Nurse Education Today 107 (2021) 105114

Contents lists available at ScienceDirect

Nurse Education Today

journal homepage: www.elsevier.com/locate/nedt

Research article

Educational program on sexuality and contraceptive methods in nursing degree students

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ARTICLE INFO

Keywords:
Contraception
Unwanted pregnancy
Primary prevention
Knowledge
Young adult

ABSTRACT

Background: Previous educational programs about sexuality and contraceptive methods are delivered through vertical teaching methodology and use an increase in knowledge level as an indicator of effectiveness; however, attitudes towards contraceptive use are not addressed.
Objectives: This study aimed to evaluate the effect of a peer-educational intervention to improve knowledge level and attitudes regarding contraceptive methods in university students.
Design: A pre-post quasi-experimental study.
Settings: Young university students from a Spanish university.
Participants: 131 students in their second year of the Nursing degree program.
Methods: An intervention consisting of two 3-hour sessions was conducted. The first session introduced the main aspects of contraceptive methods and was conducted by the teacher. The second session began with student presentations about contraceptive methods, followed by clinical simulations of a family planning service that the students had to implement and solve.
Results: There was a 71.43% improvement in the knowledge level scale score and a 2.17% improvement in the attitudes towards the use of contraceptive methods; both were statistically significant ($p < 0.001$). For 11 of the 15 items in the knowledge scale, a significantly higher proportion of success was found after the intervention.
Conclusion: Peer-educational intervention was effective in improving knowledge level and attitudes about contraceptive methods.

1. Introduction

Adolescence and youth are considered a risky period because of the increased possibility of becoming involved in activities that may have negative consequences for health. In addition, a feeling of invulnerability, the need for sexual experimentation due to the development of sexual characteristics, and the search for one's own identity make these stages especially susceptible to an unwanted pregnancy (Toro, 2010).

Sexuality becomes more evident when hormonal changes typical of puberty are initiated, and the feelings and emotions that accompany sexuality are diverse. Furthermore, sexuality is marked by the myths acquired during infancy, accompanied by the disinformation and shame felt when trying to obtain information on the questions that allow them to have healthy sex lives. In line with the International Technical Guidance on Sexuality Education issued by UNESCO (2018), young people need to build a solid knowledge base about sexuality and contraceptive methods to answer all the questions related to the experience of their sexuality.

The strategy of increasing the level of knowledge about sexuality and contraceptive methods has been used widely in adolescent education programs aimed at preventing unwanted pregnancy. A review by Sanz-Martos et al. (2019a) found 13 studies that used the knowledge level about sexuality and contraception as an indicator of the effectiveness of educational interventions. Knowledge level was the only variable for

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https://doi.org/10.1016/j.nedt.2021.105114
Received 5 April 2021; Received in revised form 13 July 2021; Accepted 18 August 2021
Available online 24 August 2021

which the authors could confirm effectiveness.

In the young population, educational interventions on sexuality and contraceptive methods are scarce, and descriptive studies evaluating the level of knowledge have found it to be low (Hickey, 2009; Aziken et al., 2003; Darteh and Doku, 2016; Tajure and Pharm, 2010).

For an educational program to be effective, other variables in addition to knowledge should be addressed, including learning procedures and attitudes. Traditionally, educational programs have been delivered through vertical teaching methodology, where the teacher explains the content to the students (masterclass), using the increase in knowledge level as an indicator of effectiveness; however, attitudes towards their use are not addressed, and they are a key element in the success of these programs. Attitude plays an important motivational role, and not only does it explain and predict behaviour, but it also helps to modify it (Whittaker, 2006). Moreover, attitudes have a cognitive element that is based on the person's knowledge of the element towards which an attitude is formed (Rodríguez, 2004). This is important when considering the use of a contraceptive method in future sexual relations, as positive attitudes are necessary (Muchcco, 2012).

A study conducted on young people reported that the main reasons that led participants not to use a condom during their most recent intercourse were the belief in the exclusiveness of the relationship and the lack of condom availability at the time of sexual intercourse. In addition, the main reasons that led to negative attitudes towards hormonal contraception were based on the negative experiences of friends, most of which were caused by incorrect contraception use (Peterson et al., 2013). These experiences highlight the importance of having a reliable source of information for acquiring a good level of knowledge and developing attitudes based on accurate knowledge (Ayayi et al., 2016; Browns et al., 2007).

Friends are one of the sources of information used by adolescents for information on sexuality and contraceptive methods because they have similar interests and concerns, making the messages better received and resulting in changes in attitudes and behaviours. Peer education is an interactive method of teaching or learning in which participants take an active role in their learning process, and this methodology is ideal for addressing topics such as sexuality and contraceptive methods. Peer education also provides advantages when dealing with sensitive issues such as initiating sexual relationships and all issues related to their sexuality, which are considered taboo and cause embarrassment when asking (Wye et al., 2006; Abdi and Simbar, 2013). Furthermore, the change of position of the students in the learning process towards a leading role will assist in the modification of attitudes. The theory of the development of attitudes based on learning explains that the feelings experienced by the students during the learning process will influence the development or modification of attitudes towards the topic. These positive attitudes will then influence future decisions in the use of contraceptive methods (Rodríguez, 2004).

Another aspect to highlight when developing an educational program is incorporating a simulated practical scenario that can accelerate the acquisition of technical skills, knowledge, and skills for the management of problems that may arise when moving from theoretical content to real health situations (LeBlanc, 2012). In biomedical science education, education based on real cases or with simulated examples but based on a healthcare reality is perceived as significantly more effective than traditional education based on vertical training or education through virtual materials (e-learning), provided that there is no support for another teaching methodology (Rohlfsen et al., 2020). Along these lines, Riancho et al. (2012), conducted a clinical simulation training program with undergraduate medical students, finding that participants rated the activity with a score of 4.8 and 4.9 out of 5 on its usefulness, and 4.9 and 4.9 on a 5-point scale on the interest of the activity for two consecutive years.

The development of safe sexual practices requires the acquisition of the necessary knowledge and positive attitudes towards sexuality and contraceptive methods.

This research aimed to evaluate the effect of a peer-educational intervention to improve the knowledge level about sexuality and contraceptive methods and attitudes towards their use among university students.

2. Methods

A pre-post quasi-experimental study was conducted to assess nursing students' knowledge and attitudes about sexuality and contraception. This article follows the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) and TIDieR (Template for Intervention Description and Replication) guidelines (Elm et al., 2008; Hoffmann et al., 2014).

2.1. Sample

The target population was young students enrolled in the Nursing degree program at a Spanish university. The inclusion criteria were: age between 18 and 25 years and attendance at all educational sessions.

2.2. Educational intervention

Two weeks before the start of the educational intervention, students were asked to complete a pre-questionnaire. The educational intervention consisted of two sessions with a duration of 3 h each. Students were divided into 10 groups of no more than 15 people.

In the first session, for 20 min, students from each group used the brainstorming technique to present the main names of contraceptive methods they knew and how they would group them together. Subsequently, the teacher presented the classification of the contraceptive methods based on those that the students had identified, and the methods not stated by the students were included to classify them into five categories (natural, barrier, hormonal combined, hormonal with a progestin, and surgical). This was followed by an introduction to the main aspects of classifying contraceptive methods and which aspects should be emphasized in order to study the different types (definition of the method, correct form of use, possible adverse effects of use, effectiveness in preventing pregnancy, and effectiveness in preventing sexually transmitted infections). Finally, the students were asked to divide themselves into groups of 1–3 people, and through a simple random process, each group was assigned a category of contraceptive methods. Each group had to prepare a 15-minute presentation in digital format on their assigned contraceptive method. In the presentation, they had to teach the main characteristics that had been identified as key aspects of each group of contraceptive methods.

The second session began with the students' presentations. The content and presentation time were guided by the teacher. At the end of each presentation, the other classmates in the session had a turn to ask the presenting students questions about their topic. The participants during the question time exercised a dual role: on the one hand, they were trainers of their peers, but they also played the role of receivers of information in the presentations of their peers. When all the subgroups finished their presentations, the teacher made a global presentation of all the contents exposed during the session, and another question period was carried out. Next, a simulation of a family planning service was carried out in which the students had to respond to practical scenarios related to frequent doubts in the use of the different contraceptive methods for 1 h. Through this simulation technique, the students were expected to be able to transfer the theoretical information learned to the ability to solve real clinical situations as futures nurses. The teacher in charge supervised all simulations, and if the students made mistakes, they were corrected. At the end of the session, a new summary was made of the main aspects addressed and the key aspects related to the use of the different contraceptive methods.

At the end of the two sessions, the students had access to a document prepared by the teacher, which included all the aspects dealt with during

the intervention so that they could consult the content. Two weeks after the end of the second session, students completed the post-questionnaire (Fig. 1).

2.3. Data collection and instruments

The data were collected through a questionnaire designed for research composed of 4 sections:

- Sociodemographic data: This section was composed of 6 variables (sex, age, source of information used, and request for information on sexuality and contraceptive methods, self-perceived knowledge, and the perceived knowledge gap). All variables had several pre-coded response categories, with an added option in which students could write a free-form response.
- Variables of sexual initiation: This section was composed of 4 variables (beginning of sexual relations, age at first sexual encounter, contraceptive method used at the first sexual encounter, and the contraceptive method used at the most recent sexual encounter). All variables had several pre-coded response categories, with an added option in which students could write a free-form response.
- Sexuality and contraception knowledge instrument: This scale measured the level of knowledge about sexuality and contraceptive methods in university students. The instrument comprised 15 items assessed through statements with three choices—true, false, and don't know/no answer. Based on the analysis of the scores on this scale, categories were determined based on the minimum score ratio: level of knowledge excellent (≥90% hits), very good (89–70%), good (69–55%), insufficient (54–30%), and poor (≤29%). The reliability of the scale was evaluated using item response theory and the Rasch model, obtaining a value of 0.99 for items and 0.73 for people (Sanz-Martos et al., 2019b).
- Scale measuring attitudes towards the use of contraceptive methods: This scale was designed to measure students' attitudes towards contraceptive use. The scale consists of 10 items measured by a Likert-type scale from 1 to 5 (strongly disagree to strongly agree). The range of scores was between 10 and 50, and the categories determined from the minimum score ratio were: excellent attitudes (≥90%), good (70–89%), and insufficient attitudes (≤69%). Reliability analyses revealed a Cronbach's alpha internal consistency value of 0.71 (Oliva et al., 1993).

2.4. Analysis

A descriptive analysis of sociodemographic and sexual initiation variables was carried out, obtaining their distributions in frequencies and percentages. The scores of the two scales were expressed using measures of central tendency and dispersion. The normality of the distributions of knowledge level and attitude scores was tested by the Kolmogorov-Smirnov test for both the pre-intervention and post-intervention scores. Both scales followed a non-normal distribution.

A descriptive analysis was conducted of the items before and after the intervention, calculating the percentage of each type of response in both measures. The difference in the proportion of success before and after the intervention was assessed using the McNemar test. The differences between the pre- and post-intervention scores for both scales were calculated using the Wilcoxon test and the effect size using the Cliff Delta statistic (Álvarez, 2007). The level of significance was set at 0.05. All analyses were performed using IBM SPSS version 25 (IBM Corp., Released 2017) and Cliff's Delta calculator (Macbeth et al., 2011).

2.5. Ethical approval and consent to participate

This study was approved by the Institutional Review Board of the University of Jaén (ABR.17/9). An information sheet was given to the participants. If happy to participate students completed and signed an informed consent form prior to undertaking the session. Students were not obliged to participate and were reassured that this would not affect their progress or success in their course of study. Confidentiality of personal data was guaranteed.

3. Results

The initial sample consisted of 131 students from the second year of the Nursing degree program at a Spanish university. After the inclusion criteria were applied, the final sample included 116 participants with a

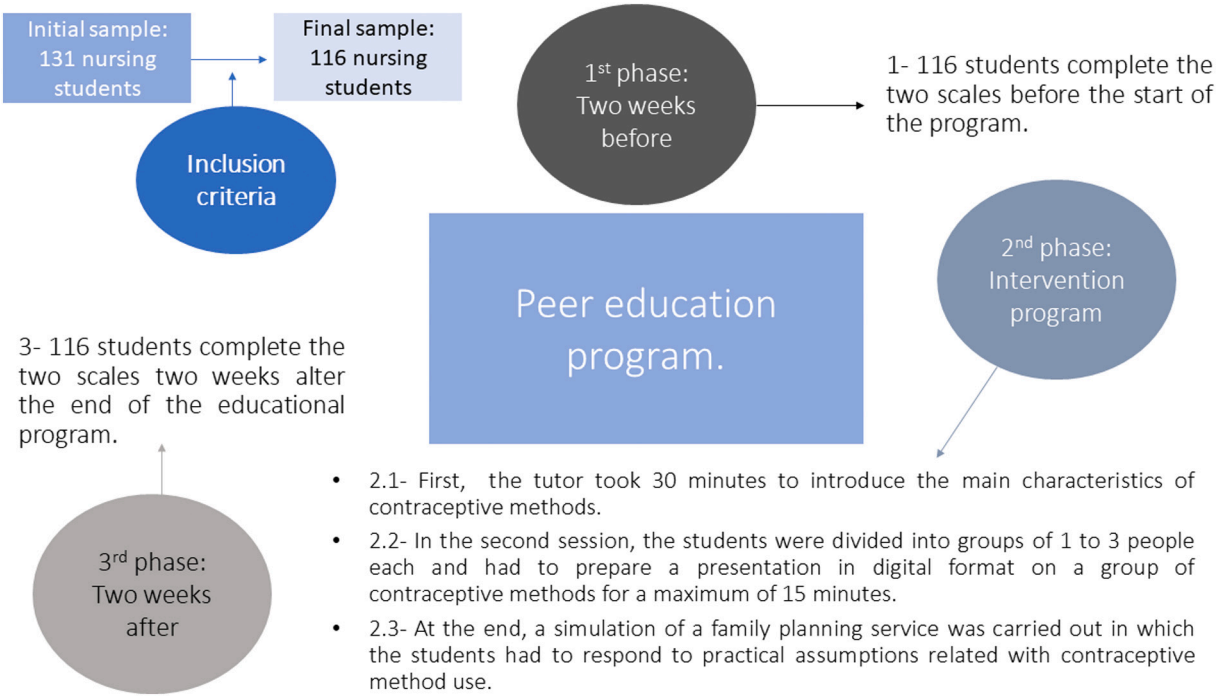

Fig. 1. Flow chart of the research process.

mean age of 19.63 years (standard deviation (SD): 1.45). Of the final sample, 81.04% of participants reported having had sexual intercourse before completing the survey, with a mean age at first sexual intercourse of 16.53 years (SD: 1.23). The characteristics of the sample are shown in Table 1.

Pre-intervention scores showed that 57.8% of the participants scored insufficient or poorly for level of knowledge. However, that percentage decreased significantly after the intervention to 0.9% ($p < 0.001$). Moreover, before the intervention, 64.7% of the participants had excellent attitudes, which increased significantly to 76.7% ($p < 0.001$) after the intervention (Table 2).

3.1. Modification of the level of knowledge and attitudes

The average score on the previous knowledge assessment was 7.30 (SD: 2.53) points and the post score 11.99 (SD: 1.71) points, a 71.43% improvement. This difference was statistically significant (Z = -8.887, $p < 0.001$; Delta: 0.8503). Regarding attitudes, before the intervention the score was 45.02 (SD: 5.22) points and after the intervention 46.28 (SD: 3.32) points, a 2.17% improvement (statistically significant Z = -3.780, $p < 0.001$; Delta: 0.1457). After the intervention, the proportion who answered "good" for the variable "Self-perceived knowledge about sexuality and contraceptive methods" improved significantly (Z = –3.781, $p < 0.01$). Regarding the main perceived "Knowledge gap," the highest proportion of respondents who answered, "do not know" before the intervention was for the option of "Contraceptive methods" (43.1%), and after the intervention, the highest proportion was for "Sexuality and forms of non-coital sexual relations" (38.8%). The variation in the "Knowledge gap" was not statistically significant ($\chi^2 = 13.848$, $p = 0.128$) (Table 3). A statistically significant weak correlation (S = 0.190, $p = 0.041$) was obtained between the level of post-intervention knowledge and attitude scores.

Table 1
Characteristics of the sample.

Variable	Categories	N (%)
Gender	Men	16 (13.79%)
	Women	100 (86.21%)
Source of information used	Internet	49 (42.24%)
	Healthcare professionals	34 (29.32%)
	Friends	26 (22.42%)
	Parents	5 (4.31%)
	Talks on sexual and reproductive health	2 (1.71%)
Source of information demanded	Internet	52 (44.83%)
	Talks on sexual and reproductive health	61 (52.59%)
	TV	2 (1.71%)
	Healthcare professionals	1 (0.87%)
Intercourse	Yes	94 (81.04%)
	No	22 (18.97%)
Use of contraception at the first intercourse	Yes	89 (76.74%)
	No	5 (4.31%)
Contraceptive used at the first intercourse	Male condom	89 (76.74%)
Reason for not using any contraceptive method at first intercourse	Improvised sexual intercourse	3 (2.57%)
	Were not planning to use it	1 (0.87%)
	Reduces pleasure	1 (0.87%)
Use of contraception at the last intercourse	Yes	79 (68.11%)
	No	15 (12.93%)
Contraceptive used at the last intercourse	Male condom	61 (52.59%)
	Contraceptive pill	15 (12.91%)
	Vaginal ring	1 (0.87%)
	Withdrawal method	1 (0.87%)
	Emergency contraceptive pill	1 (0.87%)
Reason for not using any contraceptive method at last intercourse	Improvised sexual intercourse	9 (7.76%)
	We're not planning to use it	2 (1.72%)
	Take away pleasure	4 (3.45%)

Table 2
Number of participants with excellent, very good, good, insufficient, or poor knowledge and attitudes in pre-test and post-test.

Categories	Knowledge		Attitudes	
	Before	After	Before	After
Excellent	3 (2.6%)	40 (42.2%)	75 (64.7%)	89 (76.7%)
Very good	18 (15.5%)	56 (18.3%)	–	–
Good	28 (24.1%)	10 (8.6%)	37 (31.9%)	27 (23.3%)
Insufficient	50 (43.1%)	1 (0.9%)	4 (3.4%)	–
Poor	17 (14.7%)	–	–	–

3.2. Item analysis

Before the intervention, the items with the highest percentage of success were items 1, "There is a risk of pregnancy when having unprotected sex in the 2 days before or after ovulation," and 2, "The male condom is safe if placed just before ejaculation, even if penetration has occurred previously," (97.4% and 99.1% correct responses, respectively). Item 14, "During sexual intercourse, the vaginal ring can be removed for 2 hours without risk of pregnancy," had the worst success rate. The item with the highest percentage of answers "don't know" or no answer was item 10, "The contraceptive skin patch should be inserted on the first day of the cycle." (Table 4).

After the intervention, there was an increase in the percentage of correct answers for all items, reaching 100% correct answers for items 1 and 2. The item with the lowest percentage of success after the intervention was item 5, "Hormonal contraceptive methods (for example, the contraceptive pill or the vaginal ring are recommended for

Table 3
Characteristics of the sample before and after the intervention.

Variables	Categories	Before	After	p
Self-perception of the level of knowledge[a]	Good	59	82	Z = -3.781 $p < 0.01$
	Regular	57	34	
Knowledge gap[a]	Sexuality and forms of non-coital sexual activity	32	45	$\chi^2 = 13.848$ $p = 0.128$
	Contraceptive methods	50	29	
	Places to go for information	10	18	
	Places to obtain contraceptive methods	18	17	
	I don't need more information	6	7	
Knowledge level[b]	–	7.30 ± 2.53	11.99 ± 1.71	Z = -8.887 $p < 0.001$
Attitudes level[b]	–	45.02 ± 5.22	46.28 ± 3.32	Z = -3.780 $p < 0.001$

[a] Data expressed as frequency.
[b] Data expressed as mean.

Table 4
Percentage of each response option to the Sexuality and Contraceptive Knowledge Instrument.

Knowledge scale								
Items	Before			After			Change in success rate	p
	Successes[a]	Mistakes[a]	"Don't know, no response"[a]	Successes[a]	Mistakes[a]	"Don't know, no response"[a]		
1	97.4	2.6	0	100	0	0	2.6	–
2	99.1	0.9	0	100	0	0	0.9	–
3	87.1	6.9	6	82.7	14.7	2.6	-5.40	0.424
4	55.2	16.4	28.4	56.9	37.1	6	3.08	0.888
5	17.2	48.3	34.5	39.7	50.8	9.5	130.81	<0.001
6	41.4	23.3	35.3	89.7	8.6	1.7	116.67	<0.001
7	62.9	3.5	33.6	89.6	0.9	9.5	42.45	<0.001
8	31.9	6	62.1	86.2	1.7	12.1	170.22	<0.001
9	62.9	13.8	23.3	98.2	0.9	0.9	56.12	<0.001
10	18.1	1.7	80.2	69	13.8	17.2	281.22	<0.001
11	28.4	6.9	64.7	81.9	8.6	9.5	188.38	<0.001
12	45.7	0.9	53.4	92.2	0.9	6.9	101.75	<0.001
13	42.2	34.5	23.3	83.6	6.1	10.3	98.1	<0.001
14	9.4	46.6	44	58.6	25	16.4	523.40	<0.001
15	31	10.4	58.6	69.9	10.3	19.8	125.48	<0.001

Attitudes scale				
Items	Before[b]	After[b]	Changes in mean	p
1	4.03	4.34	0.31	0.002[a]
2	3.84	3.98	0.14	0.182
3	4.91	4.97	0.06	0.107
4	4.34	4.41	0.07	0.472
5	4.60	4.66	0.06	0.325
6	4.40	4.66	0.26	0.001[a]
7	4.84	4.91	0.07	0.216
8	4.32	4.47	0.15	0.078
9	4.91	4.94	0.03	0.392
10	4.84	4.96	0.12	0.007[a]

[a] Data expressed as percentages.
[b] Data expressed as mean.

adolescents)," while item 15, "The vaginal ring should be left on for 21 days, leaving a week of rest afterwards," obtained the highest percentage of responses "don't know" or no answer (Table 4).

For items 1 and 2, it was not possible to calculate the difference in proportions because the same response categories did not exist before and after the intervention. There were no statistically significant differences in the proportion of successes before and after the intervention for items 3 and 4. The remaining 11 items had a significantly higher proportion of success after the intervention (Table 4). Table 4 shows the change in the percentage of success before and after the intervention.

The score improved for all items of the attitude scale. However, it was only significant for items 1, "I would not make love without using some contraceptive method," 6 "I would not mind carrying condoms, even if they thought badly of me," and 10 "Contraceptive methods are so unsafe that they are not worth using;" items that referred to the willingness to use some contraceptive method in future sexual relations (Table 4).

4. Discussion

The objective of this research was to evaluate the effect of an educational intervention to improve knowledge level about sexuality and contraceptive methods and improved the attitudes of young nursing students regarding this topic. A difference of 5 points was obtained between the median scores before and after the intervention for the level of knowledge (maximum possible score 15 points). Items 1, 2, and 3, which refer to knowledge about sexuality and the male condom, obtained a high success rate in the measurement before the intervention, and, as a result, did not produce statistically significant changes after the intervention. The items referring to the contraceptive pill (4, 6, 8, and 9), contraceptive patch (10, 11, and 12), and vaginal ring (13, 14, and 15) were the items with the highest percentage of ignorance or error prior to the intervention; results that are similar to other studies carried out in university students, (Aziken et al., 2003; Darteh and Doku, 2016; Hickey, 2009; Tajure and Pharm, 2010) where hormonal contraceptive methods were identified as the main gap in knowledge about sexuality and contraceptive methods. After the intervention, a significant increase was observed in knowledge for 11 of the 15 items, with a corresponding significant reduction in the proportion of erroneous and "don't know/no answer" responses.

An increase in the attitude score occurred after the intervention, and these attitudes mainly favoured the use of contraceptives. When the relationship between knowledge level and attitude score was analysed, a significant, although weak, positive correlation was found. The low strength of this association may indicate that other factors besides knowledge about contraceptive methods influence the development of attitudes towards their use. One of the main reasons for the development of negative attitudes towards the use of contraceptive methods is the influence of negative experiences with their use within their peer group; however, more research is needed to evaluate this relationship and allow us to form an explanatory model for the development of attitudes in this context (Ayayi et al., 2016; Browns et al., 2007).

The average age of initiation of sexual relations was 16.53 years, similar to that obtained by the Spanish Youth Report of 2016 and the report by the Spanish Society for Contraception of 2019. The age of onset of sexual relations has decreased compared with previous research (it was around 17 years) (Serrano et al., 2005; Luengo-Arjona et al., 2007).

The source from which information on sexuality and contraceptive methods is obtained is important for establishing initial attitudes about different contraceptive methods. In the present study, the main source of information used was internet, followed by health professionals, and friends. These data point to a change in the sources of information as already documented by Rahman et al. (2011), who also found that the

internet presented the main source of information, likely because it is a tool that is easy and quick to access. As a result, important sources such as parents or friends lose importance (Spanish Society for Contraception, 2019; Serrano et al., 2005). The reason for this change in information sources may be the sensation of shame experienced by young people when talking to their parents about sexuality, as reported Smith et al. (2015). Thus, the main sources of information, internet and talks on sexual and reproductive health, are impersonal sources through which information can be obtained without the embarrassment associated with asking directly.

The intervention carried out, in which the participants carry out the educational training starting from some initial basic notions, has been previously studied in adolescents (Tolli, 2012). Peer education offers theoretical advantages over traditional education: closeness between the information provider and the recipients and incorporation of the participants in the learning process. Previous research has evaluated the way in which learning takes place, reporting that when participants are involved in also imparting educational content, education is much more effective than in the traditional system where a teacher imparts this content (Glasser, 1998; Dale, 1969). However, this form of learning was not associated with statistically significant differences in the rate of pregnancy at age 20 in the studies selected by Tolli (2012) for her systematic review. In this systematic review, six studies were selected to assess the effect of the intervention in increasing the level of knowledge about sexuality and contraceptive methods. All of the studies found favourable results for the intervention group, but only one found statistically significant differences between both groups. Three studies were selected to evaluate the effect of the intervention on attitudes towards the use of contraceptive methods; however, only one obtained statistically significant differences in favour of the intervention group.

Another aspect to emphasize in our educational intervention is illustrated by the pyramid of variables involved in the learning process outlined by Dale (1969). The inclusion of practical simulations improves the learning process and is the second most important step in knowledge acquisition. Another key element is the person's own experience. Hence, if the person has had a bad experience conditioned due to the incorrect use of contraceptive methods, it is important to modify this through an interactive methodology. Research by Rahmani et al. (2016) about the effectiveness of an educational intervention using Scenario-based learning found that participants showed significantly higher levels of performance and knowledge relative to their pre-intervention and control group value. Taking an active role in the learning process is also essential to acquire the skills to improve knowledge level and develop positive attitudes towards the object of study. The satisfaction of the students who were trained through a Scenario-based learning intervention during their Nursing degree was significantly higher in those who took a leading role during the training (Olaussen et al., 2020).

Adolescents stated that the training they receive on sexuality and contraceptive methods is based on the importance of using some form of contraceptive method; however, this training does not include the correct form of use and the possible doubts that may arise related to its use. Moreover, other aspects not addressed in contraceptive education include sexuality, love, affectivity, and relationships (Munakampe et al., 2018).

One of the limitations of this study is the use of a self-administered questionnaire. Participants may have shared information when completing them. As they were also previously informed that they would be asked on two occasions (before and after the intervention), they may have sought answers to the items, and the results on the effectiveness of the intervention may be overestimated. Therefore, we must be cautious in interpreting the results. Another limitation is the short study time period without following up in the long term. This limits our ability to assess whether the level of knowledge remains high over time and the development of attitudes leads to a higher rate of contraceptive use in future sexual relations.

5. Conclusion

A peer-educational intervention among young university nursing students, in which the participants played a major role in their own training through an interactive process, succeeded in improving the knowledge level on sexuality and contraceptive use and improving attitudes towards the use of contraceptive methods. Using practical simulations to bring the theory of contraceptive use closer to real situations faced by participants was effective and a key element in sexuality and contraceptive method education. Incorporating these two techniques—peer education and practical simulations—into education on sexuality and contraceptive methods not only increased participants' knowledge level but also changed attitudes about contraceptive methods so that in future sexual relations they will be more likely to use them. Moreover, as future nurses, positive attitudes towards the different contraceptive methods will lead to them recommending their use. We recommend using this peer-educational intervention with practical simulations in teaching about sexuality and contraceptive methods in future research.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

This study was approved by the Institutional Review Board of the University of Jaén (ABR. 17/9). Participants were asked to provide written consent and all of their questions were answered. Confidentiality of personal data was guaranteed.

CRediT authorship contribution statement

Conception and design of study: S. Sanz-Martos, IM. López-Medina, C. Álvarez-Nieto;
Acquisition of data: S. Sanz-Martos, IM. López-Medina, C. Álvarez-Nieto;
Analysis and/or interpretation of data: S. Sanz-Martos, IM. López-Medina, C. Álvarez-Nieto;
Drafting the manuscript: S. Sanz-Martos, IM. López-Medina, C. Álvarez-García, C. Álvarez-Nieto;
Revising the manuscript critically for important intellectual content: S. Sanz-Martos, IM. López-Medina, C. Álvarez-García, C. Álvarez-Nieto,
Approval of the version of the manuscript to be published: S. Sanz-Martos, IM. López-Medina, C. Álvarez-García, C. Álvarez-Nieto.

Declaration of competing interest

None.

Acknowledgments

We would like to thank all the nursing students who voluntarily participated in this study.

References

Abdi, F., Simbar, M., 2013. The peer education approach in adolescents-narrative review article. Iran. J. Public Health 42 (11), 1200–1206.
Álvarez, R., 2007. Estadística Aplicada a Las Ciencias de la Salud. Ediciones Díaz de Santos, España.
Ayayi, A.I., Nwokocha, E.E., Akpan, W., Adeniyi, O.V., 2016. Use of non-emergency contraceptive pills and concoctions as emergency contraception among nigerian university students: results of a qualitative study. BMC Public Health 16.

Aziken, M.E., Okontam, P.I., Ande, A.B.A., 2003. Knowledge and perceptions of emergency contraception of emergency among female nigerian udergraduates. Int. Fam. Plan. Perspect. 29 (2), 84–87.
Browns, K.E., Arden, M.A., Hurst, K.M., 2007. A quantitative analysis of accounts of hormonal contraceptive use: experiences and beliefs of British adolescent. Eur J Contracept Reprod Health Care 12 (3), 269–278.
Dale, E., 1969. Audio-visual Teaching in Learning, 3rd ed. Holt, Rinehart and Winston, New York.
Darteh, E.K., Doku, D., 2016. Knowledge and usage of emergency contraceptives among university students in Ghana. J. Community Health 41, 15–21.
Elm, E.V., Altman, D.G., Egger, M., Pocock, S.J., Gotzsche, P.C., Vandenbroucke, J.P., et al., 2008. Declaración de la iniciativa STROBE (Strengthening the reporting of observational studies in epidemiology): directrices Para la comunicación de estudios observacionales. Gac. Sanit. 22 (2), 144–150.
Glasser, W., 1998. Choice Theory: A New Psychology of Personal Freedom. HarperCollins, New York.
Hickey, M., 2009. Female college student`s knowledge, perceptions and use of emergency contraception. J. Obstet. Gynecol. Neonatal. Nurs. 38, 399–405.
Hoffmann, T., Glasziou, P., Boutron, I., Milne, R., Perera, R., Moher, D., et al., 2014. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. BMJ 348.
IBM Corp, 2017. IBM SPSS Statistics for Windows. Version 25.0. Released. IBM Corp. https://www.ibm.com/products/spss-statistics.
LeBlanc, V.R., 2012. Review article. simulation in anesthesia: state of the science and looking forward. Can. J. Anaesth. 59 (2), 193–202.
Luengo-Arjona, P., Orts-Cortés, M.I., Caparrós-González, R.A., Arroyo-Rubio, O.I., 2007. Comportamiento sexual, prácticas de riesgo y anticoncepción en jóvenes universitarios de la universidad de Alicante. Enferm. Clin. 17 (2), 85–89.
Macbeth, G., Razumiejczyk, E., Ledesma, R.D., 2011. Cliff`s Delta calculator: a non-parametric effect size program for two groups of observations. Univ. Psychol. 10 (2), 545–555.
Munakampe, M.N., Zulu, J.M., Michelo, C., 2018. Contraception and abortion knowledge, attitudes and practices among adolescents from low and middle-income countries: a systematic review. BMC Health Serv. Res. 18 (1).
Muchcco, L.V., 2012. Conocimientos, actitudes y comunicación familiar frente al inicio temprano de las relaciones sexuales en estudiantes adolescentes de dos instituciones educativas nacionales (tesis profesional de Licenciatura en Obstetricia). Retrived from:. Universidad Nacional Mayor de San Marcos, Lima-Perú http://cybertesis.unmsm.edu.pe/handle/cybertesis/2990.
Olaussen, C., Heggdal, K., Tvedt, C.R., 2020. Elements in scenario-based simulation associated with nursing student`s self-confidence and satisfaction: a cross-sectional study. Nurs. Open 7, 170–179.
Oliva, A., Serra, L., Vallejo, R., 1993. Sexualidad y contracepción en jóvenes andaluces. Estudio cuantitativo. Consejería de Salud, Junta de Andalucía, Servicio Andaluz de Salud, Sevilla.
Peterson, J., Johnson, M., Hutchins, M., Florence, C., 2013. Reported condom use among students enrolled in a person health and wellness course. Health Educ. Res. 45 (2), 13–19.
Rahman, A., Rahman, R., Ibrahim, M., Sallek, H., Ismail, S., Ali, S.H., et al., 2011. Knowledge of sexual and reproductive health among adolescents attending school in Kelantan, Malaysia. Southeast Asian J. Trop. Med. Public Health 42 (3), 717–723.
Rahmani, A., Mohammadi, A., Moradi, Y., 2016. Effectiveness of scenario-based education on the performance of the nurses in the critical cardiac care unit for patients with acute coronary syndrome. Int. J. Med. Health Res. 5 (8), 218–224.
Riancho, J., Maestre, J.M., del Moral, I., Riancho, J.A., 2012. Simulación clínica de alto realismo: una experiencia en el pregrado. Educ. Med. 15 (2), 109–115.
Rodríguez, M.L., 2004. Teoría del aprendizaje significativo. Recuperado de: http://cmc.ihmc.us/papers/cmc2004-290.pdf.
Rohlfsen, C.J., Sayles, H., Moore, G.F., Mukuls, T.R., O`Dell, J.R., McBrien, S., 2020. Innovation in early medical education, no bells or whistles required. BMC Med. Educ. 20, 39–49.
Sanz-Martos, S., López-Medina, I.M., Álvarez-García, C., Álvarez-Nieto, C., 2019a. Efectividad de las intervenciones educativas Para la prevención del embarazo en la adolescencia. Aten. Primaria 51 (7), 424–434.
Sanz-Martos, S., López-Medina, I.M., Álvarez-García, C., Álvarez-Nieto, C., 2019b. Sexuality and contraceptive knowledge in university students: instrument development and psychometric analysis using item response theory. Reprod. Health 16.
Serrano, I., Dueñas, J.L., Bermejo, R., Coll, C., Doval, J.L., Lete, I., et al., 2005. Actividad sexual e información y uso de métodos anticonceptivos en la juventud española: resultados de una encuesta nacional. Prog. Obstet. Ginecol. 48 (6), 283–288.
Smith, C., Gold, J., Ngo, T., Sumpter, C., Free, C., 2015. Mobile phone-based interventions for improving contraception use. Cochrane Database Syst. Rev. 6 https://doi.org/10.1002/14651858.CD011159.pub2.
Spanish Society for Contraception, 2019. Study on Sexuality and Contraception: Young People in Spain.
Tajure, N., Pharm, B., 2010. Knowledge, attitude and practice of emergency contraception among graduating female students of Jimma university, Southwest Ethiopia. Ethiop. J. Health Sci. 20 (2), 91–97.
Tolli, M.V., 2012. Effectiveness of peer education intervention for HIV prevention, adolescent pregnancy prevention and sexual health promotion for young people: a systematic review of european studies. Health Educ. Res. 27 (5), 904–913.
Toro, J., 2010. El adolescente en su mundo: Riesgos, problemas y trastornos, edición Pirámide. Grupo Anaya, Madrid.
UNESCO, 2018. International Technical Guidance on Sexuality Education: An Evidence-informed Approach. Retrieved from:. UNESCO, Paris https://www.unwomen.org/en/digital-library/publications/2018/1/international-technical-guidance-on-sexuality-education.
Whittaker, J., 2006. In: La psicología social en el mundo de hoy. Trillas S.A, Mexico, p. 237.
Wye, S.Q., Madden, A., Poeder, F., McGuckin, S., Shying, K., 2006. A Framework for Peer Education by Drug-user Organizations. Australia.