

Effect of Sex Education Program on Knowledge of Secondary School Girls in El- Beheira Governorate

Enas Mohamed Ebrahim¹ Naglaa Kamel Abdulllah Hussein^{2*}

1. Assistant Professor, Community Health Nursing Department, Faculty of Nursing, Damanhour University, Egypt

2. Lecturer, Community Health Nursing Department, Faculty of Nursing, Damanhour University, Egypt

Abstract

Background: Lack of knowledge about sexual matters among adolescents' leads to pre- marital unprotected sexual indulgence, results in sexual transmitted infections, including HIV/AIDS, illegitimate teenage pregnancy, sexual abuse, violence and exploitation. **Aim of study:** Is to evaluate the effect of sex education program on knowledge of secondary school girls in El- Beheira Governorate. **Hypothesis** secondary school girls who attend sex education program exhibits better knowledge than those who don't attend it. **Material and Methods:** Experimental study design was assumed. **Settings:** The study was executed at five secondary schools for girls in El- Beheira Governorate that were selected by multistage random sample technique. **Subjects:** 120 girl students were chosen randomly, these were randomized into 60 girl students for study groups and 60 girl students for control groups. **Tools:** two tools were developed by the researchers for data collection. The first tool was concerned with Socio-demographic characteristics, and the second tool was to assess the knowledge of girl students before and after the sex education program. **Results:** Among study groups, the program created a positive effect on general information about sexuality ($p= 0.001$), anatomy and physiology of male reproductive system ($p= 0.001$), anatomy and physiology of female reproductive system ($p= 0.214$), fertilization/ conception ($p= 0.042$), and contraception ($p= 0.417$). **Conclusion and Recommendations:** After implementation of the sex education program, a positive improvement on knowledge of study group was apparent: So, this study recommended Sex education topics should be implemented in the curriculum of school and college, and teachers should actively participate in sex education program.

Keywords: sex education, reproductive health, and sexuality.

1. Introduction

The public health field has in recent times equestrian a sustained effort toward more positive approaches to sexuality. Semantically, "sexual health," once the province only of sexually transmitted infections (STIs), unintended pregnancies, and other undesirable consequences, has grown to incorporate indicators of sexual well-being.⁽¹⁾ More attention has been placed on sexual health by the World Health Organization (WHO) by declaring that; "There exist fundamental rights for the individual, including freedom from organic disorders, diseases and insufficiencies that inhibit sexual and reproductive function".⁽²⁾

The World Health Organization (WHO, 2017) recognizes adolescence as the period of human growth and development that occurs after childhood and before adulthood, from 10 to 19 years of age. Adolescence is branded by physical, psychological, and social changes. It represents a window of opportunity to prepare for a healthy adult life.^(3, 4) Adolescents constitute a large and important segment of the population worldwide. Globally, there are one in every six people in the world is an adolescent, around 1.2 billion, about 85% live in developing countries and the rest lives in the industrialized world. Adolescents in Egypt are around 17 million, expressive nearly 19.1% of the total population, and represent even greater proportion of the country's human potential.^(5, 6)

A report of WHO elaborated on how young people (10 to 24 years old) undergo rapid physical and psychosocial changes when they move from childhood to adulthood in their second decade. During their development to adulthood, young people are challenged to make decisions and choices about their sexual lives. Some decisions are acceptable, while others could impede the accomplishment of their personal and social goals. This may bring about the risk of unwanted pregnancies, sexually transmitted infections and disappointing or coerced early sexual relationships. Such risks are likely to have increased as a result of a lack of adequate information and a lack of skills necessary to make responsible, informed choices and to take appropriate actions.⁽⁷⁻⁹⁾

In many parts of the world, adolescents are poorly informed about their health, bodies, and sexuality. Adolescent girls in particular are often kept from learning about sexuality and issues because of cultural and religious sensitivities. This is chiefly true in Egypt, where adolescents are often unwilling to ask for sexuality information from adults in their families, communities, or in professional settings. Furthermore, social prohibitions and negative attitude of parents in discussing the related issues openly has blocked the access of adolescent girls to correct their information.^(10, 11) Consequently, it is vitally significant to know the underlying issues about young people's sexual health knowledge and their risk-taking behavior. If young people are self-conscious in the use of sexual health services, then the prominence of sexual health education within schools is

more pronounced. Accordingly, many health professionals, public health researchers, educationalists and policy-makers have shown considerable interest to understand young people's initiation to risky sexual behavior.^(12, 13)

Sex education is the acquisition of knowledge that deals with human sexuality. It contains instruction on the development of an understanding of the physical, mental, emotional, social, economic and psychological phases of human relations as they are affected by sex. In other words, sex education is a process whereby information is given or conveyed to a group of young ones and which takes into account the development, growth, the anatomy and physiology of the human reproductive system and variations that occur from youth all through stages of adulthood. The purposes of sex education, according to British Medical Association Foundation for AIDS, are ambitious relating to the lifelong quality of relationships and personal behavior. It should be age suitable and available to everyone through a variety of formal and informal settings.^(2, 7, 14)

Although specific content varies by community and is often fragmented in presentation, formal sex education efforts generally are based on one of two models: abstinence-only programs, which promote restraint from sexual activity outside of a committed adult relationship (notably marriage); and abstinence-plus programs, which rely on a harm reduction or disease prevention approach that encourages abstinence while also promoting safer sexual practices for sexually active adolescents. The latter programs are sometimes referred to as "comprehensive," although most guidelines for comprehensive sex education propose content substantially beyond what is generally included in abstinence-plus programs.^(15, 16)

Sex education programs should include different activities to address relevant social, peer and media influences. It needs to reflect the positive aspects of sexual relationships aiming at preventing pregnancy, increasing contraceptive use and controlling Sexually Transmitted Diseases (STDs), and HIV/AIDS.^(17, 18) Effective sex education programs require an effective delivery method. Thus, it should be provided by trained and confident staff and should be delivered within environments which are supportive and safe for staff, visitors and students.^(19, 20) The community health nurse could play a valuable role in promoting and teaching sex and relationship education, as their clinical training and pastoral activity may provide them added credibility with students while discussing sex and contraception.⁽²¹⁾

The plain lack of knowledge among adolescents concerning sexual and reproductive health (SRH) is a solemn concern in Egypt, where half the population is younger than 25 years old. Preparing these young people for the transition to adulthood, a time when sexuality and relationships are central, is a challenge. Presently, young Egyptians obtain little accurate information about sexuality and defensive their health, leaving them vulnerable to coercion, abuse, unintended pregnancy, and sexually transmitted infections, including HIV.^(22, 23)

Therefore the aim of this study: Is to evaluate the effect of sex education program on knowledge of secondary school girls in El- Beheira Governorate.

The research question of this study was:

What is the effect of sex education program on knowledge of secondary school girls in El- Beheira Governorate?

Hypothesis of this interventional study was:

Secondary school girls who attend sex education program exhibits better knowledge than those who don't attend it.

2. Material and methods

2.1. Material

2.1.1 Research design:

An experimental study design was carried out to determine this study.

2.1.2 Setting:

The study was conducted in five secondary schools for girls in El- Beheira Governorate there were selected using multistage random sample technique. El- Beheira contains eighteen educational districts and from the eighteen districts five districts were chosen (Bandar Damanhour, Etay El Barud, Hosh Issa, Abu Hummus and Nubariya), then, five Educational Administration were chosen (one from each district), then from each Educational Administration one secondary school for girls were chosen (Industrial Girls, Haitham Sami Hamad Girls, Technical Hosh Issa Girls, Abu Hummus Girls and Farm Machine school respectively).

2.1.3 Subjects:

The study subjects were designated through probability sampling technique. Random sample of 120 girl students was recruited; the sample was distributed among chosen secondary schools proportionate to the number of students in each (Industrial Girls (40), Haitham Sami Hamad Girls (20), Technical Hosh Issa Girls (30), Abu Hummus Girls (20) and Farm Machine School (10) respectively). Within the school, girl students were elected randomly from the list representing the three grades of secondary education.

2.1.4 Sample size

A sample of 100 girl students (was increased to 120 to avoid effect of dropouts) are needed to estimate an effect size of an intervention program for sex knowledge = 0.5 assuming the prevalence of knowledgeable students = 30.0% (1), $\alpha = 0.05$ and power of 80%, so sample size equal 112 students due to drop out of 8 students.

2.1.5 Sampling technique:

The sample of 120 girl students were randomized into study group (60 students) and control group (60 students) using systematic random sample technique as 1 of each two available students was included in the study as the following:

Name of the school	Study group No. 60 girl students	Control group No. 60 girl students
Industrial Girls	20	20
Haitham Sami Hamad	10	10
Technical Hosh Issa Girls	15	15
Abu Hummus Girls	10	10
Farm Machine School	5	5

2.1.6 Tools for data collection:

Two tools were exploited in the existing study to collect the necessary data.

Tool I:

A structured questionnaire sheet was developed by the researchers after reviewing the related current national and international literature. It was concerned with socio-demographic characteristics of the studied sample such as (age, residence, father education, father occupation, mother education, mother occupation, income and crowding index). Socioeconomic level was resolute according to the total socioeconomic score adapted after the model developed by Fahmy and El Sherbini (1983).⁽²⁴⁾

The maximum score for previous indicators was 34 points and it was classified into three levels as follows:

- High social level $\geq 75\%$ \longrightarrow ≥ 25 points.
- Middle social level $50 - < 75\%$ \longrightarrow $17 - < 25$ points.
- Low social level $< 50\%$ \longrightarrow < 17 points.

Tool (II)

It was concerned with general knowledge on sex education (definition of sex education, aim, when and where to begin sex education, and the source of knowledge about sexuality), Anatomy and physiology of male and female reproductive system, fertilization and conception (def. of menarche, time of ovulation, and life span of ovum and sperm) and lastly methods of contraception (natural, hormonal, chemical, mechanical, and surgical means of contraception). The total score for the entire item is 30 for the Questionnaire with 30 items.

Scoring system:

Scoring was done regarding students' knowledge as the following: a score of "0" was given to incorrect answer, and a score of "1" was given to correct answer. The total score was (0-30) points calculated as follows:-

- Good $100\% - 75\% = 30 - 23$ points
- Fair $< 75\% - 50\% = 22 - 15$ points
- Poor $< 50\% = 14 - \text{zero}$ points

2.2 Methods:-

2.2.1 Administrative process

- Approval of the educational districts directors and schools administration was obtained after the explanation of the purpose of the study.
- Each girl student was individually informed about the purpose of the study so as to obtain an oral informed consent for sharing in the study. Reassurance was given to the girl students about the confidentiality of their responses.

2.2.2 Data collection:

1. Tools of data collection was designed based on recent relevant literature and was tested for its content validity and relevance by a jury consisted of three academic staff in Community Health Nursing from Alexandria and Damanhour University.
2. The reliability of the instrument was analyzed by using split half method, which measures the coefficient of internal consistency. The reliability value of the tool is $r = 0.70$ which indicates good.
3. A pilot study was carried out in students which were not involved in the study. The pilot study included 12 students (10% from total sample) in order to ascertain its clarity and feasibility.
4. The purpose and the nature of the study were clarified to the students, for full cooperation. Each sheet took 15-20 minutes to be answered. Data was collected over a period of four months from September 2016 till December 2016.
5. Systematic random sampling method was used to select 60 students for control group and 60 students for study group.
6. Data was collected through structured questionnaire on socio-demographic data (tool I).
7. Assessment of the students' knowledge on sexuality was done by using tool II (pretest).
8. Sex education sessions were provided for the selected students in the study group in the five selected

schools, they attended 3 sessions (1 session/ week) and the whole number of sessions for the whole study group was 15 sessions over a period of three weeks. The duration of each session was ranged between 50-60 minutes, started with 5 minutes warming up, then 30 minutes lecture and followed by discussion for 15-25 minutes questions and answers.

Method used: lecture and group discussion.

Audio-visual materials used: Data show (available visual aids).

Content of the sex education session:-

- General knowledge of sexuality (definition of sex education, aim, when and where to begin sex education, and the source of knowledge about sexuality),
- Anatomy and physiology of male reproductive system.
- Anatomy and physiology of female reproductive system.
- Fertilization and conception (def. of menarche, time of ovulation, and life span of ovum and sperm)
- Methods of contraception (natural, hormonal, chemical, mechanical, and surgical means of contraception).

9. The control group did not obtain any sessions of sex education.

10. Reassessment of the students' knowledge on sexuality was done by using the tool II (posttest) for both study and control group three months after the end of the program.

11. **Ethical consideration;** the questionnaire sheet was clarified to the participants; verbal consent was gained from each subject. Privacy was kept during process of collecting data. Confidentiality of students' response was guaranteed during the study.

12. **Statistical analysis:**

After collection of data, they were coded and shifted into especially designed formats to be appropriate for computer feeding. Following data entry, checking and verifying processes were carried out to avoid any errors during data entry.

- ✓ Data was analyzed using PC with Statistical Package for Social Sciences (SPSS) version 16.0.
- ✓ The level of significance selected for this study was p equal to or less than 0.05.

The following statistical measures were castoff:-

A- Descriptive statistics:

Count and percentage: Used for describing and summarizing quantitative data, Arithmetic means Standard deviation (SD) and range: They were used as measures of central tendency and dispersion respectively to summarize quantitative data.

B-Analytical statistics:

Chi square test (X²): it was used to test the association between categories of qualitative variables.

3. Results

Table (1): Distribution of the studied students according to their socio- demographic characteristics.

Socio demographic data	Group				MCP
	Study		Control		
	No	%	No	%	
Age					0.079
≤16 years	31	55.4	30	53.6	
>16- <18	13	23.2	14	25.0	
18 or more	12	21.4	12	21.4	
Mean & SD.	16.13± 1.41		16.15± 1.38		
Father education					0.143
Illiterate/read &write	21	37.5	24	42.9	
Less than university	11	19.6	18	32.1	
University	24	42.9	14	25.0	
Father occupation:					0.115
Administrative work	19	34.0	22	39.3	
Manual work	34	60.7	31	55.4	
Others	3	05.3	3	05.3	
Mother education					0.104
Illiterate/read &write	26	46.5	29	51.8	
Less than university	18	32.1	23	41.1	
University	12	21.4	4	7.1	

Mother occupation:					
Administrative work	13	23.2	14	25.0	0.108
Manual work	3	05.4	4	7.1	
House wife	40	71.4	38	67.9	
Residence:					
Urban	12	21.4	8	14.3	0.101
Rural	44	78.6	48	85.7	
Socioeconomic status					
High	10	17.8	9	16.1	0.089
Middle	17	30.4	16	28.6	
Low	29	51.8	31	55.3	

MCP: *P* value based on Mont Carlo exact probability * *P* < 0.05 (significant)

Table (I) shows distribution of the study subjects according to their socio-demographic characteristics. As regards age, it was observed that the mean age of study and control group was 16.13 ± 1.41 and 16.15 ± 1.38 years respectively. Concerning father's education and occupation, it was clarified that (42.9%) of study group fathers had BSCs while only one quarter (25%) of the control group fathers had BSCs, and slightly more than three-fifths (60.7%) of study group fathers and more than one half (55.4%) control group fathers owns manual work. Regarding mother's education and occupation, it was clear that more than two-fifths (46.5%) and more than one half (51.8%) of the study and control group' mothers respectively were illiterate or just read and write, and about three quarters (71.4%) and, two-thirds (67.9%) of the study and control group' mothers respectively were housewives. Concerning residence and socioeconomic status, it was revealed that the majority (78.6%), and (85.7%) of both study and control group respectively were from rural areas, and slightly more than one-half (51.8%), and (55.3%) of them had low socioeconomic status.

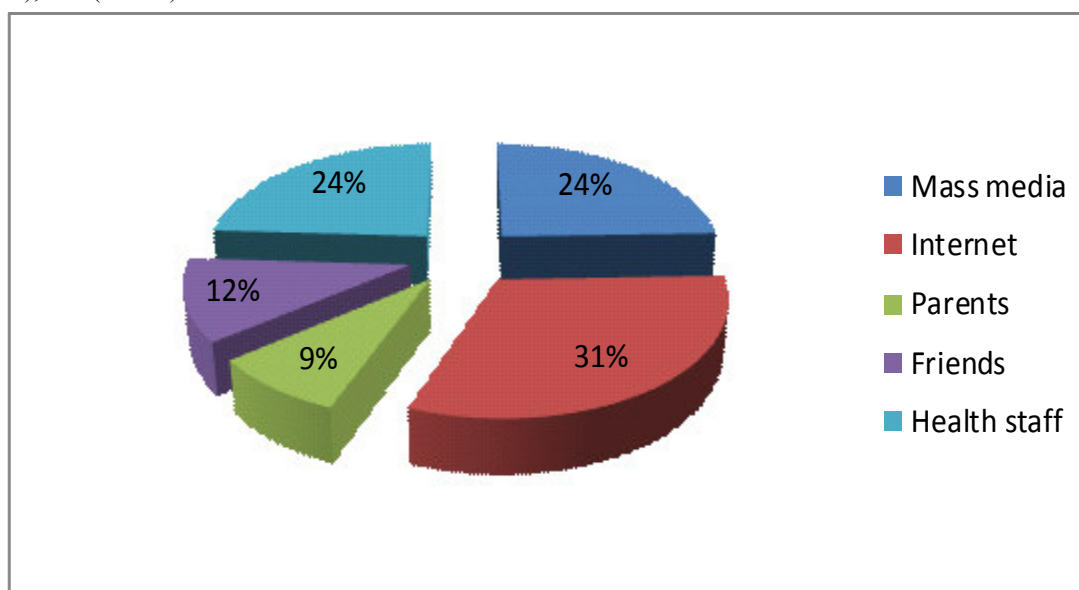


Figure (1): studied sample source of knowledge about sexuality

Figure (1) shows the studied students source of knowledge about sexuality. The figure illustrates that about one third of the studied students (31%) had their knowledge from internet; the same percentage of about one quarter (24%) of them had their knowledge from mass media and health staff respectively. Followed by (12%), and (9%) had their knowledge from friends and parents respectively.

Table (2): Distribution of the study group according to their knowledge score before and after program implementation.

Knowledge items	Phase				X^2_{mc} (P)
	Before		After		
	No	%	No	%	
General information					25.6 (0.001)*
▪ Poor	44	78.6	1	1.8	
▪ Fair	11	19.6	13	23.2	
▪ Good	1	1.8	42	75.0	
Anatomy and physiology of male					18.2 (0.001)*
▪ Poor	27	48.2	0	0.0	
▪ Fair	15	26.8	2	3.6	
▪ Good	14	25.0	54	96.4	
Anatomy and physiology of female					2.0 (0.214)
▪ Poor	2	3.6	3	5.4	
▪ Fair	26	46.4	19	33.9	
▪ Good	28	50.0	34	60.7	
Fertilization and conception					6.1 (0.042)*
▪ Poor	2	3.6	1	1.8	
▪ Fair	12	21.4	4	7.1	
▪ Good	42	75.0	51	91.1	
Contraception					1.8 (0.417)
▪ Poor	2	3.6	1	1.8	
▪ Fair	4	7.1	2	3.6	
▪ Good	50	89.3	53	94.6	

X^2_{mc} : Mc-Nemar test for related groups * P < 0.05 (significant)

Table (2) portrays the impact of sex education program on the study group. It was observed that only (1.8%) of the students were scored good knowledge regarding general information about sex before program implementation which significantly increased to three quarters (75%) after program implementation, ($X^2_{mc} = 25.6, p=0.001$). Regarding anatomy and physiology of male, it was noticed that only one quarter (25%) of the students were scored good knowledge before program implementation which significantly increased to (96.4%) after program implementation, ($X^2_{mc} = 18.2, p=0.001$). Furthermore, one half (50) of the students were scored good knowledge regarding anatomy and physiology of female before program implementation which increased to (60.7%) after program implementation. Concerning fertilization and conception knowledge score, it was noticed that three quarters (75%) of the students were scored good knowledge before program implementation which significantly increased to (91.1%) after program implementation ($X^2_{mc} 6.1, p=0.042$). Finally, (89.3%) of the students were had good knowledge score regarding methods of contraception before program implementation which increased to (94.6%) after program implementation.

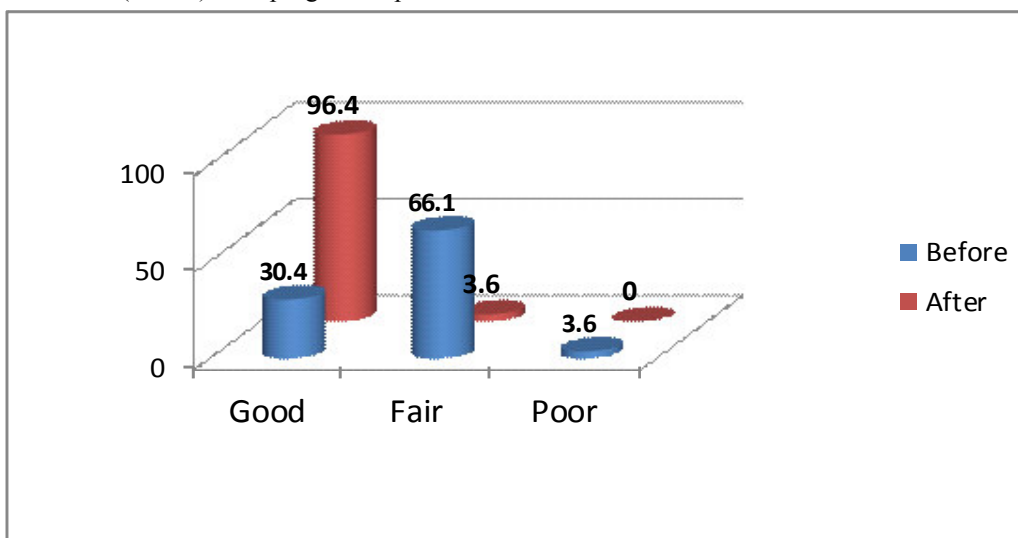


Figure (2): study group knowledge scores before and after program implementation.

Figure (2) shows the intervention group knowledge scores before and after program implementation. It shows that only (30.4%) of the students were scored good knowledge before program implementation which significantly increased to (96.4%) after program implementation, ($X^2_{mc} = 17.9, p=0.001$).

Table (3): Distribution of the control group according to their knowledge score before and after program implementation.

Knowledge items among control group	Phase				X^2_{mc} (P)
	Before		After		
	No	%	No	%	
General information					0.22 (0.893)
▪ Poor	35	62.5	35	62.5	
▪ Fair	18	32.1	19	33.9	
▪ Good	3	5.4	2	3.6	
Anatomy and physiology of male					0.45 (0.799)
▪ Poor	9	16.1	11	19.6	
▪ Fair	26	46.4	27	48.2	
▪ Good	21	37.5	18	32.1	
Anatomy and physiology of female					2.9 (0.234)
▪ Poor	1	1.8	5	8.9	
▪ Fair	20	35.7	20	35.7	
▪ Good	35	62.5	31	55.4	
Fertilization and conception					2.7 (0.256)
▪ Poor	7	12.5	8	14.3	
▪ Fair	21	37.5	13	23.2	
▪ Good	28	50.0	35	62.5	
Contraception					1.5 (0.473)
▪ Poor	1	1.8	1	1.8	
▪ Fair	4	7.1	8	14.3	
▪ Good	51	91.1	47	83.9	

X^2_{mc} : Mc-Nemar test for related groups

* P < 0.05 (significant)

Table (3) represents the distribution of the control group according to their knowledge score before and after program implementation. It is clear that there is no significant improvement of the studied students' knowledge score after program implementation. It was observed that (62.5%) of the students were scored poor knowledge regarding general information about sex before program implementation which still the same percent (62.5%) after program implementation. Regarding anatomy and physiology of male, it was noticed that (37.5%) of the students had good score knowledge before program implementation which decreased to (32.1%) after program implementation. Furthermore, (62.5) of the students were scored good knowledge regarding anatomy and physiology of female before program implementation which decreased to (55.4%) after program implementation. Concerning fertilization and conception knowledge score, it was noticed that one half (50%) of the students were scored good knowledge before program implementation which slightly increased to (62.5%) after program implementation. Finally, (91.1%) of the students were had good knowledge score regarding methods of contraception before program implementation which decreased to (83.9%) after program implementation.

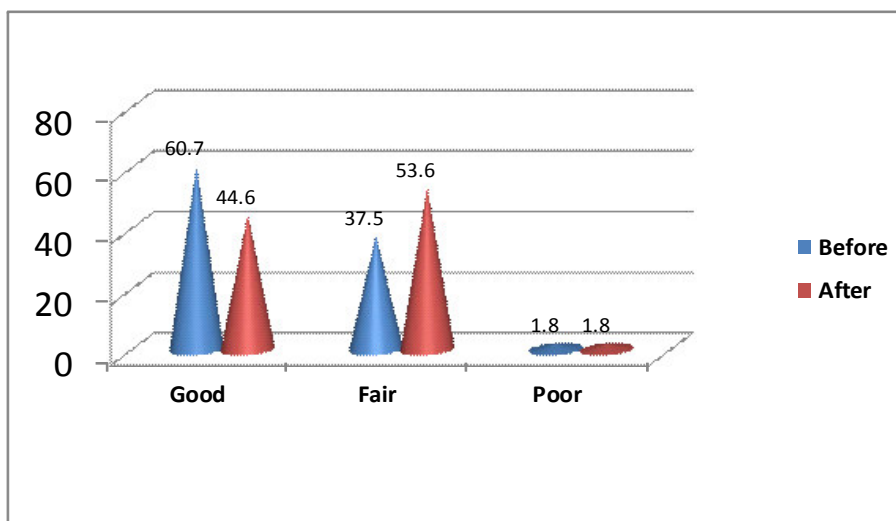


Figure (3): control group knowledge scores before and after program implementation

Figure (3) shows the control group knowledge scores before and after program implementation. It is clear that (60.7%) of the students were scored good knowledge before program implementation which decreased to (44.6%) after program implementation, ($X^2_{mc} = 2.9, p=0.288$).

Table (4): Distribution of the study and control group according to their knowledge score before and after program implementation in relation to their socio-economic level.

Socioeconomic level	Group				Change	P
	Study		Control			
	Before	After	Before	After		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
▪ High	20.0 (0.0)	24.0 (0.0)	17.2 (1.9)	18.6 (2.5)	7.0 (0.0)	0.128
▪ Middle	16.7 (2.2)	21.6 (1.9)	17.1 (2.2)	17.1 (2.2)	4.7 (3.8)	
▪ Low	17 (2.2)	21.3 (1.8)	17.9 (1.8)	17.7 (2.3)	4.3 (3.1)	

Table (4) shows the distribution of the study and control group according to their knowledge score before and after program implementation in relation to their socio-economic level. It portrays that the highest mean change at knowledge score was recorded among those who are high socio-economic level (7 ± 0) followed with those who are middle socio-economic level (4.7 ± 3.8) and the lowest improvement was for those who are low socio-economic level (4.3 ± 3.1), these differences at change levels were found to be statistically insignificant ($P=0.128$).

4. Discussion

Sexual health education, is a basic right for adolescents, supplements their knowledge and awareness, providing them with the tools to understand their responsibilities and rights. Proper sexual health education is uncommon in many countries, and mostly in developing countries. The discrepancy between international trends in sexual health education and the state of affairs in these countries is connected to a shortage of skilled health services and lack of appropriate health services, the shortage of teachers able and willing to communicate about sensitive matter, and religious and cultural taboos. ^(25, 26)

Egypt is a country where sexuality is not talking about within the family; sexual education is not involved in the curriculum of schools. Sexuality is regarded as shameful and guilty in this community that is becoming more and more conservative. Besides, many parents received no education regarding sexuality from their parents, so they do not have much knowledge about sexuality and generally avoid spoken about the theme with their children. Nearby lack of adolescent's reproductive health care services in Egypt could be another factor. ^(23,27) Therefore, this study was conducted to evaluate the effect of sex education program on knowledge of secondary school girls in El- Beheira Governorate.

Knowledge is the most significant factor for declining the prevalence of high-risk sexual behaviors. In fact, nowadays, education is considered as one of the basic human needs and a necessary means for acquiring knowledge; it is even known as one of the fundamental elements of human rights. ^(28, 29) Numerous evaluation studies have examined whether specific programs have had an impact on adolescents 'sexual knowledge and behavior. ^(30, 31)

In the present study, a significant improvement was found in the knowledge score between the pre- and

post-intervention periods among study group, (Figure 2). This is in the same line with the results of some studies by Sakha (2013) and Patterson et al (2005) as they also showed a significant increase in the adolescents' knowledge, compared to the pre-intervention period.^(32, 33) In fact, adolescents pay less attention to their health as they think they are not vulnerable to diseases; as a result, they avoid healthy behaviors. Therefore, this feeling of invulnerability, known as optimistic bias, should be considered when adolescents are being studied⁽²⁹⁾

In point of fact, after the implementation of health educational program, the study group showed significant improvement in their knowledge compared with the control group, Figure (2&3). This findings also lend credence to the research findings of Hogben et al (2015), and Esere (2008), as they compared the intervention group with control group, and they found that the students of the control group were less positively and their knowledge of sexual health had not improved.^(34,35)

Based on the above-mentioned results, education is effective in refining the knowledge. Also, more attention should be paid to providing valuable information for these groups, since the prerequisite for modifying common misbeliefs and negative attitudes is knowledge acquisition.^(36,37) Sources of sexual knowledge could be a contributing factor in receiving inappropriate, inaccurate or even wrong information regarding sexuality. Today, many adolescents turn to their friends and the modern technological sources as internet to seek information. Such sources may provide adolescents with information that are inappropriate to their ages which, in turn has a negative impact on their sexual well-being.⁽³⁸⁾

With reference to source of their knowledge, about one third (31%) of the studied students reported that internet was the main source of their sexual knowledge (figure 1). This is congruent with Malek, (2010) also, found that internet and magazine were the main sources of adolescent' sexual knowledge in northwest of Iran. Moreover, a very little percentage, only (9%) of the studied students had their knowledge about sexuality from their parents. Similar results was reported from other studies by Borkar et al (2015), and Rebecca (2012), this may be contributed to that in Egypt, many parents received no education regarding sexuality from their parents, they do not have much knowledge about sexuality and generally avoid spoken about the theme with their children.^(39-41,27)

The evaluation of sexual education programs shows its positive impact in different areas. In relation to knowledge on STI, pregnancy, contraceptive methods, sexual anatomy, etc., investigations in different contexts show evidence of their increase after the educational interventions.⁽⁴²⁾ The results of the current study reflected a significant improvement on the knowledge of the studied students regarding anatomy and physiology of male reproductive system and female reproductive system (Table 2). These findings are congruent with Jennings et al (2014) and Scull et al (2014) as they reported the positive impact of sexual education programs in relation to knowledge on anatomy and physiology of male and female reproductive system.^(43,44)

Gaining information and understanding of reproductive organs and its function are very important for sexual health and sexual well-being. In the current study only (3.6%) of the studied students had poor knowledge regarding female reproductive system before program implementation (Table 2 &3). These current results are not consistent with Cravcho, (2008) who cited that the majority of the studied adolescents in Brazil had little knowledge about the function of female reproductive organs. In contrast, about half (48.2%) of them had poor knowledge about male reproductive system. This is consistent with Selling, (2006) who reported that there was lack of adolescents' knowledge regarding male reproductive system.^(45,46,47) This is disparities in the results may be attributed to that the studied students were girls table (1). Furthermore the lack of girl students' knowledge concerning male reproductive systems might be attributed to the method of teaching such topics at schools. In Egypt, many school especially the governmental ones, tended to omit such topics or discussing it very superficially. In addition, the students have no chance to ask or gain more information. This issue is congruent with Mkumbo, (2012) who reported that teachers expressed discomfort in teaching sexuality topics in schools of Tanzania; they view it as parents' responsibilities.^(48,49)

Researchers disclose that students need more information on female reproductive life, pregnancy possibilities, and contraceptives methods.⁽⁵⁰⁾

The findings of the current study reflected a significant improvement on the knowledge of the studied students concerning conception and fertilization after program implementation (Table 2). This agreed with Rashid and Mwale (2016) who reported significant increase in sexual knowledge among Malawian adolescents after sex education workshop. Avachat and Phalke, (2011) also, reported greater change in adolescents' sexual knowledge after providing sex education program in India.^(51, 52)

A systematic review explored that examining the effect of educational interventions on contraceptive knowledge, 14 out of 15 studies originated a statistically significant improvement in knowledge of contraceptive risks, benefits, side effects, effectiveness or correct use.⁽⁵³⁾

Finally with regard to the knowledge of the studied students about the methods of contraception, the present study reflected a high good score knowledge of the studied students regarding the methods of contraception among both intervention and control group before program implementation (Table 2&3). This finding is agreed with Chimah et al (2016) which recorded very high knowledge level of contraceptives use among young people.

On the other hand this result contrary to that of Rajapaksa-Hewageegana et al (2015) as they conducted a survey in Sri Lanka that revealed low levels of sexual and reproductive health knowledge among students aged 16–19. In which, only one in 10 could correctly recognize a method of contraception. This high awareness of contraceptive methods as reported in this study is likely to be due to continuous widespread information from the mass media on the different methods of contraception. ^(54, 55)

5. Conclusions

The findings of this study provision the need for sex education approach to endorse the knowledge about sexuality of secondary school girls. Educating and providing them correct information can help them to prevent unwanted and unintended pregnancies, and sexually transmitted diseases. The present study concluded that the level of knowledge among studied students was insufficient, and the structured teaching Program was very effective to improve the knowledge of the studied students.

Recommendations So, this study recommended that:

1. Sex education topics should be implemented in the curriculum of school and college.
2. Special training should be given to all school teachers to involve, plan, organize and motivate sex education program.

References

1. Sandfort TG, Ehrhardt AA. Sexual health: a useful public health paradigm or a moral imperative?. *Arch Sex Behav.* 2004; 33(3):181-7. DOI:10.1023/B:ASEB.0000026618.16408.e0.
2. Kumar A , and Venkateshan M. Effectiveness of structured teaching programme on knowledge regarding sexual health among young adults. *Int J Res Med Sci.* 2016;4(4):1119-123. DOI: <http://dx.doi.org/10.18203/2320-6012.ijrms20160793>.
3. World Health Organization (WHO). Adolescent development. 2017 [cited 2017]; Available from: http://www.who.int/maternal_child_adolescent/topics/adolescence/dev/en/
4. Tegegn A, Yazachew M, and Gelaw Y. Reproductive Health Knowledge and Attitude among Adolescents: A community based study in Jimma Town, Southwest Ethiopia. *Ethiop. J. Health Dev.* 2008; 22(3):243-251
5. WHO (2017). Adolescents: health risks and solutions. Fact sheet Updated May 2017. Available from: <http://www.who.int/mediacentre/factsheets/fs345/en/>
6. Unicef 2015. Children in Egypt 2015. A statistical digest. Available from: http://www.oosci-mena.org/uploads/1/wysiwyg/Children_in_Egypt_2015.pdf
7. WHO. (2006a). Investing in our future. Geneva: A framework for accelerating action for the sexual and reproductive health of young people. World Health Organization. Available from: http://www.wpro.who.int/publications/docs/investinginourfuture_framework.pdf.
8. Singh S, and Darroch, J. E. Adolescent pregnancy and childbearing: levels and trends in developed countries. *Fam Plann Perspect.* 2000; 32(1): 14-23. DOI: <https://doi.org/10.1363/3201400>
9. Wight D, Raab G M, Henderson M, Abraham C, Buston K, Hart G, and Scott S. Limits of teacher delivered sex education: interim behavioral outcomes from randomized trial. *British Medical Journal* 2002; 324 (7351): 1430- 33. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC115856/pdf/1430.pdf>
10. Population Reference Bureau: World Population data Sheet. Mother – daughter: communication about sexual and reproductive health in rural areas of Alexandria, Egypt. Washington; Population Reference Bureau, 2012. Available from: <https://assets.prb.org/pdf12/mother-daughter-mena-workingpaper.pdf>
11. Mudey A, kesharwani N, Mudey G, Goyal R. A cross-sectional study on awareness regarding safe and hygienic practices amongst school going adolescent girls in rural area of Warha District, India. *Glo. J. Hlth.* 2010; 2(2): 225–231. DOI: <http://dx.doi.org/10.5539/gjhs.v2n2p225>
12. Regmi P, Simkhada P, and van Teijlingen E R. Sexual and reproductive health status among young people in Nepal: opportunities and barriers for sexual health education and services utilization. *Kathmandu University Medical Journal* 2008; 6 (22): 248- 56. Available from: http://eprints.bournemouth.ac.uk/10147/1/KMUJ_Pramod_Sex_Reproductive_2008.pdf
13. Adhikari R and Tamang J. Pre-marital sexual behaviour among male college students of Kathmandu, Nepal. *BMC Public Health.* 2009; 9: 241- 5. doi: 10.1186/1471-2458-9-241.
14. Olurotimi OJ, Nimulola M. Influence of Sexuality Education on Moral Behaviour of Adolescents in Senior Secondary School in Sokoto State, Nigeria. *Journal of Scientific and Engineering Research* 2016; 3(2): 125-31. Available from: <http://jsaer.com/download/vol-3-iss-2-2016/JSAER2016-03-02-125-131.pdf>
15. Future of Sex Education Initiative, National Sexuality Education Standards: Content and Skills, K–12, 2012. Available from: <http://www.futureofsexeducation.org/documents/josh-fose-standards-web.pdf> , accessed Sept. 8, 2017.
16. World Health Organization and Federal Centre for Health Education (2010), Standards for Sexuality

- Education in Europe: A Framework for Policy Makers, Educational and Health Authorities and Specialists, Cologne, Germany: Federal Centre for Health Education, 2010. Available from: https://www.oif.ac.at/fileadmin/OEIF/andere_Publikationen/WHO_BZgA_Standards.pdf
17. Hodžić A, Budesa J, Štulhofer A, and Irvine J. (2012). The politics of youth sexuality: civil society and school-based sex education in Croatia. *Sexualities* 2012; 15 (3-4): 494-514. DOI: 10.1177/1363460712439656
 18. Jaworsky D, Larkin J, Sriranganathan G, Clout J, Janssen J, Campbell L, and Flynn S. (2013). Evaluating youth sexual health peer education programmes: challenges and suggestions for effective evaluation practices. *Journal of Education and Training Studies* 2013; 1 (1): 227-34. DOI: 10.11114/jets.v1i1.68
 19. Rogstad K, Thomas A, Williams O, Forster G, Munday P, Robinson A, and Lazaro N. UK national guideline on the management of sexually transmitted infections and related conditions in children and young people. *International Journal of STD & AIDS*. 2010; 21 (4): 229-41. DOI: 10.1258/ijsa.2009.009353
 20. Carroll C, Lloyd-Jones M, Cooke J, and Owen J. (2012). Reasons for the use and non-use of school sexual health services: a systematic review of young people's views. *Journal of Public Health* 2012; 34 (3): 403-10. DOI: 10.1093/pubmed/fdr103.
 21. McFadyen J. Teaching sex education: are Scottish school nurses prepared for the challenge? *Nurse Educ. Today*, 2004; 24 (2): 113-20. DOI:10.1016/j.nedt.2003.10.003
 22. El Zahraa Geel F. Quality sexual education needed for adolescents in Egyptian schools; 2012. Population reference Bureau Mena Working Paper Series. Available from: <https://assets.prb.org/pdf12/adolescents-egypt-schools-workingpaper.pdf>
 23. Wahba M, Fahim R. The need for reproductive health education in schools in Egypt; 2012. Available from: <http://www.prb.org/pdf12/reproductivehealth-education-egypt.pdf>.
 24. Fahmy S, El -Sherbini A. Social score after modification of the income item to suit the present standards. *The Bulletin of the High Institute of Public Health* 1994; XIII (5): 95– 107.
 25. UNFPA: Sexual and reproductive health for all: Reducing poverty, advancing development and protecting human rights. Available from: http://unfpa.org/webdav/site/global/shared/documents/publications/2010/uarh_report_2010.pdf
 26. Shirpak K, Chinichian M, Maticka-Tyndale E: A qualitative assessment of the sex education needs of married Iranian women. *Sex Cult.* 2008, 12:133–50.
 27. Mansour SE & Mohamed HE. Handling Sexuality Concerns in Women with Gynecological Cancer: Egyptian Nurse's Knowledge and Attitude. *Journal of Education and Practice* 2015; 6 (3):222-88. Available from: <https://files.eric.ed.gov/fulltext/EJ1083761.pdf>
 28. Ochako R, Ulwodi D, Njagi P, Kimetu S, Onyango A. Trends and determinants of Comprehensive HIV and AIDS knowledge among urban young women in Kenya. *AIDS Research Therapy*. 2011; 8 (1):8-11. DOI: 10.1186/1742-6405-8-11
 29. Larki M, Taffazoli M, Roudsari RL, and Babae A. The Impact of an Educational Program on Knowledge and Attitude of Female Sex Workers in Preventing High Risk Sexual Behaviours. *J Midwifery Reprod Health*. 2015; 3 (1): 298-304. DOI: 10.22038/jmrh.2015.3609.
 30. Constantine NA, Intervention effectiveness research in adolescent health psychology: methodological issues and strategies, in: O'Donohue WT, Benuto LT and Woodward Tolle L, eds., *Handbook of Adolescent Health Psychology*, New York: Springer, 2013, pp.295–322. DOI:10.1007/978-1-4614-6633-8_20.
 31. Coalition for Evidence-Based Policy (2010). HHS's evidence-based teen pregnancy prevention program: excellent first step, but only 2 of 28 approved models have strong evidence of effectiveness, news release, Washington, DC: Coalition for Evidence-Based Policy, May 5, 2010. Available from: <http://coalition4evidence.org/wordpress/wp-content/uploads/Coalitioncomments-HHS-Teen-Pregnancy-Prevention-May-2010.pdf>.
 32. Sakha MA, Kazerooni PA, Lari MA, Sayadi M, Azar FE, Motazedian N. Effect of an educational intervention on knowledge, attitudes and preventive behaviors related to HIV and sexually transmitted infections in female sex workers in southern Iran: a quasi-experimental study. *International Journal of STD & AIDS*. 2013; 24(9):727-35. DOI:10.1177/0956462413482424
 33. Patterson TL, Semple SJ, Fraga M, Bucardo J, Davila-Fraga W, Strathdee SA. An HIV-Prevention Intervention for Sex Workers in Tijuana, Mexico: A Pilot Study. *Hispanic Journal of Behavioral Sciences*. 2005; 27(1):82-100. DOI: 10.1177/0739986304270299.
 34. Hogben M, Ford J, Becasen JS, and Brown K. A Systematic Review of Sexual Health Interventions for Adults: Narrative Evidence. *J Sex Res*. 2015; 52(4): 444–69. DOI:10.1080/00224499.2014.973100.
 35. Esere MO. Effect of sex education Programme on at-risk sexual behavior of school-going adolescents in Ilorin, *Nigeria Health Sci*. 2008 Jun; 8(2): 120–5. DOI: 10.4314/njgc.v11i1.36988
 36. Chin HB, Sipe TA, Elder R, Mercer SL, Chattopadhyay SK, Jacob V, Wethington HR, et al. (2012) "The Effectiveness of Group-Based Comprehensive Risk-Reduction and Abstinence Education Interventions to

- Prevent or Reduce the Risk of Adolescent Pregnancy, Human Immunodeficiency Virus, and Sexually Transmitted Infections: Two Systematic Reviews for the Guide to Community Preventive Services”, *Am J Prev Med.* 2012;42(3):272-94. DOI:10.1016/j.amepre.2011.11.006
37. Etemad K, Heydari A, Kabir M. Knowledge and attitude levels in high risk groups about HIV/AIDS and relation with socioeconomic level indicators in Golestan province (2007). *Journal of Gorgan University of Medical Sciences.* 2010; 12(2):63-70. Available from: <http://goums.ac.ir/journal/article-1-735-en.html>
 38. Alquaz A, Almuneef M. Knowledge, attitudes and resources of sex education among female adolescents in public and private schools in central Saudi Arabia. *Saudi Arabia Journal* 2012; 33(9):1001-9. Available from: <https://www.smj.org.sa/index.php/smj/article/view/7510/5284>
 39. Malek A. A study on the sources of sexual knowledge acquisition among high school students in Northwest Iran. *Archives of Iranian Medicine Journal* 2010; 13(6): 343-537. DOI: 10.5402/2012/645103.
 40. Borkar RS, Patil CG, and Meshram SA, Attitude of adolescent school students towards reproductive health education. *Int J Community Med Public Health.* 2015; 2(4):484-88. DOI: <http://dx.doi.org/10.18203/2394-6040.ijcmph20151034>
 41. Rebecca D L. The Effectiveness of Sex Education Programs in the Schools 2012 submitted to the University of Wisconsin-Stout, Graduate School in partial completion of the requirements for the Graduate Degree/ Major: Ed.S. In School Psychology.
 42. Manlove J Fish H, and Moore KA. Programs to improve adolescent sexual and reproductive health in the US: a review of the evidence. *Adolescent Health, Medicine and Therapeutics* 2015; 6: 47–79. DOI: 10.2147/AHMT.S48054. cancel 43
 43. Jennings J M, Howard S, & Perotte C L. Effects of a school based sexuality education program on peer educators: The Teen PEP model. *Health Education Research,* 2014; 29(2): 319-29. DOI:10.1093/her/cyt153
 44. Scull T M, Malik C V, & Kupersmidt J B. A media literacy education approach to teaching adolescents comprehensive sexual health education. *Journal of Media Literacy Education,* 2014; 6(1): 1-14. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4828968/>
 45. Salam RA, Faqqah A, Sajjad N, Lassi ZS, Das JK, Kufman M, and Bhutta ZA. Improving Adolescent Sexual and Reproductive Health: A Systematic Review of Potential Interventions. *J Adolesc Health.* 2016; 59(4 Suppl): S11–S28. DOI: 10.1016/j.jadohealth.2016.05.022
 46. Carvacho A. Knowledge of pregnant adolescents about reproductive anatomy and physiology in Brazil. *Association of Medical Journal* 2008; 54(1):29-35. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/18392483/>
 47. Selling G. Knowledge of reproduction in teenagers and young adults in Sweden. *European Journal of Contraception and Reproductive Health Care* 2006; 11(2):117-25. DOI:10.1080/13625180600557589
 48. Peuchaud S. Social media activism and Egyptians' use of social media to combat sexual violence: an HiAP case study. *Health Promotion International* 2014; 29(1):i113–i120. DOI: <https://doi.org/10.1093/heapro/dau046>
 49. Mkumbo k. Teachers' attitudes towards and comfort about teaching school-based sexuality education in urban and rural Tanzania. *Global Journal of Health Science* 2012; 4(4):149-58. DOI:10.5539/gjhs.v4n4p149.
 50. Mijatovic V, Samojlik I, Petkovic S, and Sabo A. Hormonal contraception-habits and awareness female students of the University of Novi Sad, Vojvodina, Serbia. *Med Pregl.* 2014; 67: 290-96. DOI: 10.2298/MPNS1410290M
 51. Rashid S & Mwale M. The Effects of Sex Education on the Risky Sexual Behaviour of School Going Adolescents. *Psychology and Developing Societies* 2016; 28 (1): 126-138. DOI: 10.1177/0971333615622910.
 52. Avachat S, Phalke D. Impact of sex education on knowledge and attitudes of adolescent school children of Loni Village. *Indian Medical Association Journal* 2011; 109 (11):808-11. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22666937>
 53. Tenkku LE, Flick LH, Homan S, Cal LC, Campbell C, et al Psychiatric disorders among low-income women and unintended pregnancies. *Women's Health Issues,* 2009; 19: 313-24. DOI: 10.1016/j.whi.2009.07.006
 54. Chimah UC, Lawoyin TO, Ilika AL, Nnebue CC. Contraceptive knowledge and practice among senior secondary schools students in military barracks in Nigeria. *Nigerian journal of clinical practices,* 2016; 19(2): 182-8. DOI: 10.4103/1119-3077.175970.
 55. Rajapaksa-Hewageegana N, Piercy H, Salway S, and Samarage. Sexual and reproductive knowledge, attitudes and behaviours in a school going population of Sri Lankan adolescents. *Sexual and Reproductive Healthcare* 2015; 6(1):3–8. DOI: 10.1016/j.srhc.2014.08.001.