

Effect of an Educational Package about Genetic and Reproductive Consequences of Cousin Marriage on Nursing Students' Knowledge and Attitude

Noura Mohammed Attia Ahmed ¹& Ahlam Mohamed El-Sayed ²

^{1&2}Lecturer of Obstetrics and Gynecological Nursing, Faculty of Nursing, Zagazig University

Abstract

Background: Cousin marriage is a global health issue with a number of negative health and social effects. **Aim of the study:** To evaluate the effect of educational package about Genetic and Reproductive Consequences of Cousin Marriage on Nursing Students' Knowledge and Attitude. **Subjects and Method: Research design:** A quasi-experimental design was used to achieve the aim of this study. **Setting:** The study was conducted in the Faculty of Nursing, Zagazig University, **Subjects:** 221 undergraduate nursing students at the 1st semester of academic third year (2022/2023). **Tools of data collection:** Three data collection tools were used **Tool I:** A Structured interviewing questionnaire sheet, **Tool II:** knowledge assessment sheet, **Tool III:** a Likert scale for assessment of students' attitude. **Results:** The study indicated that more than two thirds of the studied students had total correct knowledge and more than four fifth had a positive attitude regarding consanguineous marriage post-intervention. **Conclusions:** A significant improvement of student's knowledge and attitude related to cousin marriage and genetic disorders influence offspring after educational sessions was revealed. **Recommendations:** Based on this finding, the study suggested incorporating premarital counseling ideas related to consanguineous marriage into curricula at undergraduate universities.

Keywords: Consanguineous marriage, premarital counseling, attitude, nursing students

Introduction

Cousin marriage, also known as consanguineous marriage (CM), is one of the most crucial topics covered in premarital counseling. It refers to unions of blood relatives, second cousins, or close relatives. The main factors supporting a preference for CM in communities with high rates of consanguinity are maintaining the lineage solidarity of the family, the partners' relatively easy time finding a compatible spouse, supporting the status of women and bettering relations with in-laws, lowering the cost of marriage, increasing the likelihood of receiving better care for elderly people, and most importantly, improved marital stability ⁽¹⁾.

Congenital abnormalities and autosomal recessive illnesses are more likely to occur in children of parents who are consanguineous. Additionally, CM

has a negative impact on fetal survival markers and results in the birth of offspring with compromised health. Parental consanguinity is a risk factor for a variety of multifactorial issues, which may affect reproductive results. These consequences include obesity, cardiovascular disease, diabetes, and several types of cancer. The effect of CM on complicated and multivariate health concerns is disputed by certain reports. It is difficult to distinguish the estimated overall negative effects of CM from the epidemiological context because it is highly changeable ⁽²⁾.

Consanguineous marriage was found to be 27.4% common in the general population of Egypt. The rural areas have the highest incidence. Contrary to other forms of consanguinity, first cousin marriages

were more frequent.⁽³⁾ the consanguinity rate among Egyptians has fluctuated between 29% and 39% during the past 40 years. Premarital counseling can help identify and prevent diseases that may arise from in-law marriages, such as hearing loss, Mental retardation, thalassemia, autosomal recessive osteoporosis, and osteoporosis⁽⁴⁾.

A battery of tests known as "premarital screening" are conducted to look for infectious diseases like hepatitis B, hepatitis C, and HIV/AIDS as well as common genetic blood abnormalities like thalassemia and sickle cell anaemia. in couples who are about to get married⁽⁵⁾. PMS has been put into place in many nations throughout the world, was made mandatory in others, and is notably common in places like the Middle East where consanguinity rates are high. The diseases that are checked for as part of PMS differ from nation to nation. For instance, it is required in Saudi Arabia for HIV, hepatitis B and C, thalassemia, sickle cell illness, and sickle cell anaemia. PMS is only required in Egypt to screen for hemoglobinopathy⁽⁶⁾.

However, even if PMS is present in Egypt, very little people really utilize it there. According to reports, the main obstacle for young people is a lack of basic awareness and information on reproductive health as well as inadequate counseling and educational services tailored to their needs. This proved the need for a consciousness course to be developed in order to strengthen and develop undergraduates' awareness of the risks, consequences, and benefits of blood hereditary illnesses⁽⁷⁾.

Perception is the capacity to extrapolate the term seen derives its meaning. It makes reference to the ability to comprehend whatever the

senses pick up. It is also the method by which people select, organize, and convert sensory stimuli into useful information about their working environment. Students' understanding of consanguineous marriage is therefore described as both their knowledge of and attitude towards it (attitude)⁽⁸⁾.

Since The nurse is at the center of the counseling process; providing high-quality premarital counseling services for consanguineous marriages necessitates that the nurse be knowledgeable, skilled, and competent in order to be able to provide couples with planned, organized care in an effort to prevent complications from transmitting genetic diseases and to increase awareness of the negative effects of these diseases. Additionally, it aids in dispelling false notions and beliefs about consanguinity⁽⁹⁾.

Significance of the study

The 2.8% urban and 8.4% rural distribution of Egyptians with genetic illnesses and congenital abnormalities is almost completely attributable to consanguineous marriage⁽⁷⁾. The youth population is a potent force that can help end consanguineous marriages if they are well informed about the health repercussions of it and have a positive attitude towards it.⁽¹¹⁾ Additionally, in an effort by researchers to fulfil the third goal of the 2030 Sustainable Development Goals, "To ensure healthy lives and promote well-being for all at all ages," and because undergraduate nursing students will eventually be responsible for prevention and wellbeing health throughout the life cycle, this study was conducted to assess the impact of educational materials about cousin marriage and genetic disorders on university nursing students' knowledge.

Aim of the study:

The aim of the present study is to evaluate the effect of educational package about genetic and reproductive consequences of cousin marriage on nursing students' knowledge and attitude

Study Hypotheses:

University nursing student who attended educational sessions related to cousin marriage and genetic disorders influence offspring will have a correct knowledge and positive attitude compared with the pre intervention.

Subjects and method:**Study design:**

The current study used a quasi-experimental design (pre-posttest)

Study setting:

The research was done at Zagazig University's Faculty of nursing , which was established in 1984 and acquired quality accreditation from the National Authority for Quality Education and Accreditation on July 21, 2017.

Sample Type:

A purposive sample was selected.

Sample Size:

Percent of positive attitude about consanguineous marriage among university students at pre intervention program was (61.8%), whereas percent of positive attitude in post intervention was (74.2%), Nagia et al. ⁽⁹⁾ Confidence level is 95% with power of study 80%. Sample size calculated using open epi program is 221 students.

Subjects criteria:

Unmarried third academic year's students at the of marriage and agreed to participate in the study

Tools of data collection: Three tools for data collection were used

Tool I: Structured interviewing questionnaire sheet: focused on the socio demographic traits of nursing students, including their age, sex, place of residence, the degree of their parents' relationship, in the student family, and multiple illnesses linked to consanguineous marriage, It involved 9 close ended questions.

Tool II: knowledge assessment sheet which was intended to evaluate the students' understanding of cousin marriage. It had eight open ended questions, which were divided into three categories. The concept, level, spreading factors and risks of cousin marriage are discussed in the first section. The relationship between a genetic disease, cousin marriage, and the most prevalent forms of genetic disorders is discussed in the second section, which also addresses genetic diseases unrelated to cousin marriage. The concept, significance, premarital examination of male and female couples as well as cousin marriage examination were covered in the third section.

Knowledge scoring system

The scoring system included one score for correct answer and zero for incorrect answer.

Total knowledge score: 30

Satisfactory knowledge equal to and more than 60 % (20 and more)

Un Satisfactory knowledge less than 60 % (less than 20).

Tool III: (Likert scale) for assessment of students' attitude Its purpose was to gauge the students' attitudes towards cousin marriage. The scale had 15 unambiguous assertions. Each student nurse response included the words agree, uncertain, and disagree.

Attitude scoring system:

The scale covered 15 clear statements for each sentence, there were three possible attitudes: a disagree attitude worth one point, an uncertain attitude worth two points, and an agree attitude worth three points. As a result, the total attitude scores ranged from 1 to 45 (scores

between 1 and 26 below 60% were considered negative attitudes, whereas scores between 27 and 45 over 60% were considered positive attitudes).

Validity and Reliability:

Before assessing the tools' face and content validity, five specialists (two professors and three assistant professors) in obstetrics and gynecological nursing evaluated the tools for clarity, relevance, applicability, comprehensiveness, comprehension, and ease of execution. Cronbach's Alpha coefficient test with 0.51 score was used to determine the reliability of knowledge and 0.84 for attitude evaluation. According to a Likert scale, cousin marriage

Field of the work

The study was conducted through three phases:

1- Preparatory phase:

The researchers introduced themselves to each student, described the purpose of the study, its duration, and how to fill out the questionnaire before starting the interview with the researched students in order to gather baseline data. The self-administered questionnaire was given to each student to evaluate their socio-demographic traits and comprehension of CM. Participation was entirely up to the individual. Each self-administered questionnaire for the study's nurses took an average of 30 minutes to complete. **Supportive materials** were created by the researchers, had their content approved by a scientific panel, and were then given to participants for use as a self-study manual to advance their understanding of CM. The handout was created for students and contained information about CM, including its concept, level, spreading factors, and risks, as well as the connections between cousin marriage and the most common types of genetic disorders and genetic diseases, as well as premarital testing for both male and female couples and cousin marriage testing. Before the educational package sessions, students were divided

into ten groups, each of which contained 22 students. This distribution was done in accordance with the students' availability to make it easier for them to attend the sessions. The content was divided into three interactive sessions "three per week" for each group. Each session was conducted for 30-50min. The PowerPoint presentation was done, followed by a group discussion

2- Implementing phase

From 1st of October to 31 December 2022, the educational package was conducted through lectures; group discussions, role-playing, and demonstrations, audio-visual materials, such as data show were used, In addition to program handouts. The program included 3 sessions; the first session begins with an orientation to the training and its aim; Arabic language was used to suit the students' level of understanding. Feedback was given in the beginning of each session about the previous one. Sessions started at 12 p.m., the best time for students as they were busy with lectures from 8-12 p.m. The content of sessions was as following:

First session included information about the concept, level, spreading factors, and risks.

Second session included information about the relationship between a genetic disease, cousin marriage, and the most prevalent forms of genetic disorders

Third session included information about the premarital examination of male and female couples as well as cousin marriage examination.

3- Evaluation phase:

The identical pre-test questionnaire form was used to distribute the post-test questionnaire, which was then collected two weeks after the pretest.

Pilot study:

An initial study was conducted on a 10% sample of students (22).aimed to evaluate the simplicity and applicability of study. Based on the findings of the pilot

study, no adjustment was necessary. The study has included the pilot sample.

Ethical Considerations and administrative design:

The Zagazig University nursing faculty's Scientific Research Ethical Committee officially approved the study before it got started. All ethical considerations were taken into account at every stage of the investigation, and the subjects' confidentiality and anonymity were upheld. The researchers introduced themselves and briefly described the study's purpose and nature before each student provided their consent to participate. After the oral informed consent procedure, students were enrolled voluntarily. The students were also made aware of the fact that any material gathered would be treated in confidence and would only be utilized for study

Statistical Analysis

All information was gathered, tallied, and statistically evaluated using (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.2015). The mean, standard deviation, and (range) were used to express quantitative data, and the number & (percentage). To compare two paired categorical variables, the McNamara test was applied. In order to evaluate the relationships between the numerous study variables, the Pearson correlation coefficient was determined. Values close to 1 indicate strong association, whereas values close to 0 indicate poor correlation. Every test had two sides. Statistical significance (S) was defined as p-value 0.05 and statistical insignificance (S) as p-value 0.05.

Results

Table 1 reveals sociodemographic characteristics of studied sample, it represents that the age of the study sample ranges from 20-22 with mean age 21 ± 0.66 years, (67.0%) of students were females and (62.4%) of them were from rural areas. Regarding parent relative degree,

9.5% of parent have cousin marriage with (47.6%) of them at the first relative degree.

Figure 1 It is reveals that more than two fifth of students' relative parents have diabetes mellitus and hypertension (47.6% & 45.7% respectively as a multi factors diseases related to cousin marriage, meanwhile 23.8% of them have heart diseases and 4.7% have mental disorders.

Table 2 illustrates decline in all items of knowledge regarding cousin marriage and related genetic disorders among nursing students in pretest which includes cousin marriage concept, risk factors, genetic disorders, premarital counseling and investigations required meanwhile after implementation of educational package level of knowledge increased in posttest assessment among nursing students with a highly statistical significant difference ($p= 0.0001$)

Table 3 illustrates that a studied sample have a positive attitude after implementation of educational package regarding cousin marriage in terms of facilities, success & continuity, custom & traditions, preserving money, decision and advice with a high statistical significant improvement ($p= 0.0001$). In addition to a high statistical significant positive attitude in posttest ($p= 0.0001$) concerning genetic disorders which influence offspring and premarital counseling among nursing students.

Table 4 reveals total mean of knowledge score regarding cousin marriage in pretest assessment (12.1 ± 4.5) which improved after application of educational package to (20.8 ± 5.7) with high statistical significant difference. Moreover, there was a high statistical significant improvement in nursing students' attitude regarding cousin marriage with total mean score (22.1 ± 4.9) in pretest assessment which increased to (32.6 ± 6.6) in posttest assessment.

Figure 2 reveals that 8.1% of the studied students have total correct knowledge regarding cousin marriage and genetic disorders pretest which improved to 68.8% in posttest; also 10.4 % of the studied samples have a positive attitude regarding cousin marriage in pretest compared to 81.0% in posttest.

Table 5 shows a clear, favorable correlation between the investigated sample's pre- and post-intervention knowledge and attitude about cousin marriage and genetic illnesses.

Discussion

The results of the current study showed that the study sample's age ranged from 20 to 22 years old, with a mean age of 21 ± 0.66 years. This conclusion might be explained by the fact that secondary school graduates often enter at the age of 18 and leave between the ages of 20 and 22.

This outcome was consistent with Ojha et al. ⁽¹¹⁾ study, which examined students at Khalikot University in Berhampur's knowledge and attitudes regarding the health effects of consanguineous marriage. The majority of the students (58.7%) were between the ages of 17 and 21. Additionally, Kabbash. ⁽⁴⁾ investigation into medical students at Tanta University in Egypt's perceptions of the value of premarital counseling revealed that more than half of the participants were between the ages of 20 and 22.

Two thirds of the participants were female, according to the results of the current study. This result may be attributable to the cultural perception in society that a nursing career is better suited to women than to men, which makes it unfavorable for men to pursue. This finding was consistent with a study by Mahmoud et al. ⁽¹²⁾ on "the influence of premarital counseling on faculty of nursing students at Helwan University," which found that more than 75 percent of

participants were female. This finding conflicts with a study by Al-Qahtani, et al. ⁽¹³⁾, which examined students at King Khalid University's perceptions of premarital counseling and found that the majority of the sampled students were male.

More than three fifths of the participants in the current study were from rural areas, according to the study's findings. This finding was incongruent, according to Mahmoud et al. ⁽¹²⁾, who noted that more than half of the participants resided in metropolitan areas. The fact that the majority of students live in the governorates of Cairo and Giza, which are primarily urban areas, may help to explain this finding.

In Arab nations, consanguinity is a long-standing custom. According to the results of the current study, 9.5% of the students parent have cousin marriage with (47.6%) of them at the first relative degree. The findings of Aldeeb et al. ⁽¹⁴⁾, who investigated the knowledge and attitudes of students toward consanguineous marriages at Tanta University in Egypt and studied This finding was reinforced by the frequency of consanguineous marriage among family members of medical students. They discovered that 12% of parents were consanguineous.

In a study conducted in Iraq, Yahyaa et al. ⁽¹⁵⁾ discovered that two thirds of marriages were consanguineous, and one third of them were with first cousins. The contrast between these studies and our study is due to the fact that our sample consisted of medical students within a specified age range, and varied cultural backgrounds.

The current study makes clear that before the program's adoption, participants in our study had little understanding about

premarital counseling. This can be a result of the participants' inexperience (mean age = 21), which prevents them from recognizing the seriousness of hereditary blood diseases and their profound impact on the emotional and material well-being of the affected family. This outcome concurs with a current population-based study by Al-Shroby et al. ⁽¹⁶⁾ in Saudi Arabia. their study showed that only 9.2% of participants had satisfactory understanding of PMS programs, while 52.4% of participants had fair knowledge. Al-Shafai et al. ⁽⁵⁾ study in Qatar found a similar conclusion, namely that premarital testing was unknown to 50% of the individuals. These findings in reality underscore the need for health education programs to increase awareness of PMS and initiatives to lessen the burden of some genetic and STDs among future couples, particularly in countries with high incidence of consanguineous marriages and hereditary disorders.

These results were also consistent with research conducted in Menoufia, Egypt by Hamed et al. ⁽¹⁰⁾ on "knowledge, perception, and attitude of prospective couples toward premarital screening." They discovered that although about two-thirds of the prospective couples under investigation were aware of premarital screening and genetic counseling (PMSGC), almost three-quarters of them did not fully comprehend it.

The current study shows that after implementation of educational package level of knowledge about the concept, importance of premarital counseling increased in posttest assessment among nursing students. This result paralleled with Kabbash et al. ⁽⁴⁾ who claimed that most respondents provided accurate responses on the idea and significance of premarital counseling; Moreover Sedek et al. ⁽¹⁷⁾ in her study to assess how an educational program has affected the

knowledge and attitude of technical school students in Minia, Egypt, about premarital counseling. showed that before the educational program, the majority of students (82%) had weak knowledge, which fell to (11.5%) after the program.

The current study shows that before implementation of the educational package only 8.1% of the studied students have total correct knowledge regarding cousin marriage and genetic disorders and only 10.4 % of them have a positive attitude regarding cousin marriage. This finding was in line with research conducted by Shelkamy et al. ⁽¹⁸⁾ on the "Understanding and Attitude of Students Living at Assiut University Dorms Regarding Consanguinity," which revealed that 71.9% of the students had inadequate knowledge about consanguinity. Another Saudi Arabian study by Mahboub et al. ⁽¹⁹⁾ that found the majority of participants had little understanding of consanguineous marriage and a negative (low score) attitude toward it also corroborated the findings.

In their study of medical students at Tanta University in Egypt, Aldeeb et al. ⁽¹⁴⁾ found that a majority of participants had a moderate knowledge score, a quarter had a good score, and that urban females had a significantly higher knowledge score. More than half of the participants were unfazed by consanguineous marriage's risks to moms, kids, and communities. The selection of the study sample within a particular age range, the majority of whom resided in urban areas, may be the cause of this divergence from our study.

The current study shows a considerable improvement in the studied sample's overall knowledge and attitude about consanguineous marriage after intervention as compared to before intervention. So, pre-counseling, total mean of knowledge score regarding cousin

marriage was (12.1 ± 4.5) which improved after application of educational package to (20.8 ± 5.7) . And total mean of students' attitude score was (22.1 ± 4.9) in pretest assessment which increased to (32.6 ± 6.6) in posttest assessment.

The findings of Nagia et al. ⁽²⁰⁾ who examined how premarital counseling regarding consanguineous marriage affected nursing students' attitude and satisfaction at Ain Shams University in Egypt, corroborated this conclusion. According to their findings, after the intervention, almost three-fourths of the studied sample had total correct information and a favorable attitude toward consanguineous marriage. This improvement can be attributed to counseling, which plays a significant role in giving students thorough, significant, and complete information that corrects their misconceptions about premarital counseling for consanguinity.

This finding was also consistent with a study by Rocque ⁽²¹⁾ who evaluate the impact of a systematic training program on young adults' understanding of consanguineous marriage's implications on offspring. showed that, in the pre-test, 39 young adults (65%) had the majority of inadequate knowledge, 18 (30%) had the majority of moderate knowledge, and only 3 (5%) had the majority of adequate knowledge. The bulk of the young adults 30 (50%) had moderate knowledge at the time of the post-test, followed by 28 (46.67%) and 2 (3.33%) who had high knowledge.

The results of the current study show a clear correlation between the pre- and post-intervention knowledge and attitudes of the studied sample towards cousin marriage and genetic illnesses. This result may be explained by counseling

sessions that gave participants useful information and gave the majority of the sample under study the knowledge they needed to have good attitudes toward consanguinity premarital counseling. This finding was in agreement with Ojha et al. ⁽¹¹⁾, whose research indicated a favorable relationship between students' knowledge and attitudes regarding the negative effects of consanguineous marriage on their health. It was concluded that students' understanding of the negative effects of consanguineous marriage on their health had a significant influence on their attitudes toward the practice. Furthermore, the results of this study are consistent with a study conducted by Kusuma et al. ⁽²²⁾ on adolescents' attitudes toward consanguineous marriage, which found that knowledge is positively correlated with those attitudes.

Conclusion

The study's findings showed that, in comparison to pre-intervention, nursing students who attended training sessions on cousin marriage and how genetic abnormalities affect offspring had proper knowledge and a good attitude.

Recommendations

The following suggestions are made in light of the study's findings:

- Include the concept of premarital counseling for consanguineous marriage in undergraduate university curricula
- Establish a unit for premarital counseling consultants at Zagazig University, faculty of nursing.
- Repeat the research with a new group of non-medical university students and in a different setting.

Table (1) Sociodemographic characteristics of studied sample (n=221)

Sociodemographic characteristics of studied sample		n	%
Age per years	Mean ± SD Range	21±0.66 20-22	
Sex	males	73	33.0
	females	148	67.0
Residence	rural	138	62.4
	urban	83	37.6
Parent relative degree	yes	21	9.5
	No	200	90.5
If yes (n=21)	1 st degree	10	47.6
	2 nd degree	6	28.6
	3 rd degree	5	23.8

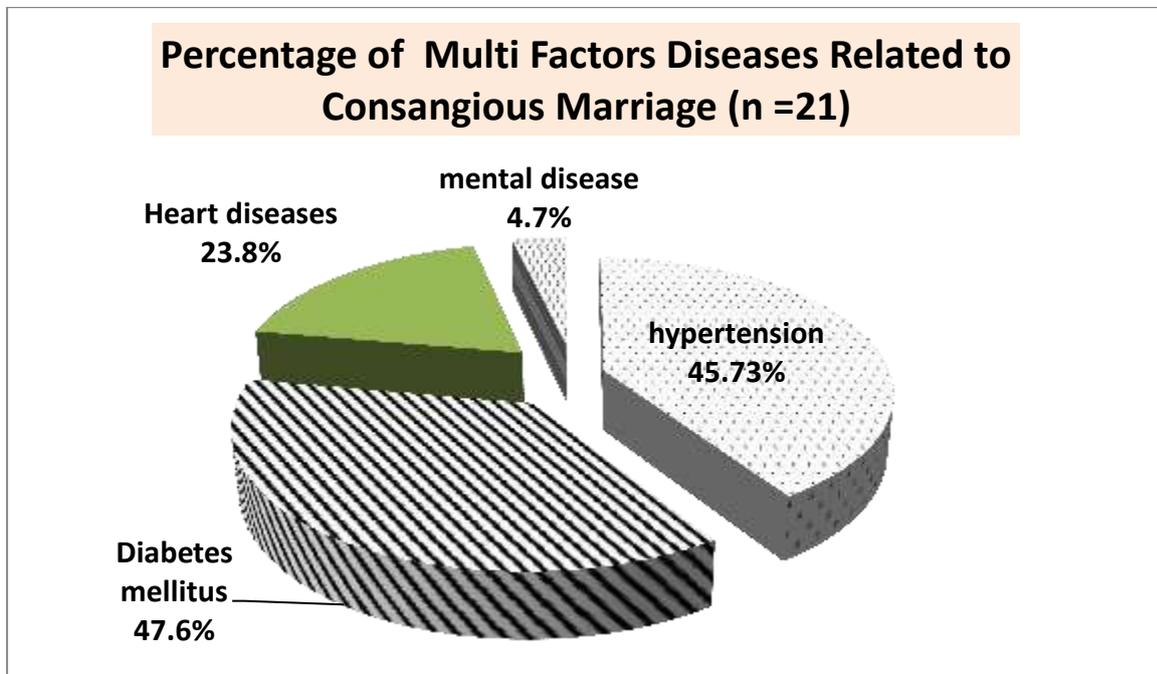


Figure (1): Percentage distribution of multi factors diseases related cousin marriage among studied sample' extended family (n=21)

Table (2): Student's Knowledge Level Regarding Cousin Marriage and Genetic Disorders (pre / post) in studied students (n=221)

Items	Correct knowledge				M _P -value	
	pre		post			
	n	%	n	%		
Concept of cousin marriage:	61	27.6	137	62.0	0.0001	
Concept of genetic disease	122	55.2	157	71.0	0.0001	
Relatives	First degree	121	54.8	168	76.0	0.0001
	Second degree	95	43.0	155	70.1	0.0001
	Third degree	91	41.2	150	67.9	0.0001
Risk factors	hypertension	98	44.3	180	81.4	0.0001
	diabetes	118	53.4	139	62.9	0.0001
	cardiac	78	35.3	149	67.4	0.0001
Genetic diseases	Cleft lip cleft palate	79	35.7	148	67.0	0.0001
	Imperforated anus	101	45.7	146	66.1	0.0001
	pyloric	79	35.7	144	65.2	0.0001
	dislocation	108	48.9	169	76.5	0.0001
	clubfoot	109	49.3	171	77.4	0.0001
	heart	107	48.4	164	74.2	0.0001
	Down syndrome	65	29.4	132	59.7	0.0001
	hypospadias	88	39.8	156	70.6	0.0001
	Undescended testicles	113	51.1	141	63.8	0.0001
	hydrocele	68	30.8	152	68.8	0.0001
	hydrocephalus	77	34.8	146	66.1	0.0001
	other	92	41.6	170	76.9	0.0001
	Premarital Counseling	Concept of premarital counseling	98	44.3	147	66.5
importance		83	37.6	165	74.7	0.0001
Premarital investigation for male and female	Blood group	56	25.3	146	66.1	0.0001
	Fertility test	61	27.6	133	60.2	0.0001
	genetic	116	52.5	161	72.9	0.0001
	HIV	77	34.8	145	65.6	0.0001
	Thalassemia	93	42.1	161	72.9	0.0001
	Mental health	85	38.5	158	71.5	0.0001
	chronic	81	36.7	157	71.0	0.0001
	Genotype	54	24.4	165	74.7	0.0001

MCnemar test of significant p<0.05:significant

Table (3): Attitude Regarding Cousin Marriage and Genetic Disorders (pre / post) among Studied Students (n=221)

Attitude regarding cousin marriage and genetic disorders		Agree		Neutral		Disagree		M ^a P
		n.	%	n.	%	n.	%	
Relative marriages haven't facilities in terms of dowry	pre	11	5.0	102	46.2	108	48.9	0.0001
	Post	77	34.8	112	50.7	32	14.5	
Consanguineous marriage is un secure in terms of continuity and success	pre	13	5.9	96	43.4	112	50.7	0.0001
	Post	65	29.4	105	47.5	51	23.1	
The family shouldn't insists on consanguineous marriage, adhering to customs and traditions	pre	22	10.0	59	26.7	140	63.3	0.0001
	Post	74	33.5	108	48.9	39	17.6	
We shouldn't insist on the marriage of relatives in order to preserve money and property	pre	22	10.0	63	28.5	136	61.5	0.0001
	Post	95	43.0	87	39.4	39	17.6	
Consanguineous marriage should be optional with advice	pre	11	5.0	52	23.5	158	71.5	0.0001
	Post	77	34.8	108	48.9	36	16.3	
There is no complete cure for genetic blood diseases	pre	10	4.5	102	46.2	109	49.3	0.0001
	Post	75	33.9	111	50.2	35	15.8	
Genetic blood diseases are dangerous as Infectious blood diseases	pre	7	3.2	88	39.8	126	57.0	0.0001
	Post	76	34.4	108	48.9	37	16.7	
Couples don't completely know the genetic diseases that occur in children as a result of their marriage	pre	8	3.6	66	29.9	147	66.5	0.0001
	Post	82	37.1	104	47.1	35	15.8	
Genetic diseases occur in some cases of consanguineous marriages	pre	19	8.6	66	29.9	136	61.5	0.0001
	Post	89	40.3	89	40.3	43	19.5	
Genetic diseases doesn't transmitted by infection	pre	18	8.1	56	25.3	147	66.5	0.0001
	Post	86	38.9	95	43.0	40	18.1	
Medical examination and advice is one of the most important means of controlling the spread of genetic diseases	pre	13	5.9	110	49.8	98	44.3	0.0001
	Post	73	33.0	114	51.6	34	15.4	
Medical examination and advice reduces the material cost to the individual and the family	pre	13	5.9	77	34.8	131	59.3	0.0001
	Post	58	26.2	115	52.0	48	21.7	
The medical examination and counseling before marriage prevents me from having children with genetic diseases	pre	13	5.9	66	29.9	142	64.3	0.0001
	Post	61	27.6	111	50.2	49	22.2	
Medical examination and counseling before marriage reduces psychological effects on the individual and the family, such as anxiety and isolation	pre	16	7.2	83	37.6	122	55.2	0.0001
	Post	100	45.2	80	36.2	41	18.6	
Medical examination and counseling before marriage doesn't prevents a young man and a girl from marrying	pre	17	7.7	52	23.5	152	68.8	0.0001
	Post	81	36.7	106	48.0	34	15.4	

Mcnemar test, p<0.05: significant

Table (4): Student's knowledge level, attitude regarding cousin marriage and genetic disorders (pre / post) in studied students

Student's knowledge level, attitude regarding cousin marriage	pre	post	^M P
Total Knowledge score	12.1±4.5 5-28	20.8± 5.7 7-30	
Knowledge level			0.0001
Correct	18(8.1%)	151(68.3%)	
Incorrect	203(91.9%)	70(31.7%)	
Total Attitude score	22.1±4.9 16-40	32.6± 6.6 17-40	0.0001
Attitude			
Positive	23(10.4%)	179(81%)	
Negative	198(89.6%)	42 (19.0%)	

Mcnemar test, p<0.05: significant

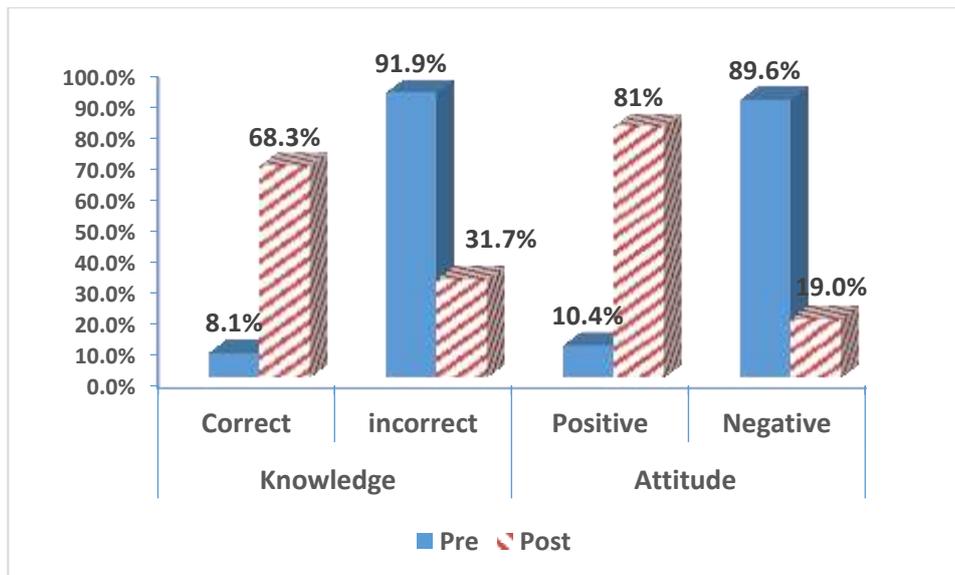


Figure (2): knowledge level &attitude regarding cousin marriage and genetic disorders (pre / post) in studied students

Table (5): Correlation between knowledge and attitude cousin marriage and genetic disorders (pre / post) in studied students

		Knowledge score	
		r	p
pre	Attitude score	0.703**	0.0001
Post	Attitude score	0.722**	0.0001

(r) Correlation coefficient ** p< 0.001**References:**

- Anwar S, Taslem Mouroso J, Arafat Y & Hosen MJ., Genetic and reproductive consequences of consanguineous marriage in Bangladesh. PLoS One. 2020 Nov 30;15(11):e0241610. doi: 10.1371/journal.pone.0241610. PMID: 33253173; PMCID: PMC7703949.
- Bollina J , Nayaja K , Sarvagnya K , Shree K D & Samuel C N , et al ,Study on Knowledge, Attitude and Practice of Consanguineous marriages among medical and non- medical students , praxis undergraduate medical research journal, volume 3 issue 2.
- El-Gilany, A. H., Yahia, S., & Wahba, Y., Prevalence of congenital heart diseases in children with Down syndrome in Mansoura, Egypt: a retrospective descriptive study. Annals of Saudi Medicine, (2017). 37(5), 386-392.
- Kabbash I A, Attalla A O & Abd Elmageed S Perception of Importance of Premarital Counseling among Medical Students of Tanta University, Egypt, the Egyptian Journal of Community Medicine Vol. 37No. 2, April, 2019, pp66-75
- Al-Shafai, M., Al-Romaihi, A., Al-Hajri, N., Islam, N., & Adawi, K., Knowledge And Perception of and Attitude toward a Premarital Screening Program in Qatar: A Cross- Sectional Study. International Journal of Environmental Research and Public Health, (2022).19(7), 4418.
- Alhosain A., Premarital screening programs in the Middle East, from a human rights perspective. Diversity & Equality in Health and Care, (2018) 15(2), 41–45. 10.21767/2049-5471.1000154.
- Ali, M., Elshabory, N., Hassan, H. E., Zahra, N., & Alrefai, H, Perception about premarital screening and genetic counseling among males and females nursing students. IOSR Journal of Nursing and Health Science, (2018). 7(1), 51-57.
- Medical Oxford Dictionary, Perception concepts, (2018): https://www.oxfordlearnersdictionaries.com/definition/english/medical_
- Nagia S. A. Nagia, Sahar M. Soliman, Kamilia R. Abo Shabana & Nevin S. Metwaly ,Effect of Premarital Counseling Regarding Consanguineous Marriage on Nursing Student's Perception and Satisfaction, Evidence-Based Nursing Research Vol. 3 No. 3 July 2021, doi: 10.47104/ebnrojs3.v3i3.207.
- Hamed E M, Eshra D M , Kassem E K A & Khalil A K , Knowledge, Perception, and Attitude of Future Couples towards Premarital Screening, ,MNJ, Menoufia Nursing Journal Faculty of Nursing, Menoufia University, 2022 Print ISSN: 2735-3974, Online ISSN: 2735-3982.
- Ojha A J K, Study To Assess The Knowledge And Attitude Regarding Health Consequences Of Consanguineous Marriage Among Students Of A Selected College Of Berhampur, Odisha To Develop An Information Guide Sheet On Consanguineous Marriage, European Journal of Molecular & Clinical Medicine, 2020 ,ISSN 2515-8260 Volume 7, Issue 11, 1149.

12. Mahmoud M A , El-Ganzory G S& Abd El Fattah W O., Effect of Premarital Counseling on Faculty of Nursing Students at Helwan University, IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320–1959.p-ISSN: 2320–1940 Volume 10, Issue 4 Ser. VII (Jul. – Aug. 2021), PP 31-38 www.iosrjournals.org
13. Al-Qahtani FS, Alfahad MI, Alshahrani AM, Almalih HS, Al-Malki AS& Alshehri TK, Perception of Premarital Counseling among King Khalid University Students. J Family Med Prim Care 2019;8: 2607-11. Available at: <http://www.jfmprc.com>
14. Aldeeb A F, Aboraya H H, Zidan O O & Hala Mostafa Elsabagh H M, Prevalence and perception of consanguineous marriage among medical students, Egyptian Family Medicine Journal (EFMJ) 2022 Vol .6 (1), May. <http://efmj.journals.ekb.eg>
15. Yahyaa B T, Al-samarrai M A M & Jadoo SAA. Prevalence and Perception of Women about Consanguineous Marriage in Al-Ramadi City. IJPHR& D. Apr 2019; 10 (4): 567-573.
16. .Al-Shroby, W.A.; Sulimani, S.M.; Alhurishi, S.A.; Dayel, M.E.B.; Alsanie, N.A.& Alhraiwil, N.J. Awareness of premarital screening and genetic counseling among Saudis and its association with sociodemographic factors: A national study. J. Multidiscip. Healthcare 2021, 14, 389.
17. Sedek M, H., Emam, E. & Abd Elrahim, A. Effect of Educational Program about Premarital Counseling for Technical School Students. *Minia Scientific Nursing Journal*, 2022; 012(1): 87-98. doi: 10.21608/msnj.2022.159578.1034
18. Shelkamy FR, ALaa EL-Din SM, Kotb SA & Sharkawy SA. Knowledge and attitude of students living in assiut university dorms about consanguinity. Med.1 Cairo Univ. June 2013; 81(2): 39-46.
19. Mahboub SM, Alsaqabi AA, Allwimi NA, Aleissa DN& Al-Mubarak BA. Knowledge and attitude towards consanguineous marriage among educated adults in Riyadh. Int J C Med Public Health. 2019 Jan; 6(1): 30-37.
20. Nagia, N., Soliman, S., Abo Shabana, K., & Metwaly, N. Effect of Premarital Counseling Regarding Consanguineous Marriage on Nursing Student's Perception and Satisfaction. Evidence-Based Nursing Research, (2021). 3(3), 7. <https://doi.org/10.47104/ebnrojs3.v3i3.207>.
21. Rocque R., A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Effects of Consanguineous Marriage on offspring Among Young Adults in Selected College. Int. J. Nur. Edu. and Research 4(1): Jan.-Mar., 2016; Page 89-91 doi: 10.5958/2454-2660.2016.00020.X
22. kusuma MS, A study to assess the knowledge and attitude towards consanguineous marriages among adolescents in selected colleges of Tirupati. Int J Nurs Appl Res. 2017; 4(8):524–5.