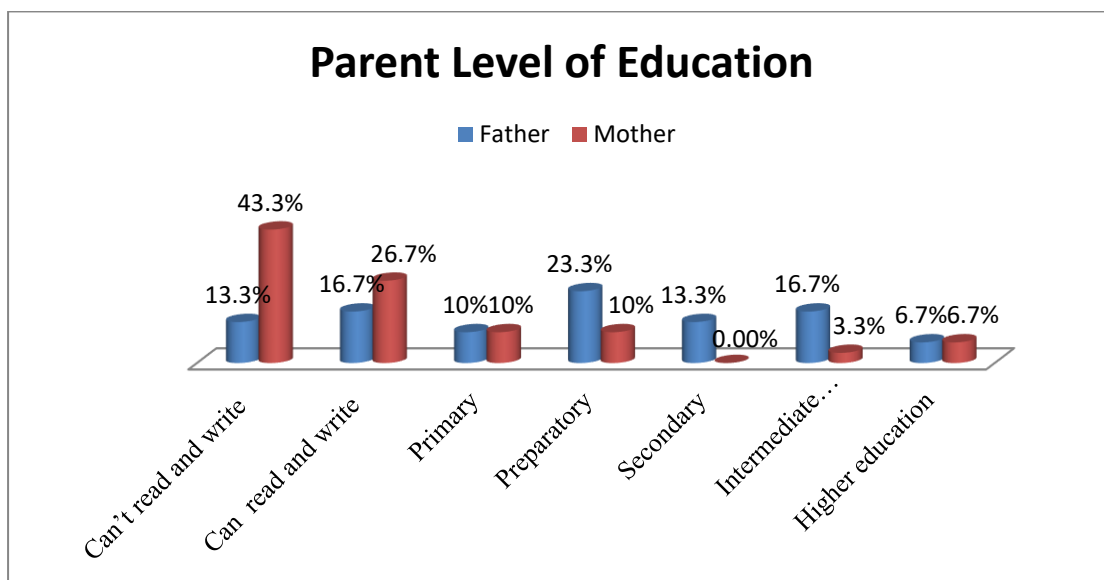


Figure (1): representing parent level of education

Table (2): Distribution of deaf and mute studied girls regarding menstrual history (n=30).

Items	The studied girls (n = 30)	
	N	%
Age of menarche:		
Less than 10 years old	1	3.3
From 11-13 years old	27	90
More than 13 years old	2	6.7
Interval of menstruation:		
Less than 30 day	15	50
Every 30 to 35 day	13	43.3
More than 36 day	2	6.7
Duration of menstruation:		
3 days	2	6.7
5-7 days	27	90
more than 7 days	1	3.3
Amount of menstrual blood:		
2 pad per day	11	36.6
3-4 pads per day	17	56.7
More than 5 pads per day	2	6.7
Regulatory of menstruation:		
No	10	33.3
Yes	20	66.7
Oder of menstrual blood:		
Not recognize	4	13.3
No odor	5	16.7
Usual blood odor	10	33.3
Offensive odor	11	36.7
Color of menstrual blood:		
Bright red	12	40
Dark red	15	50
Clotted	3	10
Pain associated with menstruation:		
No	3	10
Yes	27	90
Time of menstrual pain:		
Before menstruation	10	33.3
The first day of menstruation and through menstrual period	17	56.7
After menstruation	3	10
Intensity of the menstrual pain:		
Tolerable	10	33.3
Moderate	10	33.3
Sever	10	33.4
Methods used to deal well with menstrual pain:		
Nothing	11	36.6
using hot drinking	9	30
taking painkillers	6	20
using warm shower	2	6.7
going the hospital	2	6.7

International Journal of Novel Research in Healthcare and Nursing

Vol. 11, Issue 1, pp: (60-82), Month: January - April 2024, Available at: www.noveltyjournals.com

Table (3): Distribution of deaf and mute studied girls regarding anthropometric measurements (n=30)

Items	Studied girls (n = 30)	
	N	%
Weight:		
• < 40K.g	2	6.7
• 41-50 Kg.	7	23.3
• 51 -60 Kg.	12	40
• > 60K.g	9	30
Mean ± SD	57.17±10.27	
Height:		
• 130-150cm	3	10
• 151-160cm	8	26.7
• 161-170cm	19	63.3
Mean ± SD	161.33±5.62	
Body mass index:		
• Underweight <18	2	6.7
• Normal weight 18.1 - 25	20	66.7
• Overweight 25.1 - 30	8	26.7

Mean ± SD	22.24±3.74
-----------	------------

Table (4): Distribution of deaf and mute studied girl's knowledge regarding to puberty before, after, and follow up application of PRECEED – PROCEDE model (N=30).

'knowledge about the puberty	Pre – application			Post application			Follow up application			x ² P1	x ² P2
	0	1	2	0	1	2	0	1	2		
	%	%	%	%	%	%	%	%	%		
Definition of puberty	70	23.3	6.7	10	23.3	66.7	10	56.7	33.3	21.3, p<0.0001**	21.3, p<0.0001
Normal age of puberty	80	13.3	6.7	6.6	46.7	46.7	10	76.7	13.3	29.9, p<0.0001**	22.1 p<0.0001
Primary signs of puberty	90	3.3	6.7	10	56.7	33.3	26.6	66.7	6.7	29.5, p<0.0001**	17.1, p<0.0001
Secondary signs of puberty	80	13.3	6.7	3.3	20	76.7	3.3	43.4	53.3	39.8, p<0.0001**	33.7, p<0.0001
The cause of puberty	80	10	10	6.7	23.3	70	10	30	60	33.1, p<0.0001**	28.4, p<0.0001
the most important factors which affecting on process of puberty	83.3	10	6.7	3.3	63.4	33.3	23.6	73.3	3.3	30.8, p<0.0001**	15.2, p<0.0001
The most common health problem during puberty	86.7	6.7	6.7	3.3	46.7	50	23.3	56.7	20	35.3, p<0.0001**	18.5 p<0.0001
The most common psychological problem during puberty	86.7	6.7	6.7	6.7	50	43.3	16.6	76.7	6.7	31.7, p<0.0001**	20.8, p<0.0001
Difference between puberty and adolescence	93	0	6.7	6.7	23	70	13.3	53.4	33.3	39.5, p<0.0001**	33.1, p<0.0001
Mean total Puberty knowledge score	4.2 ± 2 (0-16)			11.7 ± 3.6 (0-16)			8.7 ± 3.1 (0-16)			t1=28.1, p<0.0001**	t2=9.7, p<0.0001

0= Don't know/ wrong answer, 1=incomplete knowledge., 2= Complete knowledge. P1=Comparison between Pre and post intervention for each knowledge item. P2= Comparison between Pre and follow up application for each Kn. item. t1 test = Comparison between pre and post application means of total puberty knowledge. Score, and t2= Comparison between pre and follow up application means of total puberty knowledge. score.

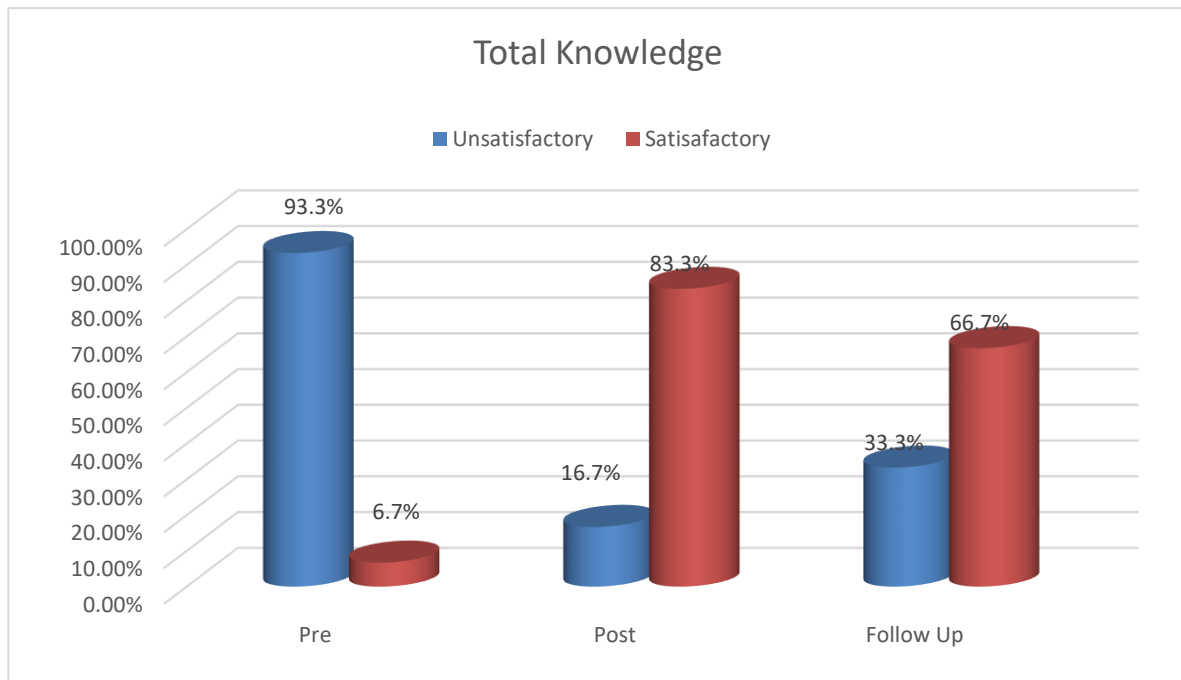


Figure 2 The levels of deaf and mute studied girls' knowledge regarding puberty pre, post, and follow up application (N=30)

Table 5: Distribution of deaf and mute studied girls' knowledge regarding life style Pre, Post, and follow up application of PRECEED – PROCEDE model (N=30)

knowledge about the life style	Pre - application			Post application			Follow up application			x ² P1	x ² P2
	0	1	2	0	1	2	0	1	2		
	%	%	%	%	%	%	%	%	%		
Definition of health life style	93.3	0	6.7	6.7	23.3	70	13.3	53.4	33.3	39.9, p<0.0001	28.7, p<0.0001
Dimension of health lifestyle	93.3	0	6.7	6.7	20	73.3	13.3	60	26.7	40.7, p<0.0001	27.3, p<0.0001
Periodic examinations and investigation during puberty	93.3	0	6.7	6.7	66.7	26.6	20	76.7	3.3	32.1, p<0.0001	24.8, p<0.0001
Importance of physical activity for girls during puberty	80	13.3	6.7	6.6	46.7	46.7	10	76.7	13.3	29.9, p<0.0001	22.1, p<0.0001
The normal rate of physical activity	80	13.3	6.7	3.3	23.3	73.4	3.3	46.7	50	35.4, p<0.0001	25.3, p<0.0001
Different types of physical activity that should be practiced during puberty	76.7	13.3	10	3.3	26.7	70	3.3	56.7	40	39.0, p<0.0001	28.5, p<0.0001
Healthy and beneficial nutrition during puberty	83.3	10	6.7	3.3	33.3	63.4	3.3	66.7	30	39.3, p<0.0001	37.2, p<0.0001
Mean total life style knowledge score	3.5 ± 1.4 (0-14)			10.8 ± 3.3 (0-14)			8.3 ± 2.6 (0-12)			t1=68.8, p<0.0001	t2=25.6, p<0.0001

0= Don't know/ wrong answer, 1=incomplete correct Kn., 2= Complete correct Kn. P1=Comparison between Pre and post intervention for each Kn. Item. P2= Comparison between Pre and follow up application for each Kn. Item. t1 test = Comparison between pre and post application means of total life style kn. Score, and t2= Comparison between pre and follow up application means of total life style kn. Score.

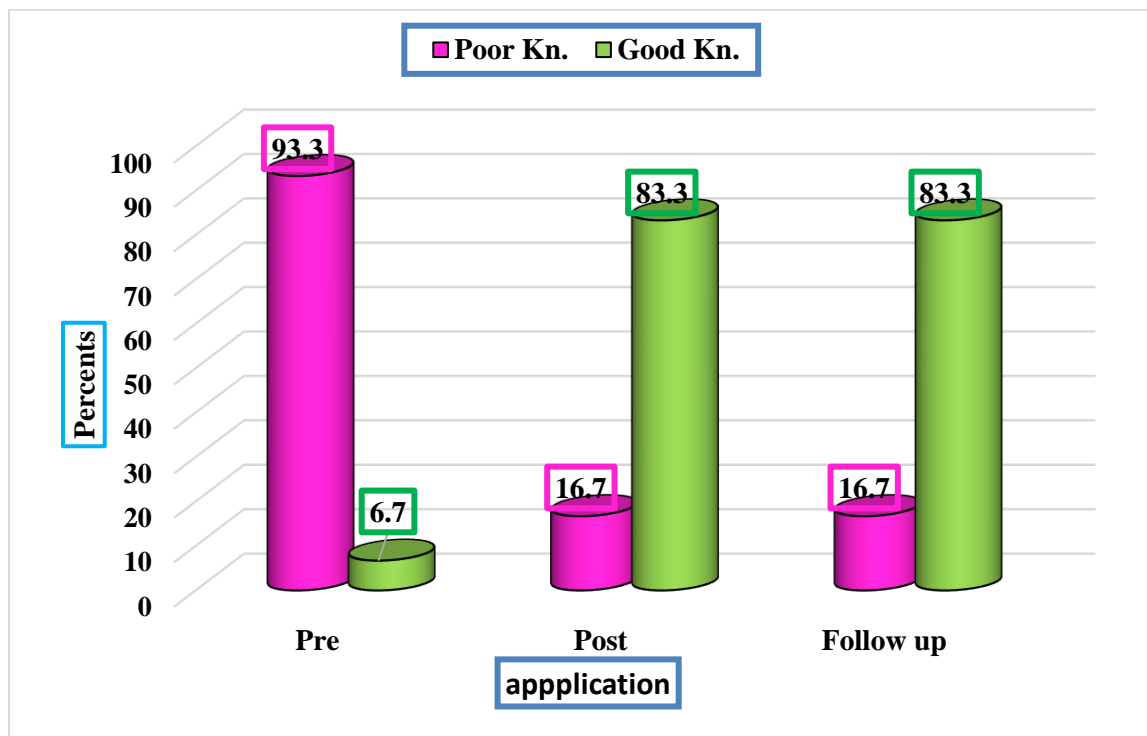


Figure 3: The levels of studied deaf and mute girls' grand total knowledge regarding puberty and life style pre, post, and follow up application (N=30).

Table (6) Distribution of deaf and mute studied girls regarding positive attitude towards puberty Pre, Post, and follow up application of PRECEED – PROCEDE model (N=30).

Positive attitude towards the puberty	Pre application			Post application			Follow up application			x ² P1	x ² P2
	0	1	2	0	1	2	0	1	2		
	%	%	%	%	%	%	%	%	%		
Feeling more freedom after puberty	83.3	10	6.7	46.7	53.3	0	26.7	66.6	6.7	13.9, p<0.0004	4.6, p<0.03
The occurrence of a positive change in the lifestyle after puberty	76.6	16.7	6.7	13.3	63.3	23.4	36.7	43.3	20	20.1, p<0.0001	9.2, p<0.002
The girl view of life became broader and more optimistic after puberty	70	16.7	13.3	40	36.7	23.3	20	60	20	4.6, p<0.03	9.8, p<0.001
The girl became more confident in herself after puberty	70	23.3	6.7	33.3	53.4	13.3	20	56.7	23.3	7.3, p<0.007	14.2, p<0.0001
The girl has better relations with her friends and family after puberty	70	13.3	16.7	26.7	26.7	46.6	16.7	26.6	56.7	11.2, p<0.0008	17.3, p<0.0003
The girl became more concerned about health and following healthy lifestyle	86.7	3.3	10	30	10	60	20	30	50	20.3, p<0.0001	22.9, p<0.0001
Mean total positive attitude score	3.4 ± 2.0 (0-12)			6.6 ± 3.2 (0-11)			5.5 ± 2.1 (0-11)			t1=20.3, p<0.0001	t2=22.9, p<0.0001

0= Disagree, 1=Agree to some extent., 2= Agree. P1=Comparison between Pre and post application for each positive attitude. Item. P2= Comparison between Pre and follow up intervention for each positive attitude Item. t1 test = Comparison between pre and post intervention means of total positive attitude. Score, and t2=, Comparison between pre and follow up application means of total positive attitude. Score

Table 7 Distribution of deaf and mute girls' negative attitude towards puberty pre, post, and follow up application based on PRECEED – PROCEDE model (N=30).

Negative attitude towards the puberty	Pre - application			Post application			Follow up application			x ² P1	x ² P2
	0	1	2	0	1	2	0	1	2		
	%	%	%	%	%	%	%	%	%		
Puberty is an unpleasant period	73.3	10	16.7	30	10	60	50	20	30	4.6, p<0.03	3.3, P=0.06 NS
Puberty is a mysterious period that most girls don't understand	70	13.3	16.7	70	26.7	3.3	63.3	36.7	0	0.33, p=0.56 NS	0.16, P=0.68 NS
The change in lifestyle after puberty is a matter of concern	26.7	10	63.3	33.3	50	16.7	50	46.7	3.3	5.3, p<0.02	9.2, p<0.001
Girl can predict the expect puberty problems	76.7	13.3	10	76.7	23.3	0	76.7	20	3.3	0.22, p=0.64 NS	0.06, p=0.82 NS
Puberty is a period of increasing responsibilities and life burdens	76.7	13.3	10	76.7	23.3	0	66.7	33.3	0	0.22, p=0.64 NS	10.1, p=0.82 NS
The girl tends to be isolated due to shyness from body shape changes	80	10	10	76.7	23.3	0	73.3	26.7	0	0.54, P=0.81 NS	0.0, p=1.0 NS
Mean total negative attitude score	3.0 ± 1.3 (0-12)			3.2 ± 1.7 (0-6)			3.1 ± 1.9 (0-8)			t1=0.85, p=0.12	t2=0.56, p=0.32

0= Agree, 1=Agree to some extent. 2 = Disagree P1=Comparison between Pre and post application for each negative attitude Item. P2= Comparison between Pre and follow up application for each negative attitude Item. t1 test = Comparison between pre and post application means of total negative attitude. Score, and t2=. Comparison between pre and follow up application means of total negative attitude. Score

Table (8) The levels of deaf and mute studied girls regarding total attitude towards puberty pre, post, and follow up applications (N=30).

The levels of total Attitude towards puberty	Application						Test of significance	P
	Pre		Post		Follow			
	N0.	%	N0.	%	N0.	%		
Negative Attitude	25	83.3	2	6.7	8	26.7	1.101	P=0.003*
Positive attitude	5	16.7	28	93.3	22	73.3		
Total	30	100	30	100	30	100		
Mean ± SD total score	5.1 ± 1.6 (0-16)		6.8 ± 2.1 (0-20)		6.7 ± 2.6 (0-22)			

Table 9: Effect of application of PRECEED- PROCEDE model on reinforcing and enabling factors among deaf and mute studied girls at puberty (N=30).

Levels of reinforcing & enabling factors	Application						Test of significance	P
	Pre		Post		Follow			
	0.N	%	N0	%	0.N	%		
Reinforcing factors								
Poor level (0 – 5)	25	83.3	21	70	18	60	X ² =4.0	=0.13 NS
Good level (6 – 10)	5	16.7	9	30	12	40		
Enabling factors								
Poor level (0 – 5)	227	90	14	46.7	16	53.3	14.1	<0.001*
Good level (5 – 10)	33	10	16	53.3	14	46.7		
Grand total reinforcing and enabling factor								
Poor factors level	26	86.7	14	46.7	16	53.3	5.254	0.000*
Good factors level	4	13.3	16	53.3	14	46.7		
Total	30	100	30	100	30	100		

Table 10: - The levels of self-efficacy as well as grand total self-efficacy for deaf and mute studied girl

Levels of self-efficacy	Application						Test of significance X ²	P
	Pre		Post		Follow			
	N0.	%	N0.	%	N0.	%		
Decision making behaviour								
Low level (0 – 5)	28	93.3	15	50	16	53.3	=15.5	<0.0001 **
High level(6 – 10)	2	6.7	15	50	14	46.7		
Resource management and adaptation behavior								
Low level (0 – 4)	28	93.3	14	46.7	3	10	41.9	<0.0001 **
High level (5 – 8)	2	6.7	16	53.3	27	90		
Adaptation to health								
Low Level (0 – 5)	28	93.3	7	23.3	8	26.7	37.5	<0.0001 **
High level (6 – 10)	2	6.7	23	76.7	22	73.3		
Grand total self-efficacy								
Low SE Levels (0 – 14)	28	93.3	12	40	5	16.7	37.1	<0.0001 **
High level (15 – 28)	2	6.7	18	60	25	83.3		
Total	30	100	30	100	30	100		

Table 11: Effect of application of PRECEED- PROCEDE model on health promotion life style among studied deaf and mute girls (N=30)

Levels of health promoting life style	Application						Test of significance	P
	Pre		Post		Follow			
	N0.	%	N0.	%	N0.	%		
According to health responsibility								
Poor level (0 – 6)	24	80	10	33.3	9	21	$X^2 = 18.8$	<0.0001
Good level (6 – 12)	6	20	20	66.7	30	70		
According to physical activity								
Poor level (0 – 3)	27	90	16	53.3	19	63.3	$X^2 = 10.1$	<0.007
Good level (4 – 6)	3	10	14	46.7	11	36.7		
According to proper nutrition								
Poor level (0 – 8)	27	90	15	50	11	36.7	$X^2 = 191$	<0.0001
Good level (9 – 16)	3	10	15	50	19	63.3		
According to spiritual development								
Poor level (0 – 7)	24	80	17	56.7	10	33.3	$X^2 = 13.3$	<0.001
Good level (8 – 14)	6	20	13	43.3	20	66.7		
According to personal relationships								
Poor level (0 – 7)	11	36.7	11	36.7	9	30	$X^2 = 0.39$	P=0.81 NS
Good level (8 – 14)	19	63.3	19	36.7	21	70		
According to stress management								
Poor level (0 – 6)	24	80	12	40	10	33.3	$X^2 = 15.3$	P<0.0001
Good level 7 – 12)	6	20	18	60	20	63.7		
Total	30	100	30	100	30	100		

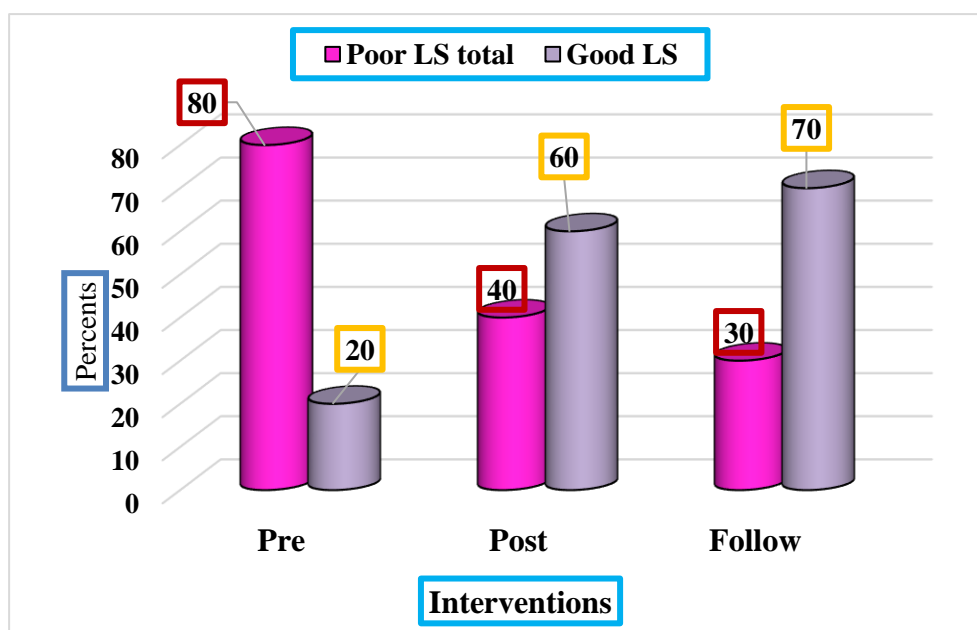


Figure 4: Effect of application of PRECEED- PROCEDE model on health promoting grand total life style (LS) among deaf and mute studied girls at puberty (N=30) ($X^2 = 16.8$, $p < 0.0001$)

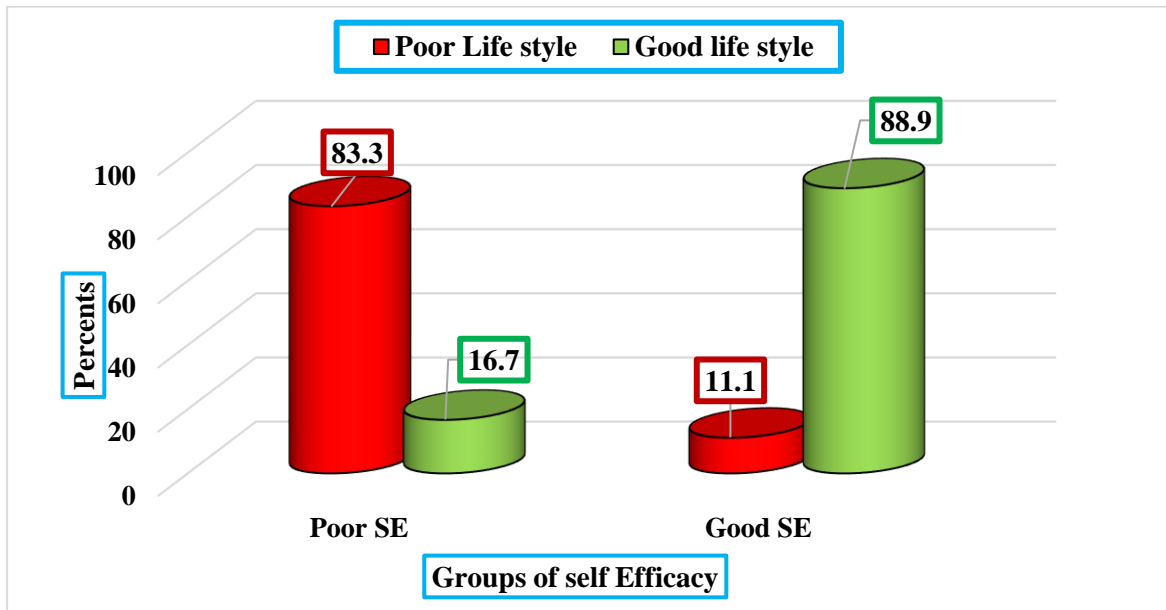


Figure 5: Relation between post application grand total self-efficacy (SE) groups and grand total life style groups among studied deaf and mute girls at puberty(N=30)

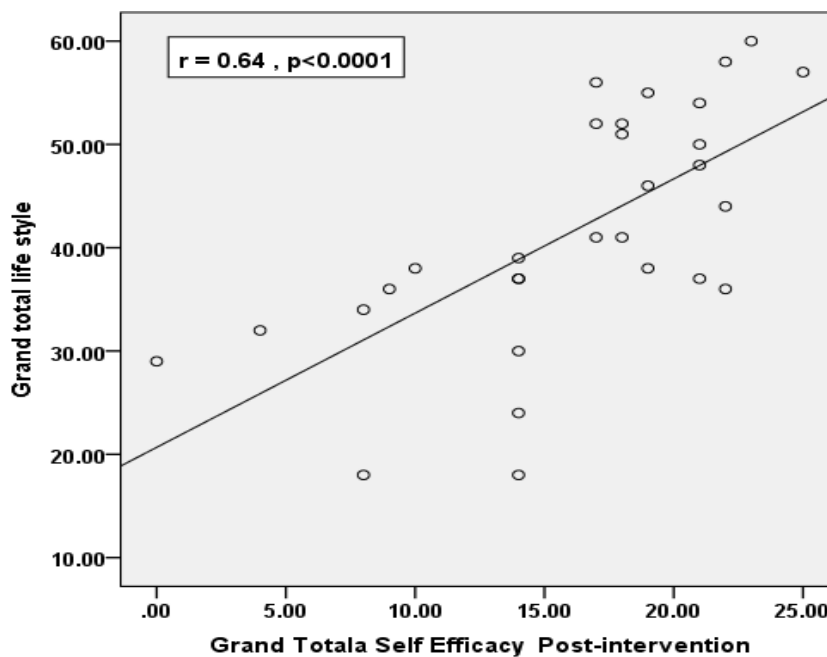


Figure 6: Correlation coefficient and regression line between post application grand total self-efficacy as independent variable and grand total life style as dependent variable among studied deaf and mute girls (N=30)

IV. DISCUSSION

The findings of current study revealed that the majority of deaf and mute girls age ranging from thirteen to fourteen years old, while the minority aged was less than thirteen years. and about one fifth of deaf and mute girls age were sixteen years old. According to level of education, two third of deaf and mute girls at preparatory grad, while one fifth at primary grad and minority girls at secondary grade that is in first stage. The researcher supposes that there is no relationship between deaf and mute girl’s age and level of education, because in schools of deaf and mute, the primary grad extends to eight years, while in other schools only six years. Therefore, find that the thirteen-year-old deaf and mute girl is still in the primary grad.

Regarding to parent level of education, the study showed that more than one fifth of father's level of education preparatory school, while less than one sixth can't read and write and about one sixth were intermediate education. Regarding to mother level of education the study showed that less than half of mothers can't read and write, while one-fifth of mothers have less than intermediate education.

The result is incompatible with (*Mahmoud Ibrahim& Kamel., 2022*) who reported that the largest percentage of parents goes for an average qualification was less than half, followed by university degree were less than third and finally qualification below average were less than one quarter. Mention that in study conducted at Egypt under title of "Social welfare services as a mechanism to reduce social exclusion of the deaf and mute".

According to parents and sibling, complain same disability, the study showed that most of deaf and mute girls were do not have parents with the same disability, while less than half of studied girls have sibling with the same disability. The finding agree with (*Wright et al , 2021*)who reported that most of deaf children in the United Kingdom are born to hearing parents, most of whom were not expecting a deaf child. Mention that in study conduct at United Kingdom under title "A systematic scoping review of early applications for parents of deaf infants".

Based on world health organization report in 2021, there are many causes for hearing loss and deafness either hereditary included intrauterine infection such as rubella as well as cytomegalovirus infection, birth asphyxia, hyperbilirubinemia, chronic ear infections and meningitis also other infections. From the researcher point of view the causes of deafness for studied deaf and mute girls is infection either intrauterine or postnatal based on deaf and mute girls' mothers report.

Regarding of menstrual history, the age of menarche for majority of deaf and mute girls at eleven to thirteen years and the duration of menstruation lasts from five to seven days. Approximately two-thirds of girls have regular menstruation, while about half of studied girl's interval of menstruation was less than month, also described the menstrual color as dark red. Regarding the order of menstrual blood, about one-sixth of deaf and mute girls not recognize, while more than a third said that menstrual blood odor unpleasant. As for amount of menstrual blood, more than half of the studied girls stated that the amount of blood was moderate. The result is consistent with *Ramos-Pichardo et al., 2020* Who reported that average age of menarche for studied sample was twelve years, more than half have regular menstrual cycle, average of duration was five days, interval about every month, while amount of blood ranging from mild to moderate. Mention that in study conducted in Madrid at Spain, under title, "Why do some Spanish nursing students with menstrual pain fail to consult healthcare professionals?"

According to menstrual pain, the result reveals that most of deaf and mute girls suffered from menstrual pain. the severity of menstrual pain was one third for both mild, moderate, and severe, methods of dealing with pain for more than a third were no thing a third of the studied girls use of warm drinks also a quarter of studied girls used painkillers and less than a sixth go to the hospital. The result congruent with *Ramos-Pichardo et al 2020*, Who mention that more than half of studied sample have menstrual pain the majority use non pharmacological method to deal well with pain and consider the menstrual pain as normal and neutral. Reported that in study conducted in Madrid at Spain, under title, "Why do some Spanish nursing students with menstrual pain fail to consult healthcare professionals?"

The researcher supposes that agreement because deaf and mute girls go through the same stages of female growth and maturity as a normal girl due to the completion of all female sexual characteristics that have nothing to do with disability.

Concerning to physical assessment for deaf and mute girls, the study founded that less than of sixth of studied girls body weight was less than forty kg, while less than half from fifty-one to sixty kg and about third was more than sixty kg. Regarding body height, about two third of deaf and mute girl's height ranges from one hundred and sixty-one to one hundred and seventy cm, while one fifth the body height was from one hundred and thirty to one hundred and fifty.

For assessing mass index (BMI), the study illustrated that more than half of deaf and mute girls were normal weigh, between eighteen and twenty-five, while less than tenth had underweight less than eighteen, while more than a quarter of the studied girls had over weight between twenty-five and thirty. The result is going a line with *Oliveira Neto et al 2022, who* reported that more than studied sample was at normal weight, height and BMI, mention that in study conducted at Brazil under title "Differences at puberty of girls before and during the COVID-19 pandemic". The researcher aske the deaf and mute girls who are under weigh or overweigh to visit the therapeutic nutritionist to follow an appropriate diet to reach the ideal weight.

Related to knowledge regarding puberty, the study demonstrated that majority of deaf and mute girls had unsatisfactory knowledge regarding puberty in pretest, which is improved in posttest and follow up. In posttest, more than half of studied girls answered correct answer regarding definition of puberty, causes and secondary characteristics of puberty while one third answered correct answer regarding primary characteristics and most important factors that affecting on puberty process. In follow-up, about half of deaf and mute girls had correct answer incomplete regarding health psychological problem.

The result of current study corresponds with *Bahaei et al 2021* who mention in study conducted at Iran, under title, "Effect of a health education program on puberty knowledge among visually". Reported, the students need to have comprehensive knowledge about puberty to improve thinking/learning abilities, positive emotions, and responsible behavior

Deaf and mute girl's knowledge are improved in the post-test compared to the follow-up test, due to the long time between study program and the follow-up test. In addition, lack of studied girls' memory. The researcher also noted that the deaf and mute girl's knowledge is satisfactory in certain knowledge more than others are, may be due to the deaf and mute girls interesting.

According to the life style knowledge, the current study represented the most of deaf and mute girls had unsatisfactory knowledge regarding healthy life style in pretest, which was improve in posttest and follow up. In posttest, more than two third of studied girls answered correct answer in posttest regarding definition of life style, exercise and proper nutrition during puberty. For follow up test, majority of deaf and mute girls' answers correct incomplete regarding periodic examination and investigations during puberty.

Result of current study vary with *Shendge 2023*, who reported that majority of studied sample had good knowledge about life style. Mention that in study conduct in India under title of "Assessment of knowledge and practice regarding lifestyle modification about poly cystic ovaries among college girls attending gynaec outpatient department of selected hospitals"

From the researcher's point of view, normal girls have many opportunities to research about everything that is new and beneficial for health, through several ways such as social media, telecommunications programmers, attending educational seminars, participating in awareness campaigns. Deaf and mute girls miss all of opportunity due to disability and because lack of such sources of knowledge by sign language.

According to deaf and mute girl's attitude toward puberty, the current study revealed that only one sixth of studied girls had a positive attitude toward puberty in pretest, while most of them had a positive attitude in posttest scores and majority of deaf and mute girls had a positive attitude in follow up.

The results are identical with *Mohammed et al., 2023* who reported that the lowest percentage of studied adolescent girls had positive attitude at pre application which increased to two thirds post application, mention that in study conduct in Benha, under title" Effect of instructional guidelines on adolescent girl's knowledge and attitude regarding puberty development".

Still many deaf and mute girls do not know about the physical changes that occur during puberty or the reasons leading to this, so sudden changes can effect on self-confidence as well as daily lifestyle and make it difficult to adapt well to the changes, which leads to deaf and mute girls looking into puberty as an unpleasant period.

Concerning self-efficacy of deaf and mute girls, the result indicated that the majority of studied girls have low level of self-efficacy. According to self-efficacy regarding perception/ decision-making, in pretest, less than quarter of girls can take a decision regarding health care and choose healthy lifestyle. While the most of studied girls can't balance between the advantage and disadvantage of healthy life style, which is improved in posttest and follow up. For self-efficacy regarding resources management and health adaption, in pretest the majority of studied girls can't able to visit the doctor for asking help about health issues, also can't able connected to internet for search about a healthy life style and can't overcome the mood swing further more manage the daily responsibilities.

The result is matched with *Mazlomezhad & Moghadam., 2022*, who mention that low self-efficacy can decrease cognitive and behavioral functioning and makes people feel helpless and unable to control their life events. Reported that in study conducted at Iran under title "Evaluation of quality of life and self-efficacy in adolescents with amblyopia".

Self-efficacy, defined as the belief that a person holds about their ability to organize and perform actions to achieve certain goals. Self-efficacy affects deaf and mute of adaptive behavior and the choice of environment and conditions strive to achieve. Furthermore, self-efficacy beliefs influence deaf and mute girl's patterns of thought and emotional actions. From the researcher point of view to improve the **level** of deaf and mute girls' **self**-efficacy, the reinforcing and enabling factors must be supported. As mentioned previously, is very important to provide awareness campaigns about health in sign language, whether in schools, health centers, or on social media. Likewise, educational health programs on television must have a sign language interpreter.

Related to reinforcing factor, the current result illustrated that in pretest about two third of studied girls' family not represents a support or help to pass the puberty safely, also girls not receive encouragement from family and friends when a girl expresses to change the life style and not consider that medical authorities encourage and support the maintenance of deaf and mute girl's health, while the majority of studied girls not receives award from the family for adopting a healthy life style. In posttest and follow up the result improved.

Regarding to enabling factors, in pretest, only sixth of deaf and mute girls who have different sources of accurate knowledge about puberty also are seeking to attend workshops or seminars about how to take care of, the result improves in posttest and follow up to about two third mention that some extent.

The results agree with (*Bab 2022*), who reported that enabling factors include perceived barriers, self-efficacy, and perceived behavioral control and the important reinforcing factors were family support and social strengthening and there is a change in changes resulting from the educational program on predisposing, enabling, and reinforcing factors and behavior. Mention that in study conducted at *Iran* under title "Planning, implementation, and evaluation of educational application based on PRECEDE–PROCEED model for mothers about oral health promotion on children aged 3–6 years"

In educational class, which held to deaf and mute girls' mothers, the researcher instructs the mothers to support and cooperate the deaf and mute girls to implement program. For example, improve studied girls' knowledge and life style during puberty, ask to be a guiding, supervising and helping deaf and mute girls to adapted well with puberty changes, finally encourage the studied girls to change the unhealthy life style

According to health promotion life style, the current study assesses the six life style dimension for studied girls. Regarding health responsibility, the majority of deaf and mute girls never finding out about topics that revolve around health also never do periodic examination to check on health and detection of diseases

The result is disagreed with *Tomaszewska et al., 2022* who reported that low level of intensity of health behaviors was presented by less than third of subjects, average results were obtained by more than two quarter of subjects. High level of intensity of health behaviors was present by third of subjects. Women show a higher rate of proper eating habits, preventive behaviors, and work practices. Mention that in study conducted at *Europe*, under title "Responsibility for health-public awareness".

From the researcher point of view, the lack of deaf and mute girls' interest regarding health responsibility is due to lack of awareness about how to maintain health. Furthermore, the reason may be back to the deficiency of sources of information by sign language which is easy to refer to if necessary, awareness is needed, and also the lack of awareness of health care providers by sign language, lead to deaf and mute girls find difficult to seek health advice. Lack of physical activity is due to lack of knowledge about the correct concept of physical activity as well as where and how to do exercise

Regarding eat proper nutrition as a healthy promotion lifestyle, the result of current study demonstrate that less than tenth of deaf and mute girls choose an integrated diet that contains all nutrients in all meals and eat simple meals six times per day and more than half of studied girls never eat or drink daily dairy products also never eat daily fresh vegetables and fruits. The result incompatible with *Megahed et al., 2022* who reported that majority of studied sample had good diary habit. Mention that in study conduct at *Port Said city*, under title "Adolescents' self-efficacy and perceived barriers toward healthy eating habits in Port Said city".

Over two-thirds of global deaths caused by chronic diseases, and unhealthy diet are a primary risk factor of chronic diseases. The WHO lists four key metabolic changes that increase the chance of dying from chronic diseases, which is, elevated

blood pressure, overweight/obesity, hyperglycemia, and hyperlipidemia. Proper nutrition can attenuate current factors, diets continue to increase rates (*Didinger et al., 2022*).

For spiritual development, the current study revealed that in pretest, about third of deaf and mute girls not realized the purpose life also not looking forward to the future. While only fifth of studied girls working towards achieving educational and life goals also search every day for something interesting and the majority never exposure to new experiences and challenges, while that more than half usually have a sense of contentment and psychological peace.

Spiritual development is an on-going and dynamic process, results from the tension between a propensity towards growth and self-transcendence on the one hand the propensity towards self-centeredness and self-absorption on the other. Furthermore, spiritual development is a process of deepening, expanding, enriching, and integrating which occurs within the individual, so as to in time break through to the outside and manifest in outward growth – in actions and way of life, and in relationship to the outside world (*Godula., 2019*).

The researcher supposes that, spiritual development is not easy to define or discuss yet, become an important concept for our changing, complex, and often turbulent world. Also, helpful to know that a spiritually developed self can help cope with deaf and mute girls fear and despair while offering wholeness and hope. Spiritual development is regarded as being a way of life and an inseparable aspect of human development, or, simply human development as seen through a spiritual perspective

According to studied girls' interpersonal relationship, the current result showed that, more than half of deaf and mute girls have moderate level of personal relationship, such as spend a time with close friends also influenced and influenced by close people. In addition, expressing feelings of love and respect for relatives and friends and respect the opinion of others and listen to girls' point of view.

To create successful interpersonal relationships, girls need certain skills to communicate with community. Girls are born with certain interpersonal skills, which use in every day when through communicate and interact with each other - whether individually or in groups. Interpersonal skills can include communication skills, such as effective listening and speaking, emotional intelligence, teamwork, negotiation, persuasion and influence skills, problem solving, and decision-making includes the ability to control and manage emotions. However, deaf and mute girls lack the most important skills, which are speaking and listening, which makes the circle of personal relationships limited and closed to those of the same disability.

Regarding to the last dimension of health promotion life style which is stress management; the result of current study revealed that only tenth deaf and mute girls accept the things that cannot change and focus on positive thoughts at bed time, furthermore doing 15 minute/day of relaxation and meditation and less than tenth of studied girls usually balancing the time between study and entertainment.

Regarding to total knowledge, attitude, self-efficacy, and health promotion life style deaf and mute girls, the result of current study showed that there was a highly statistically significant difference between studied girls regarding total knowledge, total attitude regarding puberty, self-efficacy and total life style practice in pre, post and follow up the program.

The result is supported by *Bazpour et al., 2019* who mention that the mean of the lifestyle score changed from weak level to moderate level at baseline and to good level immediately after application, and a month after application in the experimental group. Also, there is a significantly positive predisposing awareness and attitude, reinforcing, and enabling factor changes in the experimental group immediately after and a month after application. Reported that in study conduct at Iran under title " The Effect of a training program based on the PRECEDE-PROCEED model on lifestyle of adolescents with beta-thalassemia: a randomized controlled clinical trial"

Finally, healthy lifestyle considered a valuable source for decreasing health problems, promoting health, managing stressful events and improving the quality of life. The healthy promotion lifestyle practice should be start from childhood. World Health Organization also believes that the fight against unhealthy way of life at an early age has a significant impact on health in adulthood. PPM is an appropriate model for planning and implementing the training program to promote healthy lifestyle because PPM work as a conceptual framework for identifying the relevant behavioral and environmental factors associated with lifestyle (*Bazpour et al., 2019*).

V. CONCLUSION

Based on the results of the current study, the following can be concluded: Most of deaf and mute studied girls have poor knowledge regarding puberty and life style as well as healthy promotion lifestyle in the pre-test, which is improved in the post-test and follow up. The results showed that the reason is due to the lack of enabling and reinforcing factors for deaf and mute girls. Results of current study supported the research hypothesis

VI. RECOMMENDATIONS

Based upon the results of the current study, the following recommendations were suggested:

- Design a digital reproductive health promotion media for deaf students and parents, focuses on simple text and images, designed by sign language and delivered digital-based, so that girls are easy to access
- Develop educational guideline by sign language through different mass media such as YouTube channels.

Recommendations for Further Researches:

- The study should be replicated on large sample and in different deaf and mute school setting in order to generalize the results.
- Development of an educational program for healthcare providers to deal well with deaf and mute by sign language

REFERENCES

- [1] Kheyfets, A., & French, A. V. (2023). Normal and Delayed Puberty in Females. *Topics in Obstetrics & Gynecology*, 43(8), 1-7.
- [2] <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- [3] Rippe, J. M. (2021). *Manual of lifestyle medicine*. CRC Press Book chapter 1 Page No 24.
- [4] Mahfuz, M. T., Sultana, F., Hunter, E. C., Jahan, F., Akand, F., Khan, S., ... & Winch, P. J. (2021). Teachers' perspective on implementation of menstrual hygiene management and puberty education in a pilot study in Bangladeshi schools. *Global health action*, 14(1), 1955492
- [5] Kim J, Jang J, Kim B, Lee KH. (2022). Effect of the PRECEDE-PROCEED model on health programs: a systematic review and meta-analysis. 2022 Oct 9;11(1):213. doi: 10.1186/s13643-022-02092-2. PMID: 36210473; PMCID: PMC9549687.
- [6] <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- [7] Yao, J., Ziapour, A., Abbas, J., Toraji, R., & NeJhaddadgar, N. (2022). Assessing puberty-related health needs among 10–15-year-old boys: a cross-sectional study approach. *Archives de Pédiatrie*, 29(4), 307-311.
- [8] <https://education.alwaffer.com/articles/2014733/>
- [9] World Health Organisation, Deafness and Hearing Loss, 2021. <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>. Accessed 1 Apr 2021
- [10] Gamal, G., Abdelhaseeb, M., Abdel-Salam, S., & Abdel-Haliem, S. (2021). Application of an Educational Program on Lifestyle of Perimenopausal Women Utilizing PRECEDE–PROCEED Model. *Journal of Nursing Science Benha University*, 2(2), 755-775.
- [11] Walker, S, Sechrist, K, & Pender, N. (1987). The Health- Promoting Lifestyle Profile: development and psychometric characteristics. *Journal of Nursing Research*, 36(2), 76-81.
- [12] Mahmoud A. M., & Kamel, H. H. (2022). Social Welfare Services as a Mechanism to Reduce Social Exclusion of the Deaf and Mute. *Egyptian Journal of Social Work*, 14(1), 35-56.
- [13] Wright, B., Hargate, R., Garside, M., Carr, G., Wakefield, T., Swanwick, R., ... & Simpson, P. (2021). A systematic scoping review of early applications for parents of deaf infants. *BMC pediatrics*, 21, 1-13

International Journal of Novel Research in Healthcare and Nursing

Vol. 11, Issue 1, pp: (60-82), Month: January - April 2024, Available at: www.noveltyjournals.com

- [14] Ramos-Pichardo, J. D., Ortega-Galán, Á. M., Iglesias-López, M. T., Abreu-Sánchez, A., & Fernández-Martínez, E. (2020). Why do some Spanish nursing students with menstrual pain fail to consult healthcare professionals?. *International Journal of Environmental Research and Public Health*, 17(21), 8173
- [15] Bahari, R., Shokravi, F. A., Anosheh, M., & Moridi, M. (2021). Effect of a health education program on puberty knowledge among visually impaired female adolescent students. *Medical Journal of the Islamic Republic of Iran*, 35, 74
- [16] Shendge, R. H. Assessment of knowledge and practice regarding lifestyle modification about poly cyst ovary disease among college girls attending gynaec outpatient department of selected hospitals
- [17] Mohammed, T., Ahmed, A., & Soliman, R. (2023). Effect of Instructional Guidelines on Adolescent Girls Knowledge and Attitude regarding Puberty Development. *Journal of Nursing Science Benha University*, 4(1), 1048-1061.
- [18] Mazlominezhad, A., & Moghadam, F. A. (2022). Evaluation of quality of life and self-efficacy in adolescents with amblyopia. *Journal of Medicine and Life*, 15(4), 499.
- [19] **Bab, N., Khodadadi, H., & Nasirzadeh, M. (2022).** Planning, implementation, and evaluation of educational application based on PRECEDE–PROCEED model for mothers about oral health promotion on children aged 3–6 years. *Journal of Education and Health Promotion*, 11.
- [20] Tomaszewska, K., Majchrowicz, B., & Zimoń, P. (2022). Responsibility for health-public awareness. *Journal of Education, Health and Sport*, 12(3), 198-209.
- [21] **Megahed, A., Abdalla, S., & Elghareap, M. (2022).** Adolescents' Self-Efficacy and Perceived Barriers toward Healthy Eating Habits in Port Said City. *International Egyptian Journal of Nursing Sciences and Research*, 3(1), 382-396
- [22] Didinger, C., Foster, M. T., Bunning, M., & Thompson, H. J. (2022). Nutrition and human health benefits of dry beans and other pulses. *Dry Beans and pulses: Production, processing, and Nutrition*, 481-504.
- [23] Godula, M. (2019). *Spiritual Development Through Client Encounters: Reflections of Senior Psychotherapists* (Doctoral dissertation, Université Saint-Paul/Saint Paul University).