Effect of implementing audio-educational measures on the severity of primary dysmenorrhea among blind female students

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Abstract

Background: Young women, especially those with disabilities suffering from primary dysmenorrhea (PD), should be a cause for concern, as it negatively affects both their physical and mental health, as well as their future productivity. This study aimed to evaluate the effect of implementing audio-educational measures on the severity of PD among blind female students.

Methods: This quasi-experimental study was conducted at 2 schools for blind females in Egypt in 2022. The sample consisted of 40 blind female students who were selected randomly. The WaLIDD (working ability, location, intensity, days of pain, dysmenorrhea) scale was used to assess the degree of dysmenorrhea, while the 12-Item Short Form Health Survey (SF-12) was used to evaluate their physical and mental well-being. The intervention program involved audio education sessions designed to improve their health, education, and skills, as well as reduce the severity of dysmenorrhea. These audio education sessions took place twice a week, with each session lasting 45 minutes for a duration of 3 months. Data analysis was performed using chi-square and paired sample t tests at a significance level of $\alpha = 0.05$.

Results: The average age of the participants was 15.5 ± 1.91 years. The findings showed that the implementation of the audio-educational intervention led to a significant reduction in the severity of dysmenorrhea symptoms, significant increase in general knowledge, and significant improvements in the physical and mental health of the participants (P < 0.001). Listening training was a positive and significant predictor for the health status of blind female students (ß = 0.614; P = 0.028), while the severity of dysmenorrhea was a significant negative predictor for their health status (ß = -0.046; P = 0.05).

Conclusion: The use of audio-educational measures is an effective strategy for increasing knowledge, practice, and health status while reducing the severity of dysmenorrhea among blind female students. Therefore, it is recommended that nurses educate blind teenage girls about menstruation and standard menstrual care to reduce dysmenorrhea and enhance their overall health. Additionally, dysmenorrhea and its management strategies should be included in school curricula for females.

Highlights

What is current knowledge?

In general, blind individuals tend to possess less knowledge about human body health compared to sighted individuals. Thus, providing blind girls with knowledge and skills to manage their menstrual periods boosts their self-esteem and enhances their confidence.

What is new here?

Audio-educational measures have a positive impact on increasing knowledge, improving practice, enhancing health status, and reducing the severity of dysmenorrhea in blind female students.

Introduction

Girls with disabilities, especially those who are blind, may experience menstruation differently and more negatively compared to non-disabled women (1). This includes frequent reports of dysmenorrhea and menstrual hygiene issues, which can be more burdensome (2). Dysmenorrhea refers to lower abdominal cramping that occurs during the menstrual cycle and is one of the most common menstrual disorders. However, diseases of the menstrual cycle, especially dysmenorrhea, are not well understood, and young girls are often not educated about this issue (3).

Primary dysmenorrhea (PD), distinguished from other secondary causes of dysmenorrhea involving organic pelvic disorders, is characterized by discomfort associated with functional menstruation. A hallmark symptom of PD is regular, noticeable lower abdominal pain during menstruation. Additional symptoms may include pain in the lower abdomen and sacral area, fatigue, nausea, vomiting, mental confusion, and, in severe cases, fainting (4). Researchers have identified the main contributors to the etiology of PD as the contraction of blood vessels and smooth muscle, as well as increased synthesis of prostaglandin F2 (PGF2) and prostaglandin E2 (PGE2) in the late luteal phase (4).

Dysmenorrhea affects a significant percentage of women, ranging from 41.7% to 89.1%, making it a prevalent issue. Risk factors typically include being under 20 years old, family history of menorrhagia and dysmenorrhea, early menarche, low or high body mass index, excessive caffeine consumption, emotional stress, anxiety, and depression (5). Primary dysmenorrhea in young women is concerning because it has a negative impact on both their physical and mental health, as well as their future productivity (6).

The most effective approach to managing dysmenorrhea involves a combination of pharmaceutical and non-pharmacological therapies. Non-pharmacological methods aim to increase physical activity and functional ability, reduce the perception of weakness, and enhance the sense of control. These methods can reduce the need for analgesic medication, maximize patient capacity, and minimize treatment-related side effects. Complementary therapies used alongside medication can improve pain management and reduce discomfort. Non-pharmacological pain relief techniques include the application of hot or cold compresses, exercise, positioning, massage, and relaxation (7).

An auditory presentation that analyzes a planned set of educational measures is called an audio-educational program. The audio player is time-efficient and can be used multiple times to achieve the desired results. It is a method of gathering data through sound. There are no visible components or recordings; it is solely an audible presentation delivered on an audio medium, like a CD. The foundation of audio education is the record flow, music, and sound effects. In addition to its magnitude, the precise psychological effect of the visual force on those who are blind is also being discussed (8, 9).

Providing blind girls with the knowledge and skills to manage their periods properly can boost their confidence and self-esteem. Therefore, delivering audio-educational strategies related to menstrual care is an organized aural presentation covering menstrual hygiene, symptom management, safety procedures, as well as knowledge and practice in these items. This approach helps blind female students learn more about menstrual practices and reduces the severity of dysmenorrhea. This study aims to evaluate the effect of implementing audio-educational measures on PD among blind female students.

Methods

Study design

A pilot study was conducted to assess the applicability of the tools, research feasibility, and the required data collection time. This pilot study involved 5 individuals based on the selection criteria. The main study was conducted in 3 phases: the interviewing and assessment phase, program planning and implementation phase, and evaluation phase. The study was conducted from October 2022 to December 2022.

A 1-group pre-posttest quasi-experimental research methodology was used to achieve the study's objective. The study was conducted at El-Noor School in Sohag and Benha Governorates, Egypt, both of which are schools for blind female students under the supervision of the Ministry of Education's special education division. These schools follow a comprehensive government program. A total of 40 blind female students, 6 from Sohag and 34 from Benha, who met the following requirements, were randomly selected as samples.

Sampling

The sample size was determined based on the literature, considering a significance level of 5% and a study power of 80%: $n = [(Z\alpha/2 + Z\beta)^2 \times \{2(SD)^2\}]$ (Mean Differ)^2. According to this formula, the required sample size was 35, which was increased to 40 to account for potential dropouts.

The inclusion criterion was unmarried blind females aged 16-18 with primary dysmenorrhea for 3 prior cycles and reporting moderate to severe pain, who voluntarily agreed to participate.

The exclusion criterion was females with psychological/mental disorders and speech impairments.

Data collection tools

The researchers used 4 tools to collect data for the study.

Tool 1: A structured interview questionnaire was initially developed by the researchers, and after examining the literature, it was divided into 2 parts:

- Part I: Information on the socio-demographics of blind female students, including age, place of residence, mothers' education and occupation, and monthly family income.
- Part II: Information regarding menstrual history, including age of menarche, length, regularity, and volume of blood.

Tool 2: To assess the degree of dysmenorrhea, the researchers used the WaLIDD (working ability, location, intensity, days of pain, dysmenorrhea) scale (8). The total score categorizes dysmenorrhea as mild (0-5), moderate (6-10), or severe (10+).

Tool 3: A questionnaire for knowledge assessment was developed to test participants' understanding of the reproductive system, menstruation, personal hygiene, and reproductive health. It comprised 30 questions, and responses were scored, with correct answers receiving a score of "1" and incorrect answers receiving a score of "0." Scores were totaled and converted to percentages, with 50% or more considered adequate knowledge.

To assess the practices of blind female students regarding dysmenorrhea, the researchers developed a practice assessment sheet with 22 elements. Participants' practices were evaluated by asking questions, and a score of "1" indicated satisfactory practices with a percentage of at least 50%.

Tool 4: The 12-Item Short Form Health Survey (SF-12) (9) was used to assess the physical and mental well-being of blind female students. The tool includes 12 questions that cover physical health scales like Physical Functioning, Role Physical, or Bodily Pain, as well as mental health scales such as Mental Health, Role Emotional, and Social Functioning. A higher score on the SF-12 scales and summary measures indicates a higher level of health and well-being.

Validity and reliability of the tools

After an extensive review of the relevant literature, the researchers developed the instruments and assessed their validity. In this study, the content validity of the questionnaire was confirmed by a panel of 3 experts. Content validity assesses the extent to which the instrument measures what it is intended to measure. Changes were made based on their evaluation of the content's relevance and sentence clarity. When the internal consistency of these tools was evaluated on 10 blind female students, the WaLIDD scale demonstrated a reliability score of 0.912, and the SF-12 scale showed a reliability score of 0.893.

Interviewing and assessment phase

The researchers conducted one-on-one interviews with blind female students in the library using 4 interview techniques to explain the study's details and gather essential background information, including the degree of dysmenorrhea, knowledge, practices, and health status (pretest). The duration of the interview ranged from 30 to 45 minutes, depending on the interviewers' expertise and comfort level. This phase lasted for a month.

Program conduction phase

The proposed program was implemented in 5 groups: 1 group in Sohag with 6 blind female students and 4 groups in Benha (A, B, C, and D) with 8- or 9-blind female students in each group. The objective of audio activities for blind female students was to enhance their health, education, and skills, as well as reduce the severity of dysmenorrhea. The decision was made to deliver this audio education

in 2 sessions (45 minutes each) per week for 3 months for each experimental group, following the school administration's guidance. The researchers started recording audio-educational tests, including comprehension and implementation of menstrual hygiene precautions and symptom management. The audio program consists of a dramatized audio performance played without visual aids, accompanied by music and sound effects, to assist blind female students in comprehending all the information regarding menstruation, dysmenorrhea, and reproductive health. Audio education compensates for the absence of visual content with clear explanations for blind female students. The researchers educated blind female students about dysmenorrhea and exercise by presenting audio-educational materials through a laptop and appropriately connected speakers.

Evaluation phases

This phase focuses on evaluating the impact of audio-educational methods on PD in blind female students by comparing pre- and post-program results, including reassessing the WaLIDD scale, knowledge levels, and SF-12.

Statistical analysis

Data analysis was conducted using SPSS version 22 (SPSS Inc, Chicago, IL, USA), and comparisons between variations in dysmenorrhea severity and health status were performed using the Fisher exact, Chi-square tests (Tables 3, 4 and 6), paired sample t test (Table 5), and logistic regression analysis (Table 7) at a significance level of $\alpha = 0.05$.

Results

Table 1 presents the demographic data of all participants. The mean age of the participants was 15.5 years old. Furthermore, over half (60.0%) of the participants came from urban areas, and 87.5% of them reported insufficient monthly income. The data reveals that the most common sources of information among blind female students were their mothers (52%), followed by health care providers (17%), the internet (15%), books (8%), and friends (8%).

Table 1. Demographic characteristics of blind female students (N = 40)

Items	(N=40)	%
Age (in years)		
12-<14	12	30.0
14-<16	22	55.0
≥16	6	15.0
Mean ± SD	**15.5 ± 1.91**	
Residence		
Rural	16	40.0
Urban	24	60.0
Education of mothers		
Elementary	5	12.5
Secondary education	25	62.5
University education	10	25.0
Mothers' working conditions		
Working	15	37.5
Not working	25	62.5
Income		
Enough	5	12.5
Not enough	35	87.5

Table 2 illustrates that 62.5% of the studied blind female students experienced menarche between the ages of 12 and 14, with a mean ± SD of 14.9 ± 2.16 years and a menstrual duration of 3 to 5 days, occurring at intervals of 28 to 35 days. Additionally, more than half of them reported having regular and moderate menses.

Tables 3 and 4 demonstrate a statistically significant reduction in the severity of dysmenorrheal symptoms and an increase in total knowledge (P < 0.001 for each) after the implementation of the audio-educational intervention. Likewise, Tables 4 and 5 reveal a statistically significant improvement in total practice, physical health, and mental health status following the audio education (P < 0.001 for each).

Table 6 highlights a statistically significant relationship between the severity of dysmenorrhea among blind female students and their mothers' education and occupation (P < 0.05).

Table 7 indicates that audio education serves as a significant positive predictor for the health status of blind female students (ß = 0.614; P = 0.028). Additionally, dysmenorrhea severity is a significant negative predictor of health status (ß = -0.046; P = 0.05).

Table 2. Distribution of the studied female students according to their menstrual history (N = 40)

Items	No.	
Age at menarche (years)		
12-<14	25	62.5
14-<16	12	30.0
≥16	3	7.5
Mean ± SD 14.9 ± 2.16		
Duration of menstruation (days)		
<3	10	25.0
3-5	25	62.5
>5	5	12.5
Mean ± SD 3.6 ± 1.64		
Menstruation interval (days)		
<28	12	30.0
28-35	25	62.5
>35	3	7.5
Regularity of the menstrual cycle		
Regular	34	85.0
Not regular	6	15.0
Amount of menstrual blood		
Slight	10	30.0
Moderate	24	55.0
Severe	6	15.0
Number of used pads		
≤2 pads/day	19	47.5
3-4 pads/day	20	50.0
≥5 pads	1	2.5
Family history of dysmenorrhea		
Yes	29	72.5
No	11	27.5
Symptoms associated with menstruation #		
Lower back pain	23	57.5
Cramping	20	50.0
Stabbing	5	12.5
Dysuria	3	
Pain during defecation	3	7.5
Breast pain	15	37.5
Nausea and vomiting	12	30.0
Other	6	15.0
Methods used to relieve pain #		
Hot fluids	35	87.5
Warm compress on the abdomen	15	37.5
Rest	8	20.0
Drug	17	42.5
Timing of drug use (n=17)		
Before the onset of menstruation	12	70.6
After the onset of menstruation	5	29.4

More than one answer

Table 3. Distribution of the studied participants according to dysmenorrhea WaLIDD (N = 40)

Dysmenorrhea WaLIDD	Pre-program		Post-program		P-value
	No.	%	No.	%	
How much does menstrual pain affect your work ability?					
No effect	0	0.0	6	15.0	
Mild effect	7	17.5	18	45.0	0.001*
Sometimes	8	20.0	12	30.0	
Always	25	62.5	4	10.0	
Menstrual pain location					
No pain	0	0.0	8	20.0	
Lower back	23	57.5	20	50.0	0.08*
Inguinal region	7	17.5	10	25.0	
Lower abdomen	10	25.0	2	5.0	
Menstrual pain severity					
Does not hurt	0	0.0	10	25.0	
Hurts a little bit	8	20.0	22	55.0	0.000*
Hurts a little more (hurts even more)	30	75.0	8	20.0	
Hurts much (hurts worst)	2	5.0	0	0.0	
Days of menstrual pain					
0	0	0.0	12	30.0	
1-2	28	70.0	20	50.0	0.001*
3-4	10	25.0	8	20.0	
5	2	5.0	0	0.0	
Type of dysmenorrhea					
Mild	5	12.5	22	55.0	
Moderate	30	75.0	18	45.0	0.001*
Severe	5	12.5	0	0.0	

*Fisher Exact Test

Table 4. Comparison of the total knowledge and practice scores between the participants before and after implementing the program (N = 40)

Items	Pre-program		Post-program		χ 2
	No.	%	No.	%	
Adequate knowledge	5	12.5	33	82.5	15.6
Inadequate knowledge	35	87.5	7	17.5	0.000*
Total practice	Pre-program		Post-program		χ 2
	N0	%	N0	%	
Unsatisfactory practice	32	80.0	10	25.0	50.13
Satisfactory practice	8	20.0	30	75.0	0.001*

*Chi-square test

Table 5. Comparison of the components of the 12-item short form health survey between the participants before and after implementing the program (N = 40)

Items	Pre-program	Post-program	T	P-value
	Mean ±SD	Mean ±SD		
Physical health (PCS)	10.2 ±2.2	13.3 ±2.3	7.049	0.001*
Mental health (MCS)	16.4 ±2.1	19.7 ±2.0	6.123	0.000*
Total score	26.6 ±4.3	33.0 ±4.3	8.826	0.001*

*Paired sample *t* test

Table 6. The relationship between the severity of dysmenorrhea among the participants and their demographic data (N = 40)

Demographic data	Severity of dysmenorrhea			
	Mild 5	Moderate 30	Severe 5	P-value
Age (in years)				
12-<14	2 (40.0)	7 (23.3)	3 (60.0)	
14-<16	1 (20.0)	20 (66.7)	1 (20.0)	0.240*
≥16	2 (40.0)	3 (10.0)	1 (20.0)	
Residence				
Rural	1 (20.0)	5 (16.7)	10 (66.7)	0.100*
Urban	4 (80.0)	25 (83.3)	5 (33.3)	
Education of mothers				
Elementary	1 (20.0)	2 (6.6)	2 (40.0)	
Secondary education	1 (20.0)	23 (76.7)	1 (20.0)	0.03*
University education	3 (60.0)	5 (16.7)	2 (40.0)	
Mothers' occupation				
Working	3 (60.0)	10 (33.3)	2 (40.0)	0.05*
Not working	2 (40.0)	20 (66.7)	3 (60.0)	

*Chi-square test

Table 7. logistic regression analysis for factors that predict health status in blind female students (N = 40)

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std. error	Beta	T	
Constant	42.984	5.542	42.984	7.758	
Age at menarche	-0.044	0.628	-0.011	-0.070	0.945
Duration of menstruation	-1.991	1.031	-0.341	-1.931	0.063
Regularity of the menstrual cycle	0.414	0.630	0.096	0.657	0.514
Methods used to relieve pain	-4.453	1.464	-0.423	-3.041	0.005
Dysmenorrhea severity	-0.046	0.720	-0.010	-0.064	0.050
Audio program	0.614	0.273	0.328	2.271	0.028

Discussion

The primary aim of this study was to assess the impact of implementing audio-educational measures on PD among blind female students. It is evident that students with visual impairments require specialized education due to their vision loss, which can lead to a range of cognitive, mental, physical, behavioral, and communication challenges if appropriate adaptations and audio-educational programs are not provided (10).

The current study revealed that the mean age of menarche among the blind female students studied was 14.9 ± 2.16 years, with menstrual cycles lasting 3 to 5 days, occurring at intervals of 28 to 35 days. Moreover, more than half of them reported having regular and moderate menses. These results are consistent with the study of Wong (11), investigating the impact of audio drama and menstrual hygiene and reporting similar findings regarding the age of menarche, duration of menses, and regularity. It is noteworthy that most of the students in both studies had regular menses.

Regarding pain management methods, the present study found that a significant proportion of participants preferred using hot fluids with minimal drug usage. In contrast, this finding differs from a study conducted in the south of Spain by (12), exploring the management of PD and finding a high proportion of participants using analgesics.

In terms of sources of information, the present study revealed that the primary source of information about menstrual and hygienic care among the students was their mothers. This aligns with the findings of (13), investigating girls' self-care strategies and sources of knowledge about menstruation and reporting that family was the most common source of information. This preference for maternal guidance may stem from the comfort and trust that blind female students often have in consulting their mothers regarding menstrual care practices.

Regarding the severity of menstrual pain, the results showed a substantial reduction in pain intensity, with three-quarters of the blind female students experiencing pain during the pretest compared to only one-fifth during the post-program assessment. This indicates a noteworthy decrease in pain severity, which is consistent with a study conducted in Iran by (14), suggesting an educational program to reduce the severity of menstrual pain. Similarly, a study in Australia by (15) reported a significant reduction in overall menstrual pain and severity after implementing an intervention program.

To promote the physical and emotional well-being of blind women, nurses can play a crucial role by providing them with essential information and techniques for menstrual care (8). The current study observed a statistically significant improvement in total knowledge after the implementation of the audio program. This finding is in line with (16), who studied the effects of a dysmenorrhea support program and found a positive impact on knowledge among the participants.

Regarding the overall practice of blind female students, the present study demonstrated a statistically significant improvement after the implementation of the audio program. This result aligns with a previous study by (17), reporting highly significant differences in practice scores among blind female students regarding menstruation after the application of an audio-educational program.

Regarding the relationship between the severity of dysmenorrhea among blind females and their demographic characteristics, the present study identified statistically significant relationships between the severity of dysmenorrhea and mothers' education and occupation. These findings may be attributed to mothers being the primary source of education for their daughters, with higher levels of maternal education positively influencing how blind females manage dysmenorrhea. In contrast to (18), our study did not find a significant relationship between the severity of dysmenorrhea and age at menarche.

The current study revealed that audio education about menstrual care was the only statistically significant positive predictor for the health status of blind female students. Conversely, dysmenorrhea severity is a statistically significant negative predictor of health status. These findings are consistent with several previous studies (19, 20, 21), emphasizing the positive impact of audio programs on the overall health and lifestyle of blind students.

In light of the results of this study and previous studies, it is recommended that audio-educational measures on menstrual care be integrated into primary care services for blind female students.

Limitations of the study

This study has several limitations. First, the sample size was relatively small, warranting further research with a larger sample to validate the findings. Second, participant feedback served as the primary basis for excluding secondary dysmenorrhea. However, since no diagnostic work-up was conducted during the recruitment process to definitively rule out additional causes of pain, the possibility of inadvertently including a participant with a secondary cause cannot be completely eliminated.

Conclusion

For blind female students experiencing PD, the implementation of audio-educational measures proves to be an effective method for enhancing knowledge, practices, and health status and reducing the severity of dysmenorrhea. It is recommended that adolescent blind girls receive education from nurses regarding menstruation and standard menstrual care to alleviate PD and improve their health. Furthermore, school curricula for female students should incorporate information on dysmenorrhea symptoms and management strategies.

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Ethical statement

The study protocol received approval from the Research Ethics Committee of Gynecological and Reproductive Health Nursing, Sohag University, Egypt (Code: 49-7.3.2323).

Conflicts of interest

The authors declare no conflict of interest regarding the research, writing, and/or publication of this paper.

Author contributions

A.A.E. contributed to idea presentation, software, writing original draft, writing review, and editing; A.A.A. provided supervision, methodology, project administration, and data curation. S.G.E.I. and W.A.M. were responsible for the formal analysis, methodology, and preparation of the first draft.

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