

## Effect of Educational Program on Knowledge and Attitude of Adolescent Nursing Students About preconception Care at Assiut City

Fatma R. Khalaf<sup>1</sup>, Reda R. Ail<sup>2</sup>, Mervat. M. Hassan<sup>3</sup> & Aml A. Mohamed<sup>4</sup>

<sup>1</sup>. Assistant Professor of Family and Community Health Nursing Department, Faculty of Nursing, Assiut University, Egypt.

<sup>2</sup>. Lecturer of Maternal and Newborn Health Nursing Department, Faculty of Nursing, Assiut University, Egypt.

<sup>3</sup>. Lecturer of Obstetric and Gynecological Nursing Department, Faculty of Nursing, South Valley University, Qena, Egypt.

<sup>4</sup>. Lecturer of Family and Community Health Nursing Department, Faculty of Nursing, Assiut University, Egypt.

### Abstract:

**Background & Objectives:** Preconception health includes health of woman and man before pregnancy to reduce risks that woman may face during pregnancy and enhance fetal and maternal outcomes. The present study aimed to evaluate the effect of the educational program on knowledge and attitude of adolescents nursing students regarding preconception care. **Methodology:** Quasi-experimental research design was applied in this study. The current study was conducted in Technical Institute of Nursing, Assiut University and Technical Institute of Nursing Al-Azaher University. The studied students were selected by simple random sample. Data collection was done using structured questionnaires which were distributed to the participants. An educational program was implemented to enhance students' knowledge and their attitude about preconception care. Data analysis was done using SPSS program, version 23. **Results:** A total of 200 students were enrolled in the present study, aged (18-19) years with mean  $\pm$ SD (18.48 $\pm$ 0.584) and 85.0% of them were female. Regarding students' knowledge score was 26.40 $\pm$ 11.39 pre education while after implemented the education program become 40.74 $\pm$ 10.56 with highly significant differences (P value= $<$ 0.001). Moreover, mean score of the students' attitude had 12.37 $\pm$ 1.74 regarding preconception care while after the application of the educational program had become 15.14 $\pm$ 1.55. **Conclusion:** There was a relation between total score of students' knowledge regarding preconception care with student's age, gender and university grade, moreover, there was a positive correlation between students' knowledge and their attitude. **Recommendation:** Further studies are needed using large samples to raise awareness of students about preconception care.

**Keywords:** Knowledge, Attitude, Educational program, Preconception care & Adolescent nursing students.

### Introduction:

Preconception health is critically important to promote favorable maternal and infant outcomes in both the short- and long-term. Adverse lifestyle factors and unhealthy weight status prior to pregnancy are now recognized as important factors associated with reduced fertility, excessive gestational weight gain, postpartum weight retention, and high long-term weight status in both mothers and offspring. Furthermore, the preconception period is considered a unique opportunity for the reduction of risk factors linked with non-communicable diseases in offspring. Mechanisms by which maternal preconception health can impact offspring health include epigenetic alterations to gene expression occurring soon after conception, via poorer pregnancy outcomes associated with maternal over- or undernutrition, or via environmental and social impacts (Hill et al., 2020).

Preconception care (PCC) is care provided before pregnancy to improve maternal and newborn health outcomes. PCC includes numerous aspects of health care, such as family planning, lifestyle behaviors

including physical activity and weight management, immunizations, substance abuse, infectious disease treatment, and chronic disease management. (Bickmore et al., 2020)

In 2004, the United States Centers for Disease Control and Prevention convened experts who developed "Recommendations to Improve Preconception Health and Health Care". In February 2012, the World Health Organization convened a meeting of researchers and partner organizations "to achieve a global consensus on the place of preconception care (PCC) as part of an overall strategy to prevent maternal and childhood mortality and morbidity. The group concluded that further improvements in maternal and infant pregnancy outcomes would be achieved through a "continuum of care" starting "before pregnancy and continuing through pregnancy, infancy, childhood, adolescence and adulthood (Atrash & Jack, 2020)

According to World Health Organization, preconception care is a way of provision of preventive, curative health of biomedical, behavioral,

and social health interventions to women and couples before conception occurs to improve maternal and child health outcomes, in both the short term and the long term. Preconception care has positively affected maternal and child health outcomes and is addressed primarily by health professionals responsible for developing national and local health policies. **(Bekele et al., 2020)**

Large numbers of individuals are not aware by component of preconception health counseling. Pregnancy outcomes are also linked to the man's lifestyle and health as smoking beside his wife that increase risk low birth weight, so it is important to be included in preconception health counseling. Enhancing youth women and men information, attitudes and behaviors is important issue to promote preconception health and to implement this it is important to reach to youth in universities to improve their awareness about preconception health **(Ibrahim et al., 2019)**

Preconception care includes the providing of health care to women and men during their reproductive years. It's defined as any intervention provided to women and couples of childbearing age, regardless of pregnancy status or desire, before pregnancy, to improve health outcomes for women, newborns and children. It is an essential part of antenatal care because this care assists women to reducing risk, promoting healthy lifestyle and improving readiness for pregnancy. As well as it is important to minimize fetal defect. Educating young women about healthy lifestyles not only empowers them as individuals in their own right, but also it can result in healthier maternal and newborn outcomes should they become pregnant **(Nepali & Sapkota, 2017)**

Nurses are play important role in all phases of preconception care like prevention, early detection, diagnosis and treatment of anemia and other health related issues before pregnancy. The role of the nurses during the preconception period involves developing and delivering education programs that emphasize the individual responsibility of women during pregnancy, increase awareness, and understand the necessity for frequent visits for pregnancy checkup and inter conception care **(Ottun, 2016)**.

Although the Primary Health Care (PHC) nurses are at the forefront of rendering preventive interventions, both in the primary health care and in the community settings, PCC is not always provided to women in the PHC setting and women find that health professionals scarcely discuss the availability and need for PCC with them **(Collins, 2016)**. Additionally, much literature on the topic of discussion exists in developed countries, and the few studies that are found in the African context are not

very specific but PCC are rather incorporated into other services **(Gezahegn, 2016)** In Egypt some studies reported poor PCC knowledge and practice among women in childbearing periods. These studies recommended that antenatal care should start before conception to alleviate bad obstetrics outcome. Maternal and child health planners, policy-makers and stakeholders should be recognizing of the values of PCC to attain the sustainable development goal (SDG) targets in relation to maternal, neonatal and child health. All women of reproductive age should receive preconception counseling before becoming pregnant. So, the role of the obstetrics and community health nurse during the preconception period involves developing and delivering education programs that emphasize the individual responsibility of women during pregnancy, increase women awareness, and understand the necessity for frequent visits for pregnancy checkup and inter-conception care to prevent poor pregnancy outcomes **(Nabil Aboushady et al., 2021)**

#### **Significance of the study:**

Research conducted on the knowledge of preconception care in Assiut was limited and has not been done in the study area yet. Adolescence is a particularly important point in the Reproductive, Maternal, Newborn and Child health (RMNCH) continuum to promote preconception health. Educating young adolescence about healthy lifestyles not only empowers them as individuals in their own right, but also it can result in healthier maternal and newborn outcomes. Improving health knowledge, attitudes and behaviors of both young women and men is an essential step in promoting preconception health **(Ibrahim et al., 2019)**. Therefore, the aim of this study was to evaluate the effect of the teaching program on adolescents nursing students' knowledge and attitude regarding preconception care.

Despite efforts to eliminate adverse birth outcomes, infant mortality rate in Egypt under 5 years estimated 51/1000 live births in both sex. Women may not recognize a pregnancy until the first or second missed menstrual cycle, a full six to eight weeks or more after conception. In that time period, the woman may have unknowingly exposed her embryo to nutritional deficiencies over the counter drugs, tobacco, alcohol, or other toxics **(Nabil Aboushady et al., 2021)**.

#### **Methods:**

##### **Research hypothesis:**

- There is a significant increase in the mean post –test knowledge scores than the mean pre- test knowledge scores regarding pre conception care among adolescent students

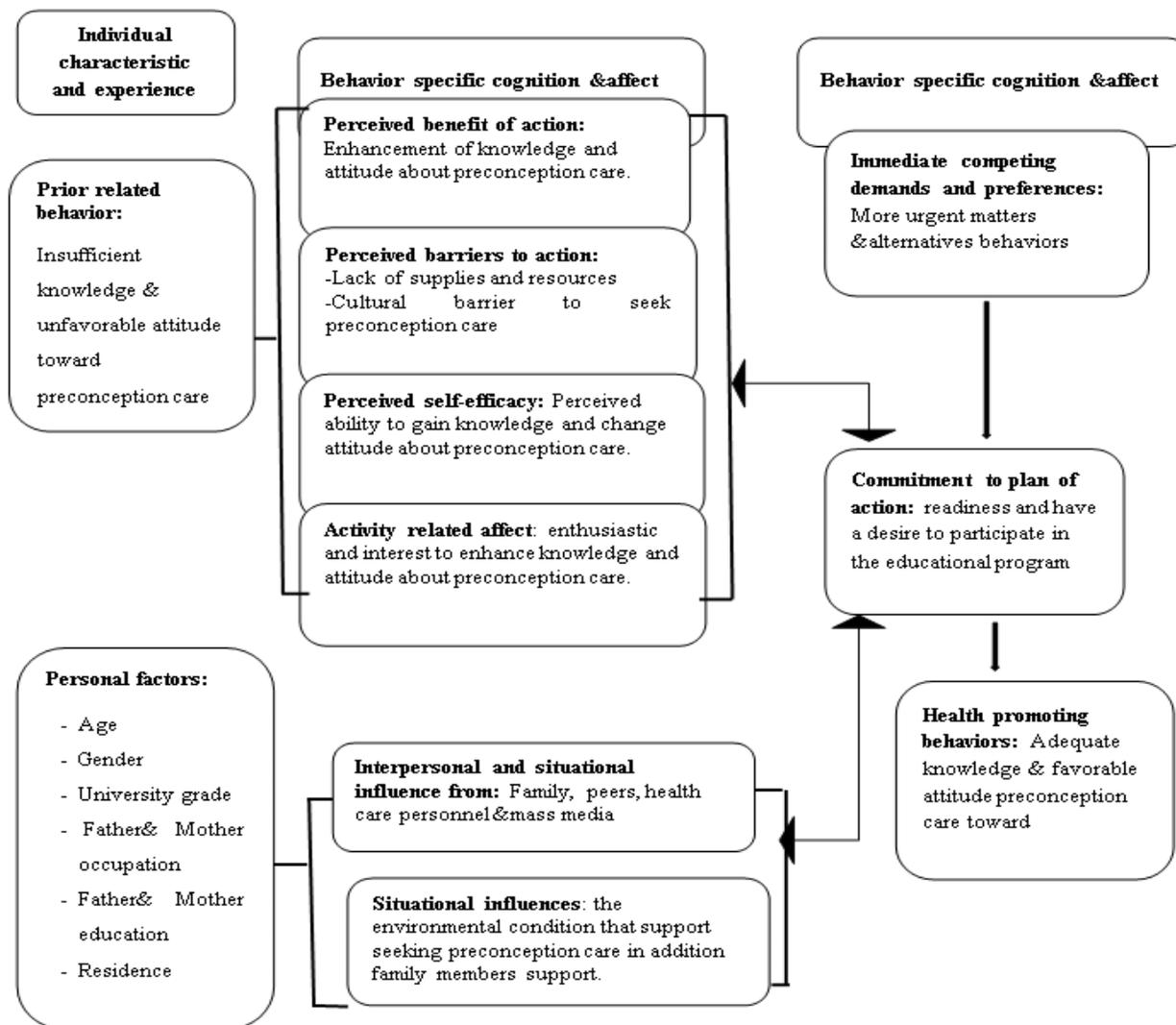
- There is a positive correlation between the knowledge with attitude regarding pre conception care among adolescent students.

**The conceptual framework:**

The current study's conceptual framework was created using Nola J Pender's 'Health Promotion Model.' Health, according to Pender's health promotion model, is "a positive dynamic state, not only the absence of sickness." The goal of health promotion is to improve a client's overall well-being.

It explains the multi-faceted nature of people as they interact with their surroundings in order to achieve health. Individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes.

are the three areas where the model concentrates (Murdaugh, Carolyn L.Parsons, M. A., & Pender, 2018).



**Fig: Modified Nola .J. Pender's health promotion Model**

**Study design and setting**

Quasi-experimental research design was applied. The pretest for e students' knowledge and attitude towards preconception care then posttest was done to evaluate the effect of the educational program. The current study was conducted in Technical Institute of Nursing, Assiut University and Technical Institute of Nursing Al-Azaher University.

**Sample size calculation:**

Simple random sampling was used to collect data from Technical institute through closed envelope method; 3 pieces of paper representing names of the collected setting which are placed in a box, then 1:2 paper was chosen without any bias during 2 days/week. The sample size was calculated using Epi-Info statistical package version 7. The parameters used to

estimate the minimum required sample size included; score of knowledge regarding preconception health (16.4%) (Krishnan et al., 2016), and 95% confidence interval. the minimum required sample was 185 subjects, 10% was added to compensate for dropout and refusals. A total number of 200 students were recruited for the study. The studied students were selected by simple random sample.

**Tool of the study:**

Structured questionnaire was developed by the researchers. The self-administered sheet divided in to three parts. The first part was socio-demographic data such as age, parents' education, parents' occupation, residence and students' grade. The second part included data related to preconception health knowledge consists of 66 close ended questions to explore preconception knowledge the following question were asked as; meaning, investigation, time, importance and time of folic acid, effect of smoking on women and fetus, type of STDs and drug abuse, time to follow up before to get pregnant, and sources of this information. The third part likert scale regarding preconception care attitude; It was developed by researcher after extensive literature review included ten questions to measure student's attitude.

**Scoring system:**

The scoring system of knowledge was one score for each correct answer and zero score for incorrect answers and don't know. Total score for knowledge was calculated by the mean score for each student's responses.

The scoring system of attitude: The three-point Likert scale (agree, uncertain and disagree), which was scored as 3, 2 and 1 respectively. Total score of attitude was calculated by the mean score which ranged from 0: 20. Students who score higher than or equal to the mean value of attitude were allocated to have positive attitude, whereas students who score less than the mean value were allocated to have negative attitude.

**Pilot study:**

It was conducted before the beginning of data collection on 20 students which were included in the total study sample because there weren't any modifications in the questionnaire. The aim of the pilot study was to assess the clarity of questionnaire and estimate the time required to fill it.

**Reliability of a tool:**

The internal consistency of the responses for each scale and the total tool were calculated by using Cronbach  $\alpha$  coefficient that was 0.820.

**Validity of the tool:**

The content validity of the questionnaire was assessed by three experts, two from Community Health Nursing department and one from Obstetrics and

Gynecology Nursing, Assiut University and who reviewed the tools for clarity, relevance, comprehensiveness, understanding and applicability.

**The educational program:** The educational program had been developed by the researchers based on the relevant literature.

**Assessment phase:** The researchers developed the educational program to improve students' knowledge and attitude, it based on pre-test assessment of students' knowledge and attitude regarding preconception care.

**Planning phase:** This phase included the arrangement for conduction of the program such as: **teaching place:** the program was conducted in students' class room between theoretical lectures, technical nursing institute, **teaching time:** the time of the program decided according to available time of the student and the coordination between the researchers and students, **teaching methods and materials:** The researchers used simple teaching methods such as: lecture, picture, video, discussion. The media handouts regarding preconception prepared by the researchers and distributed to every student at the end of the program, the contents of the program divided into sessions; these sessions included: introduction about preconception care, definition, importance, preconception package as genetic, nutrition, immunization and Post-test was done.

**Implementation stage:** Every student took one session for one hours to complete the educational program contents. Upon completion of the program, an immediate post-test was applied.

**Evaluation stage:** The evaluation was conducted through the post-test after implementing and completing the course to assess students' knowledge and attitude.

**Data collection**

The data was collected on randomly selected two days / week by the researchers themselves. The researchers introduced themselves to the students and explained the purposes of the study. The average number of the educational sessions were twenty-four sessions, about eight to ten students were included in each session. The educational session took nearly one hour. This program conducted in the period from the beginning of October 2020 until the end of December 2020.

**Administrative phase:** An official letter approval was obtained from the Dean of the Faculty of Nursing, Assiut University to the Directorate of technical institute of nursing. The letter was included a permission to carry out the study.

**Ethical considerations:**

Research proposal was approved from Ethical Committee of Faculty of Nursing, Assiut University,

Egypt. Informed written consent by signature or fingerprint was obtained from student who agreed to participate in the study after explaining the nature and purpose of the study. Confidentiality and privacy of the data were assured. The student had the right to refuse to participate or withdraw from the study without any rationale at any time.

#### Statistical analysis:

Data entry and data analysis were done using the IBM SPSS, version 23 (Statistical Package for Social

Science). Categorical variables were described by number and percentage (No., %) while continuous variables described by mean and standard deviation (Mean  $\pm$  SD). Independent t-test, paired t test and ANOVA test were used for comparison between continuous variables. A p value  $<$  0.05 was considered statistically significant.

#### Results:

**Table (1): Distribution socio-demographic data of adolescents nursing students (n=200)**

Items	No	%
<b>Age</b>		
18 year	103	51.5
More than 18 year	97	48.5
Mean $\pm$ SD	18.48 $\pm$ 0.584	
<b>Gender</b>		
Male	30	15.0
Female	170	85.0
<b>University grade</b>		
First year	103	51.5
Second year	97	48.5
<b>Father education</b>		
Illiterate	19	9.5
Read and write	15	7.5
Basic education	26	13
Secondary education	71	35.5
University	69	34.5
<b>Father occupation</b>		
unskilled worker	18	9.0
skilled worker	18	9.0
Employee	113	56.5
Business worker	40	20.0
Retried	5	2.5
Other (died)	6	3.0
<b>Mother education</b>		
Illiterate	56	28.0
red and write	26	13.0
Basic education	17	8.5
Secondary education	64	32.0
University	37	18.5
<b>Mother occupation</b>		
Housewife	150	75.0
Employee	50	25.0
<b>Residence</b>		
Rural	146	73.0
Urban	54	27.0

**Table (2): Statistical difference of studied adolescents nursing students regarding their Knowledge of preconception care before and after the education Program**

Variables	Pre educational program (Mean±SD)	Post educational program (Mean±SD)	P. value
Total score of knowledge about preconception care	26.40±11.39	40.74±10.56	<0.001**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*\*Significant level at P value < 0.01

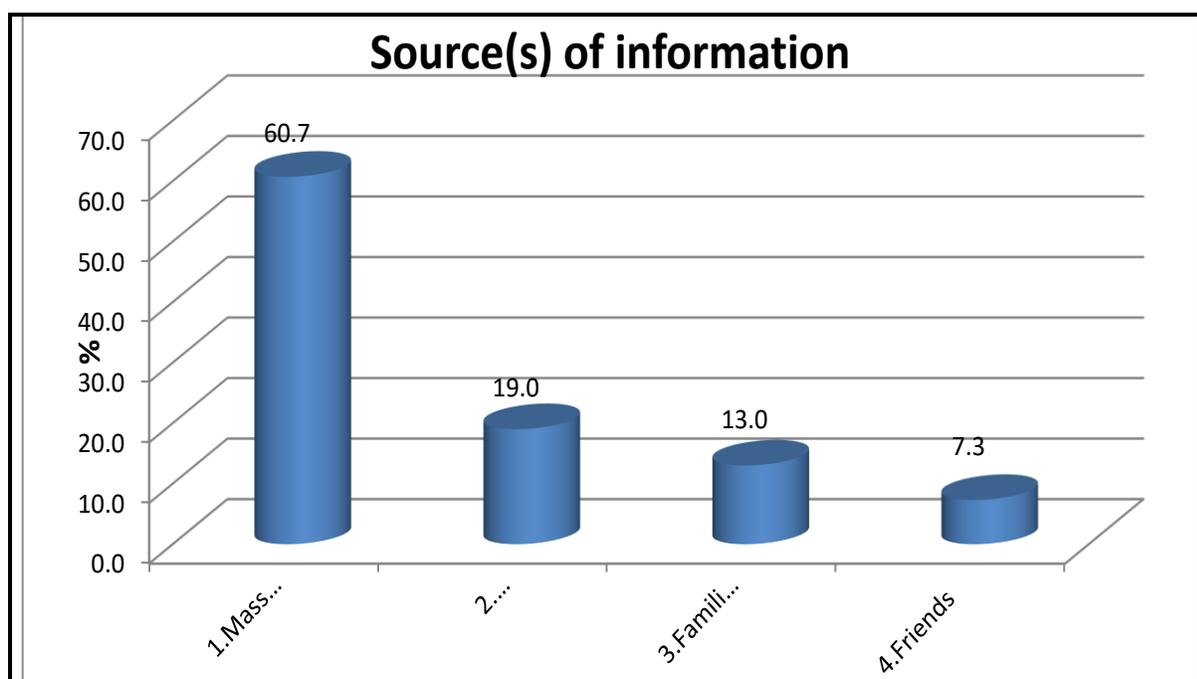
**Table (3): Mean score of adolescent nursing students' attitude towards preconception care**

Variables	Max Score	Pre		Post		P.value
Negative	<65%	113	56.5	11	5.5	<0.001**
Positive	>65%	87	43.5	189	94.5	
<b>Mean±SD</b>	<b>20</b>	12.37±1.74		15.14±1.55		<0.001**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*\*Significant level at P value < 0.01



**Fig. (1): Sources of knowledge about preconception care among adolescent nursing students, Assiut**

**Table (4): Relation between socio demographic data and knowledge of adolescent nursing students regarding preconception care**

Socio demographic data	Knowledge Level About preconception care	
	Pre	Post
	Mean±SD	Mean±SD
<b>Age</b>		
18 year	21.37±10.91	36.18±11.19
More than 18 year	31.92±8.83	45.58±8.43
<b>P.value</b>	<b>&lt;0.001**</b>	<b>&lt;0.001**</b>
<b>Gender</b>		
Male	24.63±14.65	35.93±11.98
Female	26.71±10.74	41.53±10.09
<b>P. value</b>	<b>0.358</b>	<b>0.007**</b>

Socio demographic data	Knowledge Level About preconception care	
	Pre	Post
	Mean±SD	Mean±SD
<b>University grade</b>		
First year	21.37±10.91	36.18±11.19
Second year	31.92±8.83	45.58±8.43
<b>P.value</b>	<b>&lt;0.001**</b>	<b>&lt;0.001**</b>
<b>Father education</b>		
Illiterate	28±12.37	41.68±12.67
Read and write	28.73±14.6	40.6±14.21
Basic education	25.92±10.88	39.42±10.12
Secondary education	27.03±11.77	41.25±9.62
University	24.99±10.23	40.48±10.39
<b>P.value</b>	<b>0.679</b>	<b>0.994</b>
<b>Mother education</b>		
Illiterate	28±12.37	41.68±12.67
Read and write	25.46±12.88	40.54±11.28
Basic education	26.85±13.71	41.69±10.93
Secondary education	28.59±8.75	44.41±9.04
University	26.53±10.18	40.52±10.01
<b>P.value</b>	<b>0.903</b>	<b>0.523</b>
<b>residence</b>		
Rural	26.27±10.68	39.08±10.81
Urban	26.82±11.35	40.1±10.69
<b>P.value</b>	<b>0.398</b>	<b>0.213</b>

Independent T-test quantitative data between the two groups

One way Anova quantitative data between the two groups or More

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.01

**Table (5): Relation between socio demographic data and Attitude of adolescents nursing students regarding preconception care**

Socio demographic data	Attitude About preconception care	
	Pre	Post
	Mean±SD No (200)	Mean±SD No (200)
<b>Age</b>		
18 year	12.01±1.73	14.75±1.58
More than 18 year	12.74±1.52	15.55±1.39
<b>P.value</b>	<b>0.003**</b>	<b>&lt;0.001**</b>
<b>gender</b>		
Male	11.4±1.83	15.37±1.33
Female	12.54±1.67	15.16±1.54
<b>P.value</b>	<b>0.001**</b>	<b>0.483</b>
<b>University grade</b>		
First year	12.01±1.73	14.75±1.58
Second year	12.74±1.52	15.55±1.39
<b>P.value</b>	<b>0.003**</b>	<b>&lt;0.001**</b>
<b>Father education</b>		
Illiterate	63.68±7.23	77.37±9.18
Read and write	58±9.02	70.33±8.76
Basic education	63.08±8.61	75.77±6.74
Secondary education	61.97±9.32	75.77±7.5
University	61.52±8.28	76.3±7.51
<b>P.value</b>	<b>0.354</b>	<b>0.074</b>

Socio demographic data	Attitude About preconception care	
	Pre	Post
	Mean±SD No (200)	Mean±SD No (200)
<b>Mother education</b>		
Illiterate	12.71±1.71	15.25±1.52
Read and write	12.31±2.13	14.58±2.02
Basic education	12.71±2.37	15.47±2.1
Secondary education	12±1.56	15.19±1.36
University	12.35±1.34	15.14±1.23
<b>P.value</b>	<b>0.217</b>	<b>0.341</b>
<b>residence</b>		
Rural	12.28±1.74	15.22±1.58
Urban	12.59±1.71	15.09±1.34
<b>P.value</b>	<b>0.261</b>	<b>0.588</b>

Independent T-test quantitative data between the two groups

One way Anova quantitative data between the two groups or More

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.01

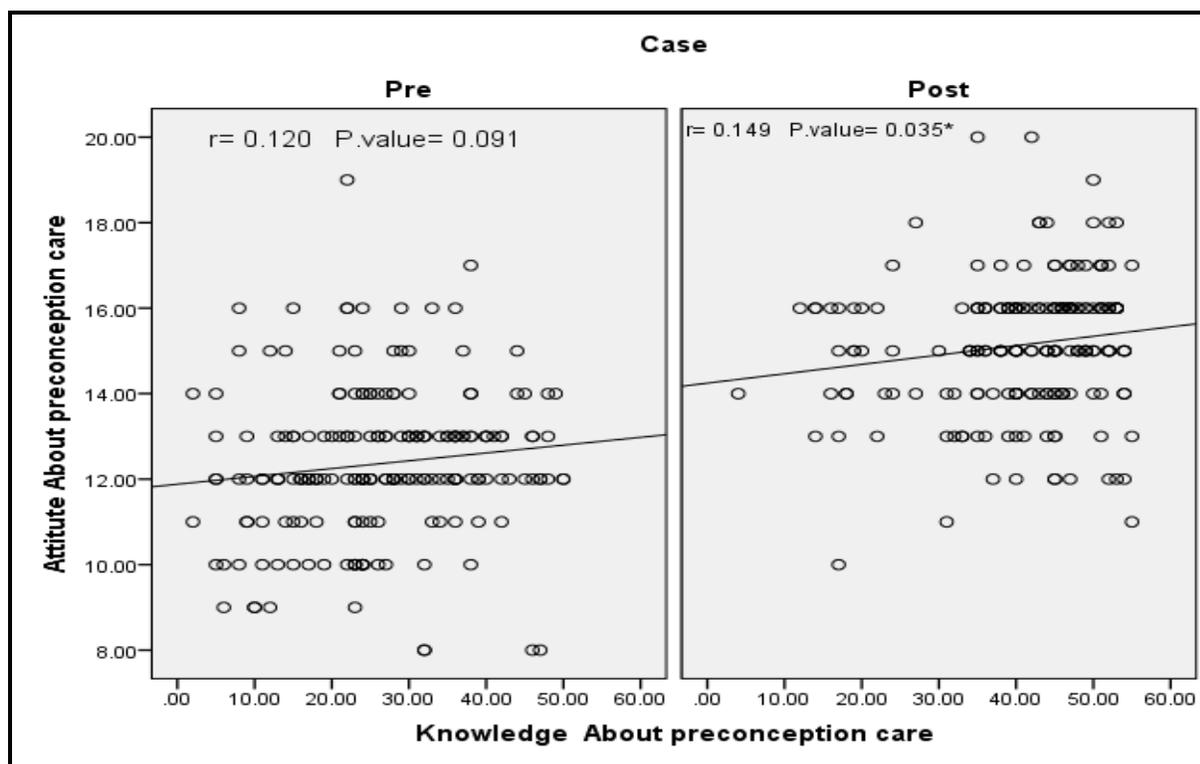


Figure (2): Correlation Co- efficient between Knowledge and Attitude scores about preconception care among adolescents nursing students

**Table (1):** shows socio-demographic features of students. The present study included 200 students, aged (18-19) years with mean ±SD (18.48±0.584) and 85.0% of them were female. Nearly three quarters of students were from rural area (73%).

**Table (2):** shows students' knowledge score was 26.40±11.39 pre education and enhanced post education 40.74±10.56 with highly significant differences (P value= <0.001).

**Table (3):** Declares that mean score of the students' attitude had 12.37±1.74 regarding preconception care while after the application of the teaching program attitude of them had become 15.14±1.55.

**Figure (1):** Illustrated that mass media were the main source of information about preconception care among adolescent nursing students.

**Table (4):** Clears that there was relationship between score of students' knowledge regarding preconception

care and their age, gender and university grade (P values= <0.001, 0.007, and <0.001 respectively).

**Table (5):** Clears that there was relationship between score of students' attitude regarding preconception care and their age, gender and university grade (P values= <0.001, 0.007, and <0.001 respectively).

**Figure (2):** Illustrated that there was positive Correlation Co-efficient between students' Knowledge and Attitude scores regarding preconception care.

### Discussion:

Healthy preconception is very essential to prepare for pregnancy, childbirth, and healthy babies. However, many women still lack of knowledge on having healthy preconceptions. Effective education requires relevant and standardized material and educational media (Nurunnayah, et al 2021). The study aimed to evaluate the effect of the educational program on adolescents' students' knowledge and attitude regarding preconception care.

The current study revealed that the majority of studied students were female and three quarter of them their mothers were housewives. Regarding to their education and residence, the present study observed that slightly less than one third of students and less than three quarter of them had secondary education and from rural area respectively. This may be explained by field of nursing is mainly dominated by females. These results may be explained by nearly three quarters of students were from rural area where there is neglecting of preconception education.

These results agreed with (Ukoha & Dube, 2019) who found that the majority (83.3 %) were female. Moreover, these results were consistent with previous studies (van Voorst et al., 2016). In addition, these results supported by (Charafeddine et al., 2014) who found that most (81.1%) of them were female (78.1%) of them their mothers were housewives 34.5% had secondary education. This may be explained by field of nursing is mainly dominated by females.

Concerning students' knowledge about preconception care. it was found that before implementing the educational program there was lack of knowledge. In addition, there was appositive relation between students' knowledge and their age. It may be explained by the normal consequence that with increasing age their knowledge will be increased. These results agreed with several studies which revealed a low level of knowledge regarding PCC services (Bortolus et al., 2017, Braspenningx et al., 2013, Ojukwu et al., 2016 & Coll et al., n.d.)

These results in contrasted with (Ukoha & Dube, 2019) who stated that the participants were knowledgeable about preconception care. In addition,

these results disagreed with (Krishnan et al., 2016) who found that there wasn't association between students' knowledge or attitude with demographic characteristics.

Preconception education and counseling allow women from before pregnancy to facilitate and reduce possible risk factors for unfavorable pregnancy outcomes. Fertile women who receive preconception education and counseling are more likely to change risk behaviors such as stop smoking before becoming pregnant, reduce alcohol consumption and avoid the use of drugs (Bernecki DeJoy, 2014)

The current study showed that there positive effect on students' knowledge after implementing the educational program, there was statistically significant difference between pre and posttest ( $p < 0.001$ ) mean score of knowledge.

These results were in the same line with (Krishnan et al., 2016) who found that the mean post- test knowledge is significantly higher than that of mean pre-test knowledge score. In addition, The present study findings is in accordance with an experimental study for assessing the effect of STP on preconception care among women in age group of 18 to 45 years in a selected rural area, Chennai, India (Krishnan et al., 2016).

Moreover these results supported by (Charafeddine et al., 2014) who found that Mean knowledge scores in the post-test increased ( $p < 0.001$ ), the mean scores in both pre- and post-tests were statistically related to gender ( $p < 0.05$ ). Also, (Priani et al., 2019) revealed that there is a significant difference in preconception health knowledge between the intervention groups before and after the training of preconception education. And there is a significant difference before and after the intervention in knowledge and attitude.

These findings are in line with the previous study by DeJoy, 2014 whose outcome reported that preconception education stimulates understanding about preconception health. In addition, these results supported by (Richards & Mousseau, 2012) who found that the intervention group displayed significantly more changes in overall preconception health knowledge.

The results of the present study found that 60.7% of students have their information about preconception care from mass media. these results can be explained by effective role of mass media in increasing population awareness. This finding was agreement with (Gautam & Dhakal, 2016) which showed that 47.69% of the study participants had got their information about preconception care from radio/ television.

The results of the current study showed that more than half of studied students had un favorable attitude toward preconception care. These results were in line with most of the previous literature on PCC, (Klein et al., 2017 & van Voorst et al., 2016) who revealed that most of participants had favorable attitudes towards preconception care

Regarding effect of the educational program on students' attitude toward preconception care, the results of the current study found that there was improvement in students' attitude after implication of the educational program. These results agreed with (Krishnan et al., 2016) who revealed that the mean pre-test score on attitude was improved after rendering structure teaching program.

The current study found that there was appositve correlation between students' knowledge and attitude toward preconception care. This may be explained by normal consequence that by increasing ones knowledge about the matter their false attitude will be changed. These results supported by (Krishnan et al., 2016) who reported that there was a negative correlation between knowledge and attitude about preconception care.

### Conclusion:

The present study concluded that, there was a significant increase in the mean post-test knowledge scores than the mean pre-test knowledge scores regarding pre conception care among adolescent students. Moreover, there was a positive correlation between students' knowledge and their attitude regarding preconception care.

### Recommendations:

the present study recommended the following:

- Raising public awareness through national and social media to shed the light on and PC care benefits for young people, aiming to promote health and increase community awareness of the impact of PC care on maternal, newborn and child health outcomes.
- Further studies are needed using large samples to raise awareness of students about preconception care.
- Preconception care items should be incorporated into the curriculum of the secondary schools and in the university.
- Empower female youth through PC counseling to make informed choices regarding their and future pregnancy.

### Nursing Implication

- It emphasizes a holistic approach to care during the nursing training phase by encouraging students to provide preconception care education to women and teenage girls.

- The findings of the study serve to highlight those activities that boost women's health and prevent them from difficulties by enhancing healthy behaviors while they beginning in adolescence.
- It can be used to proof the cost-effectiveness of preconception care in lowering maternal morbidity and mortality rates as evidences of research results.

### Limitation:

Finally, since the ministry of education recommended initiating this intervention in “girls only” public schools, there were only 15% male participants; this affects the generalizability of the findings in terms of gender differences.

### References

- **Atrash, H., & Jack, B. (2020):** Preconception care: developing and implementing regional and national programs. *Journal of Human Growth and Development*, 30 (3), 398–406. <https://doi.org/10.7322/jhgd.v30.11076>
- **Bekele, M., Gebeyehu, N., Kefale, M., & Bante, S. (2020):** Knowledge of Preconception Care and Associated Factors among Healthcare Providers Working in Public Health Institutions in Awi Zone, North West Ethiopia, 2019: Institutional-Based Cross-Sectional Study. *Journal of Pregnancy*, 2020, 1–7. <https://doi.org/10.1155/2020/6978171>
- **Bernecki DeJoy, S. (2014):** Pilot Test of a Preconception and Midwifery Care Promotion Program for College Women. *J Midwifery Womens Health*, 59, 523–527. <https://doi.org/10.1111/jmwh.12106>
- **Bickmore, T., Zhang, Z., Reichert, M., Julce, C., & Jack, B. (2020):** Promotion of Preconception Care Among Adolescents and Young Adults by Conversational Agent. *Journal of Adolescent Health*, 67(2), S45–S51. <https://doi.org/10.1016/j.jadohealth.2019.09.006>
- **Bortolus, R., Oprandi, N., Rech Morassutti, F., Marchetto, L., Filippini, F., Agricola, E., Tozzi, A., Castellani, C., Lalatta, F., Rusticali, B., & Mastroiacovo, P. (2017):** Why women do not ask for information on preconception health? A qualitative study. *BMC Pregnancy and Childbirth*, 17(1), 1–11. <https://doi.org/10.1186/s12884-016-1198-z>
- **Braspenningx, S., Haagdorens, M., Blaumeiser, B., Jacquemyn, Y., & Mortier, G. (2013):** Preconceptional care: a systematic review of the current situation and recommendations for the future. *Facts, Views&Vision in ObGyn*, 5(1),13–25. <http://www.ncbi.nlm.nih.gov/pubmed/24753925%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3987351>
- **Charafeddine, L., El Rafei, R., Azizi, S., Sinno, D., Alamiddine, K., Howson, C., Walani, S., Ammar, W., Nassar, A., & Yunis, K. (2014):** Improving awareness of preconception health among adolescents: Experience of a school-based intervention in Lebanon. *BMC Public Health*, 14(1),

- 1–9. <https://doi.org/10.1186/1471-2458-14-774>
- **Coll, A., Potter, J., Chakhtoura, N., Alcaide, M. L., Cook, R., & Jones, D. (n.d.) (2015):** Providers' perspectives on preconception counseling and safer conception for HIV-infected women †. <https://doi.org/10.1080/09540121.2015.1112349>
  - **Collins, L. (2016):** Knowledge, Attitudes, and Beliefs About Preconception Care Among American Adolescent Females. ProQuest Dissertations and Theses, 174. [http://ezproxy.its.uu.se/login?url=https://search.proquest.com/docview/1794167104?accountid=14715%0Ahttp://mz8an8jm8e.search.serialssolutions.com?ctx\\_ver=Z39.88-2004&ctx\\_enc=info:ofi/enc:UTF-8&rft\\_id=info:sid/ProQuest+Dissertations+%26+Theses+A%26I&rft\\_va](http://ezproxy.its.uu.se/login?url=https://search.proquest.com/docview/1794167104?accountid=14715%0Ahttp://mz8an8jm8e.search.serialssolutions.com?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rft_id=info:sid/ProQuest+Dissertations+%26+Theses+A%26I&rft_va)
  - **Gautam, P., & Dhakal, R. (2016):** Knowledge on Preconception Care among Reproductive age Women. Saudi Journal of Medical and Pharmaceutical Sciences, 2(1), 1–6. <http://scholarsmepub.com/sjimps/Website:http://scholarsmepub.com/>
  - **Gezahegn, A. (2016):** Assessment Knowledge and Experience of Preconception Care among Pregnant Mothers Attending Antenatal Care in West Shoa Zone Public Health Centers, 2016.
  - **H. Ibrahim, W., Khalaf, S., Abdel-fatah, W., & G. Hassan, S. (2019):** Knowledge of Some Issues Related to Preconception Health and Pregnancy among Faculty of Nursing Students, Assiut University. American Journal of Nursing Research, 7(4), 574–580. <https://doi.org/10.12691/ajnr-7-4-19>
  - **Hill, B., Hall, J., Skouteris, H., & Currie, S. (2020):** Defining preconception: Exploring the concept of a preconception population. BMC Pregnancy and Childbirth, 20(1), 1–11. <https://doi.org/10.1186/s12884-020-02973-1>
  - **Klein, J., Boyle, J., Kirkham, R., Connors, C., Whitbread, C., Oats, J., Barzi, F., McIntyre, D., Lee, I., Luey, M., Shaw, J., Brown, A. & Maple-Brown, L. (2017):** Preconception care for women with type 2 diabetes mellitus: A mixed-methods study of provider knowledge and practice. Diabetes Research and Clinical Practice, 129, 105–115. <https://doi.org/10.1016/j.diabres.2017.03.035>
  - **Krishnan, G., Joseph, J., & (2016):** Effect of structured teaching program on knowledge and attitude regarding preconception care among adolescent girls. International Journal of Applied Research, 2(4), 435–439. <http://www.allresearchjournal.com/archives/2016/vol2issue4/PartG/2-3-50.pdf>
  - **Nabil Aboushady, R., Abd El-kareem Hegazy, M., & Ebrahim Abd Elnabi, M. (2021):** Knowledge, Beliefs and Behaviors toward Preconception Care among Women at Childbearing period: Suggested Plan of Action. Egyptian Journal of Health Care, 12(1), 1463–1474. <https://doi.org/10.21608/ejhc.2021.215599>
  - **Murdaugh, Carolyn L. Parsons, M., & Pender, N. (2018):** Health Promotion in Nursing Practice.
  - **Nepali, G., & Sapkota, S. (2017):** Knowledge and practice regarding preconception care among antenatal mothers. International Journal of Perceptions in Public Health, 1(4), 224–227. <https://www.researchgate.net/publication/31949005>
  - **Nurunnayah S., & Nurdiati D, (2021):** Development process of the preconception education booklet. International Journal of Research in Medical Sciences, 9(7), 1–7.
  - **Ojukwu, O., Patel, D., Stephenson, J., Howden, B., & Shawe, J. (2016):** Upsala Journal of Medical Sciences General practitioners' knowledge, attitudes and views of providing preconception care: a qualitative investigation General practitioners' knowledge, attitudes and views of providing preconception care: a qualitative investigation General practitioners' knowledge, attitudes and views of providing preconception care: a qualitative investigation. Upsala Journal of Medical Sciences, 121(4), 256–263. <https://doi.org/10.1080/03009734.2016.1215853>
  - **Ottun, O. (2016):** Evaluating the role of nurses in educating women during the preconception period. College of Health Sciences, 30. <http://search.ebscohost.com/login.aspx?direct=true&db=cin20&AN=124411295&site=ehost-live>
  - **Priani, I., Afyanti, Y., & Kurniawati, W. (2019):** Preparing pregnancy through Preconception Education Training. Enfermería Clínica, 29, 304–309. <https://doi.org/10.1016/J.ENFCLI.2019.04.140>
  - **Richards, & Mousseau, A. (2012):** Community-based participatory research to improve preconception health among Northern Plains American Indian adolescent women. Am Indian Alsk Native Ment Health Res. ;19.(1), :154-85.
  - **Ukoha, W., & Dube, M. (2019):** Primary health care nursing students' knowledge of and attitude towards the provision of preconception care in KwaZulu-Natal. African Journal of Primary Health Care and Family Medicine, 11(1). <https://doi.org/10.4102/PHCFM.V11I1.1916>
  - **van Voorst, S., Plasschaert, S., de Jong-Potjer, L., Steegers, E., & Denktaş, S. (2016):** Current practice of preconception care by primary caregivers in the Netherlands. In European Journal of Contraception and Reproductive Health Care (Vol. 21, Issue 3, pp. 251–258). <https://doi.org/10.3109/13625187.2016.1154524>