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Article

Designing Board Games to Educate Female Sex Workers on Sexually Transmitted Infection Using The ADDIE Model

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Abstract: Infectious disorders known as sexually transmitted infections (STIs) are spread through sexual contact. Female sex workers (FSWs) are particularly vulnerable to STIs. As of right now, FSWs' STI prevention practices are still insufficient. This is brought on by ignorance of STIs and failure to use condoms during sexual activity. This study's goal is to use the ADDIE Model to create a board game that educates female sex workers about sexually transmitted infections; Methods: This research employed a research and development (R&D) approach utilizing the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. In the analysis stage, needs assessment was conducted to determine gaps in existing STI health promotion efforts. In the design stage, a board game concept was created tailored to FSW characteristics. During development, the board game was produced and subjected to feasibility testing for both media and content. The implementation stage involved a media trial with selected participants, and the evaluation stage focused on assessing the practicality and effectiveness of the game; Results: The analysis showed that FSWs had limited knowledge of STIs, and existing health promotion methods were not sufficiently interactive or engaging. The developed board game achieved a media feasibility score of 92% and a content feasibility score of 85%, indicating high practicality without the need for major revisions. During the implementation phase, 15 FSWs participated in a trial, with 93% reporting the game was practical and engaging; Conclusions: The conclusion of this study is that using board games as a health promotion medium is very feasible for FSW to increase their knowledge about STIs because they are more interactive, enjoyable, new, and the information is relevant to what FSWs need to know.

Keywords: Media Development; ADDIE; Health Promotion; Female Sex Workers

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1. Introduction

Sexually transmitted infections (STIs) have a profound effect on sexual and reproductive health worldwide. More than one million STIs are acquired every day. In 2020, an estimated 374 million new infections occurred with one of four bacterial or parasitic STIs that can be cured with available antimicrobials: Treponema pallidum (syphilis), Chlamydia trachomatis (chlamydia), Neisseria gonorrhoeae (gonorrhoea), and Trichomonas vaginalis (trichomoniasis)[1]. Additionally, viral STIs that can be long-lasting (eg, human papillomavirus [HPV]) or lifelong (eg, herpes simplex virus) affect hundreds of millions of people worldwide at any point in time[2]. The burden of STIs is greatest in low-income and middle-income countries (LMICs)[3]. In addition to genital symptoms, STIs can lead to multiple adverse sexual and reproductive health outcomes, including cervical cancer, infertility, increased vulnerability to HIV, pregnancy

complications, and congenital infections. Moreover, the psychological, social, and economic consequences of STIs can substantially affect the quality of life[4].

HIV/AIDS is one of the sexually transmitted infections. Globally, women and girls of all ages contributed 46% of new HIV infections in 2022[5]. FSWs are part of the key population group in the HIV prevention agenda, comprising all other sex workers, gay men, and other men who have sex with men, injecting drug users, transgender people, and people in prison[6]. Since the emergence of HIV, and even before it, many FSWs have lived in work and social circumstances unfavorable for the prevention of STIs. According to figures from the United Nations of HIV/AIDS, the global average prevalence in 2022 of HIV among female sex workers was 2.5% higher compared with the average prevalence of 0.7% for all adults aged 15–49 year[7].

In Indonesia, sexually transmitted infections are still a major problem and must receive special attention, one of which is sexually transmitted infections (STIs)[1]. Human Immunodeficiency Virus (HIV) infection and sexually transmitted infections (STIs) are public health problems that have spread to become social, economic, and cultural problems. In 2023, the number of people living with HIV in Indonesia based on the AIDS Epidemic Model (AEM) is estimated at 515,455 people[8].

The increase in the incidence of sexually transmitted infections is caused by sexual behavior that involves changing partners. One group at risk of transmitting and suffering from sexually transmitted infections is female sex workers. The phenomenon of becoming a female sex worker is still a problem in all countries. There are many reasons why someone chooses to become a female sex worker, such as economic problems, single-parent marital status, and being responsible for supporting their family. Approximately 75% of FSWs are women under the age of 30 [3].

A preliminary study conducted among female sex workers (FSWs) in one of the localizations in Jember Regency revealed that their ability to prevent sexually transmitted infections (STIs) remains suboptimal. A preliminary study on sexually transmitted infections (STIs) showed that 38% of participants had good knowledge, 60% had sufficient knowledge, and 2% had poor knowledge. Although most participants demonstrated at least sufficient knowledge based on the questionnaire results, interviews with local health workers revealed that many female sex workers still lacked a deep and practical understanding of STIs and their prevention in everyday practice. This discrepancy suggests that while some theoretical knowledge may exist, it is not necessarily translated into preventive behavior. Observational data also indicated that preventive practices—such as consistent condom use and regular health check-ups—were not consistently carried out, even by those categorized as having sufficient knowledge. This reflects a significant gap between knowledge and behavior, and highlights the urgent need for targeted health education interventions. Previous efforts, primarily in the form of one-way counseling sessions delivered by the local health center, were perceived as less interactive and less engaging by the target group. Therefore, there is a clear need for more innovative and effective health education media tailored to the unique characteristics of FSWs. The aim of this study is to develop health promotion media specifically designed for female sex workers to enhance their understanding of STIs and promote healthier behaviors.

The health promotion media which will be developed is board games. Board games have been a popular pastime for centuries, providing entertainment and fostering social connections among players of all ages. Board games are a great way to encourage social interaction among friends, family, or even strangers. The most popular games thrive by encouraging interaction between players. These games encourage friendly conversation, negotiation, and competition, making them an ideal choice for gatherings with friends and family. So it is hoped that board games can be an interactive medium to educate Female Sex Workers to prevent sexually transmitted infections.

2. Materials and Methods

The research method used is the research and development (RnD) method. In this study, the development of health promotion media using the ADDIE Model. ADDIE is a product development concept that has the acronym Analyze, Design, Development, Implementation, and Evaluation[9]. The health promotion media developed is aimed at female sex workers so that they understand how to prevent sexually transmitted infections. The data collection methods used in this study were observation, interviews, and literature studies. The instrument used in this study was validation form of a material validation and a media expert validation. Analysis of validation data in this study uses descriptive data analysis techniques.

The description phase of the ADDIE Model in developing this media is as follows[10]:

a. Analysis
   In this phase, the researcher needs to identify the needs and problems of the learners. To achieve this, data collection methods such as surveys, interviews, pretests, or pre-assessments can be utilized. In this study, a preliminary survey was conducted to assess the knowledge of female sex workers (FSWs), using a semi-structured questionnaire adapted from previous validated tools. The questionnaire covered basic knowledge related to reproductive health and HIV prevention. A total of 30 FSWs participated in the survey. In addition, in-depth interviews were conducted with local health workers to gain contextual insights and triangulate the data.
b. Design
   In This phase, researchers determine the health education methods, media forms, and types of information that will be provided to female sex workers. The selection of health promotion media design in this study was carried out through interviews and literature review. he interviews were conducted with three key informants, consisting of one public health center (puskesmas) officer and two outreach workers who assist female sex workers. These interviews aimed to gather insights regarding the suitability of educational content and the most effective media formats for the target audience.
c. Development
   The development stage is the stage where instructional designers and developers create and compile content assets that have been planned in the design stage. In this stage, researchers collect references about sexually transmitted diseases, design game designs, choose materials for board games, and determine board game graphic designs. In this phase, material validity tests and media validity tests are also carried out. Media validity tests assess aspects of media appearance, media material aspects, and media usage aspects. The material feasibility aspect is assessed against the feasibility of content, feasibility of presentation, and context.
d. Implementation
   Implementation is the phase when the health education program is delivered to the target audience (Female Sex Workers). This phase tests the practicality and effectiveness of the game design and methods, highlighting the importance of smooth delivery mechanisms as well as the readiness of both the instructor and the participants. In this study, the implementation was conducted in small groups involving a total of 15 female sex workers who participated in the intervention. Each game session lasted approximately 15–20 minutes and was facilitated by a trained facilitator. The sessions were organized so that each game was played by four participants, divided into two teams. The game was repeated four times to ensure that all 15 participants had the opportunity to engage with the game. Throughout the implementation, observations and brief feedback sessions were conducted to assess participant engagement and the usability of the game. This structured approach allowed the researchers to evaluate not only the effectiveness of the

educational content but also the dynamics of group interaction and facilitator support in delivering the intervention.

e. Evaluation

Evaluation plays a critical role in assessing the effectiveness of the training program and identifying areas for improvement. This phase involves collecting feedback and analyzing the outcomes of the health education delivered to the target population. It ensures that the developed board game not only addresses current needs but is also refined for future educational applications. In this study, evaluation was conducted by administering an acceptance test questionnaire to participants in order to measure both the effectiveness and acceptability of the media. Effectiveness was assessed by comparing pre-test and post-test knowledge scores of female sex workers before and after engaging with the game. Acceptability was measured using a 17-item questionnaire based on a Likert scale, which examined participants' perceptions regarding various aspects such as the clarity of the material, ease of use, appropriateness of language, choice of colors, selection of images, and the overall perceived benefits of the game. This comprehensive evaluation approach provided valuable insights into both the educational impact and user experience of the board game.

3. Results and Discussion

3.1. Analysis

In the analysis phase, the instructional problem is clarified, the instructional goals and objectives are established and the learning environment and learner's existing knowledge and skills are identified[10]. In the analysis phase, the researcher conducted the following analysis:

a. In an analysis of the learner:

The target audience for this health promotion media development is female sex workers. A preliminary study on sexually transmitted infections (STIs) showed that 38% of participants had good knowledge, 60% had sufficient knowledge, and 2% had poor knowledge. Although most participants demonstrated at least sufficient knowledge based on the questionnaire results, interviews with local health workers revealed that many female sex workers still lacked a deep and practical understanding of STIs and their prevention in everyday practice. This discrepancy suggests that while some theoretical knowledge may exist, it is not necessarily translated into preventive behavior. Most female sex workers live in localized settings, which increases their vulnerability to STIs. Monthly health checks are routinely conducted, and health education sessions are provided. However, these sessions tend to be one-way and less interactive, reducing their overall effectiveness in improving real-world understanding and behavior change.

b. In analysis of instructional goals:

Based on the analysis of these problems, the research team developed effective and more interactive health promotion media to increase the knowledge of female sex workers about sexually transmitted infections.

3.2. Design

The design phase is the next step in the ADDIE model. This phase is really about applying the instruction. The instructional designer in this step thinks about how design instruction can be effective in ways that facilitate people's learning and interaction with the materials you create and provide. Furthermore, in the design phase, the instructional designer evolves and focuses on designing an assessment for

(his/her) topic, selecting a form of the course, and creating their instructional strategy [11].

a. Choose Health Information Needs:
   Female sex workers are a high-risk group for sexually transmitted diseases. So information is needed about several types of sexually transmitted infections that often appear in Indonesia. Some of these sexually transmitted infections are HIV/AIDS, Syphilis, Gonorrhea, Condyloma Acuminata, Chlamydia, Vaginal Candidiasis, and Genital Herpes. Each disease will be explained the cause, signs, and symptoms of the disease, how it is transmitted, and how to prevent it.

b. Choose Health Education Method:
   The method chosen to be developed is the educational game method. Educational games are very interesting to develop. There are several advantages of educational games compared to conventional educational methods. One of the main advantages of educational games is that they are more interactive, and visualization of real problems. Games are very useful for improving the logic and understanding of players towards a problem through games. With this game application, female sex worker can play and learn about sexually transmitted infections and how to prevent contracting sexually transmitted infections.

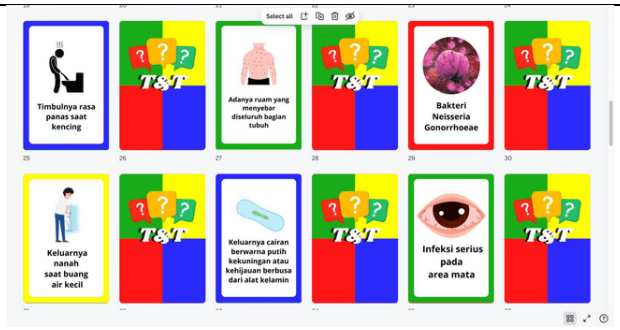
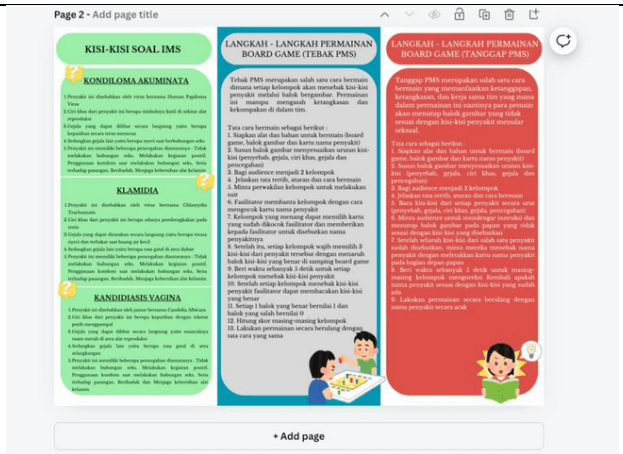
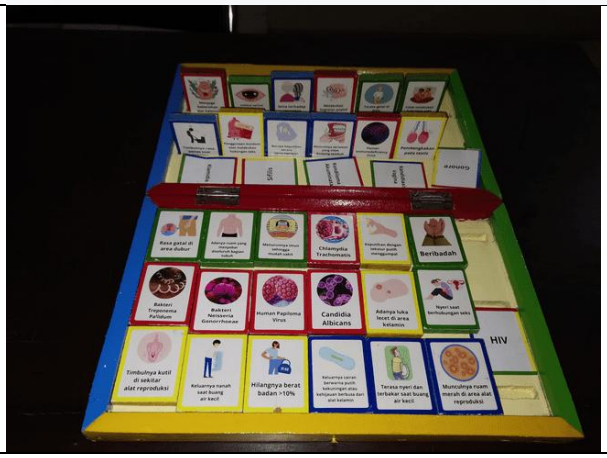
c. Choose Health Promotion Media:
   The game media chosen in this study is board games. Board games are a type of game that has many components and various game stories. Board games also have various game themes and playing techniques. The benefits of board games are to train problem-solving, build social skills, relieve stress, train strategic skills, and learn with fun.

3.3. Development

This phase depends on the first two phases, which are the analysis and the design phase. That means, if we did these phases correctly the development will be easier. In this third phase, the instructional designers integrate the technology with the educational setting and process. Also, keep in mind the backup plan in case the technology that we choose does not work. For example, if we consider Google research to find some information about what the word Ancient civilization means and the Internet does not work, we have a backup, which is a PowerPoint presentation. Moreover, the instructional designer starts to develop and create a good quality factual sample for the instruction design, the materials of the course, and run-through of the conduction of the course [10] [12].

In this stage, the researcher developed the board game media as follows:

Table 1. *Development Boardgame Guess Me*

Picture	Description
	Board Game Card Design
	Game Instruction Leaflet Design
	Board Game

After the board game has been developed, the media validity test and material validity test are carried out with the following results.

Table 2. *Media validity dan material validity*

No	Aspect of Validity	Total
1	**Overall Media Validity**	**92%**
	Aspect of Media Display	94%
	Aspect of Media Materials	100%
	Aspect of Media Use	85%
2	**Overall Material Validity**	**85%**
	Aspect of content eligibility	84%

No	Aspect of Validity	Total
	presentation feasibility Aspect	85%
	Contextual Aspect	87%

Based on these results, it shows that the board game developed is in very good criteria, is very feasible to use as a promotional medium, and does not require revision.

3.4. Implementation

The implementation stage is carried out by testing boardgame media on female sex workers. Learning media/health promotion media is a tool for the educational process. The media functions as an intermediary that bridges communicators and communicants. Without media, the educational process cannot take place optimally. One form of media is interactive learning media. One form of interactive learning media is an educational game. Educational games can often be the right media choice because the world of children is a world of play. Play is one of the means for children to develop their thinking, imagination, creativity, motor skills and also interaction. In this research, the interactive media used is a board game [13][14].

The implementation phase of this study involved testing a board game as an educational tool among female sex workers (FSWs). Four participants took part, divided into two teams of two. In health promotion, media serves as a vital link between the educator (communicator) and the learner (communicant), enabling more effective knowledge transfer. Without such media, the educational process may not be as effective. One particularly effective form of educational media is interactive learning tools like educational games, which combine learning with play. Although commonly used in children's education, games have also been shown to be highly effective for adult learners by simplifying complex information and enhancing engagement.

In this study, the interactive medium was a board game designed to raise awareness about sexually transmitted infections (STIs). The game was conducted in groups, with each session facilitated by one person to guide the process and support learning. The board game was played over two sessions. During the first session, participants were given time to review educational materials on STIs. The facilitator then named a specific disease, and participants were asked to select three board tiles related to that disease—such as its cause, symptoms, and prevention methods. In the second session, participants arranged the tiles in a logical sequence: cause, characteristic symptoms, and prevention. After completing the sequence, they were required to identify the disease and place the corresponding disease tile in front of their arrangement. Throughout the game, the facilitator provided guidance and corrected any misunderstandings to reinforce learning. The participants exhibited high levels of enthusiasm and enjoyment, indicating strong engagement with the educational media.

3.5. Evaluation

This phase measures the effectiveness and efficiency of the instruction. Evaluation should occur throughout the entire instructional design process within phases. At this stage, the media acceptability test was conducted on female sex workers.

This phase measures the effectiveness and efficiency of the instructional media. Evaluation is conducted throughout the instructional design process. In this phase, both an acceptability test and an effectiveness evaluation were carried out involving female sex workers as participants.

To assess effectiveness, participants' knowledge of sexually transmitted infections (STIs) was measured using a pre-test and post-test**.** The results showed that the average pre-test score was 67**,** and the average post-test score increased to 84**,** indicating an improvement of approximately 25.4%**.** These findings demonstrate that the board game is effective in increasing STI-related knowledge. In addition, an acceptability test was conducted to evaluate the feasibility of using the board game as an educational tool.

Table 3. *Result Media Acceptability Test*

No	Findings	Total	%
1	Media Very Feasible	14	93%
2	Media Feasible	1	7%
	Total	15	100%

Based on the acceptability test, 93% of participants stated that the board game was highly suitable for STI education. Participants also reported that the interactive and engaging nature of the game helped them better understand the material. Therefore, the board game is considered both **feasible and effective** as a health promotion medium for increasing knowledge among female sex workers.

4. Conclusions

Based on the results of development and research results by material experts, and media experts in trials on female sex workers, it can be concluded that the game board meets the quality requirements very well and is very attractive to be used as an alternative media for health promotion on sexually transmitted infections. Using board games FSWs understand more about STIs.

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