

Effect of Interactive Digital versus Printed Health Media Based At ADDIE Model on Postpartum Perinea Discomfort

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Abstract:

Background: Postpartum stage emerges as a very critical period in mothers' life. It is linked with profound changes "postpartum discomfort" perineal discomfort emerge to be the most one mothers are concerned about. Interactive digital health media such as Power Point has become a valuable tool in education. It enhances presentation information in well structure and precise manner. Its effect in health field; not been yet evaluated over the printed ones. For this **objective** the current study aimed to evaluate the effect of interactive digital versus printed health media on postpartum perineal discomfort. A **quasi experimental design** was utilized. Sixty pregnant women in their ninth month and meeting the inclusion criteria, attending antenatal clinic of Elshatby Maternity University hospital and followed by telephone to the 2nd and 7th days post partum, were allocated randomly for two groups. Group A where interactive digital health media (Power Point) was applied and group B were printed health media (booklet) was used. **Finding** revealed that Digital media group showed a statistical significant difference in acquisition of knowledge, practice as compared to printed media group. In relation to perineal pain scores interfering with daily activities; scores of pain decreased among digital group during sitting and walking while no statistical difference was found between both groups in relation to urination or defecation. All subjects in both groups showed a high level of satisfaction with both types of media. It can be **concluded** that interactive digital health medium is more effective than printed one for mother's teaching. Researchers **recommended** embed using interactive digital health media in mother's health teaching with Ensuring provision of policies, equipment, resources, time, proper setting and environment in every maternity hospital to integrate advanced methods of health teaching.

Key words: postpartum perineal discomfort, perineal pain, evaluation, health teaching media

What this paper adds;

- The growing technology in health education for women regarding their maternity cycle in general and postpartum in particular has been lately predicted, but this huge technology progress should be fully evaluated to appraise if this progress matters or produce any added gains or advantages to women .

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I. Introduction

Throughout ages, women's health is affected by several significant stages including postpartum period. Witch is associated with great multiple physiological and psychological changes. These changes strongly impact on women live, as they are not only intrusive with their physical and emotional state, but also with interpersonal and family relations. Hence, women need substantial energy to adapt with these changes ⁽¹⁾.

Regrettably, the number of maternal mortality and morbidity reported during childbirth and postnatal period still alarmingly high. Worldwide, over 500,000 women die of complications related to pregnancy and childbirth each year. Over 99% of those deaths occur in developing countries including Egypt which maternal mortality rate represents 33 per 100,000 live child births in 2015 ^(2, 3).

Never less important than these complications many postpartum adaptations occur, resulting from return to the non-pregnant state, causing numeral discomforts both somatic and expressive. Among those are after-pains, perineal discomfort, urinary retention, constipation, breast engorgement, nipple soreness and postnatal depression. Researchers identified that; mothers are most bothered by perineal discomfort that also prejudices the woman's capability and readiness to care for her self or her newborn ⁽⁴⁾.

Perinea discomforts

Perineal pain is a common sequel vaginal delivery within the first 8 weeks postpartum. It is affecting around half of women at ten days postpartum and may persist in ten percent of them till eighteen months.

Regardless of whether the birth resulted in actual perineal trauma or not, women are susceptible to feel pain in their perineal tissues⁽⁴⁾. The perineum is a diamond-shaped area between the vagina and the anus. It is a very sensitive area, in which its muscles involved in not only sitting but also walking, bending down, squatting, urination and defecation. El-nagger (2012) stated that nursing interventions are necessary to reduce this discomfort and allow the woman to take care of herself and her baby. Nurse should educate mother about self perineal care during antenatal period and then it can be used in postnatal when mothers are at home⁽⁵⁾.

Perineal care is always performed by postpartum women after elimination (urination or defecation) or at least every 4 hours during postpartum. Mother should pour the prescribed solution over perineal area and dry it from front to back. Perineal pad should be changed regularly to prevent infection. Additionally, the perineum could be exposed to the air by letting the pad down during resting or napping⁽⁶⁾.

Using of ice packs in the first 24 hours is effective in decreasing perineal edema, and hematoma thereby reducing pain and promote healing. It should be wrapped in wash cloth since the direct application of ice can damage tender tissue in this area. After that, healing increases best if circulation is encouraged by heat so hot packs are applied to this area. The mother should also wrap the hot packs with a towel to prevent possible burn⁽⁷⁾.

To decrease perineal pain, medicated spray, ointment is recommended as physicians order. Standing and sitting positions that put pressure on this area should be avoided and women should lie on side while resting or napping until pain decreased⁽⁷⁾. Farrag et al. (2016) mentioned in their study that kegal exercise also facilitates flexibility of the tissue, reduces swelling, relieves the pressure on the incision and the surrounding tissue and might help to decrease pain. Kegel exercise is done by contraction of the perineum muscles then relax it, stat with 2-3 seconds of contraction then increase the period gradually⁽⁸⁾.

Also women must be taught to detect infection early to prevent further complication and ask for medical help if; she had offensive vaginal discharge, severe perineal, pelvic or abdominal pain, dysuria, oliguria, anuria, urgency and frequency of micturition, fever, nausea and vomiting, heavy lochia with large blood clots⁽⁷⁾.

Although all previous mentioned measures are considered easy to execute; women are missing about these. Postpartum period occupies the lowest priority of the entire maternity care cycle in care and health teaching in clinical setting. Almost all puerperal women are in uttermost need to be educated to care for themselves and newborn and to manage any health discomfort that might arise. Further, current hospital stay reductions and inadequate structured support after childbirth decrease the capacity of mothers to acquire knowledge to deal with these discomforts. Antenatal period is a good chance for providing health teaching for mothers to deal with postpartum period⁽¹⁾.

The health instructional media

Health teaching could be provided through multiple resources. Among them; printed materials, visual aids, audio and visual aids, computer based resources and interactive technology. First, real things may include people, objects, devices, models, simulators and outdoor environment. Second, printed materials are numerous such as handouts, pamphlets, books, catalogs and brochures. Third, visuals aids are also various as charts, posters, flipcharts, pictures, chalk and white boards and transparencies. Fourth, audio and visual materials are comprised of videotapes, videodisc, CD recording and simply television. Fifthly, computer based resources recently are more powerful as power point presentations, internet and computer generated images. Finally, interactive technologies include interactive CD ROMs, video and audio conferences⁽⁹⁾.

One of the most widely instructional materials in health teaching is printed materials. They encompass leaflets, brochures, books and booklets. Printed materials are economical and effective media for health teaching. They also are a simple, relatively inexpensive knowledge translation. Printed materials can aid in recall of the material and may improve compliance with treatment. They serve as permanent records of information as on-going sources of patient guidance. However, they have also many disadvantages, they are frozen language and no interaction provided in it⁽¹⁰⁾.

During the last several decades, the technology in health education has overcome those disadvantages which are found in using the traditional methods of teaching. One of the most common tools of technology is the PowerPoint presentation. PowerPoint presentation is clearly an activity that involves knowledge sharing and interaction. Further, PowerPoint application enriches teaching and learning process. It enables educators to deliver organized presentation which permits learners' attention for long period. It also aids in the order and pacing of the content prescribed and makes it easier to present clear summaries of health education⁽¹¹⁾.

Models of Instructional Design

Many models of instructional design have been developed suitable for various instructional purposes and by differing levels of expertise of instructional designers. Instructional models such as ADDIE model, Dick and Carey's model, Kemp model, and ASSURE model, but almost all are based on the concept of the ADDIE model⁽¹²⁾.

ADDIE Model

ADDIE model is an acronym of generic instructional design comprised of: analysis, design, development, implementation and evaluation;⁽¹²⁾

Analysis

Analysis phase is the most important phase. It really save huge amount of content, effort, and time in the other stages. Analysis is carried out for four categories. Analysis of the target learners, analysis of instructional goals, content analysis and development of objectives should be done.

- **Analysis of target learners:** learners' previous knowledge, skills, needs and problems were determined. To identify about target learners, survey, interview and pre-test should be done.
- **Analysis of instructional goals:** it is vital to be aware about learning goals to save time and effort.
- **Developing instructional analysis:** this provides necessary steps to learn and search about new information will be delivered.
- **Developing learning objectives:** objectives specify what learners will be able to be at the end of instruction. It includes knowledge, skills and behavior domain. Observable measureable objectives that indicates attainment of the goal.

Design

The analysis phase is followed by the design phase where educators create an overall blueprint of how the instruction will be delivered. This includes choosing the optimal method(s) of instruction and creating useful action oriented learning objectives to guide the learning. In other words, it is the part where the instruction method, learning activities and evaluation process become clear.

Development

This is the process of producing the instructional materials, all the tools and any kind of support materials which will be used during instruction. The material is created during this phase and an evaluation is made and modifications are carried out if necessary. Educators take the map or overviews created in the design phase and think through, step by step, how to practically deliver each feature of this instruction .

Implementation

This phase is about transforming our plan into action. It is the actual delivery of the instruction. It compromised of three major steps, training the instructors, preparing the learners, and organizing the learning environment.

- **Training the instructors:** It is the time to train the teachers on materials, course objectives, multi-media, assessment, and activities will be used.
- **Preparing learners:** learners are familiar with the information about this course such as when and where the course will be.
- **Organizing the learning environment:** environment should be well prepared and available to teach. In addition, handouts and all equipment should be ready to use. After these three steps, instruction can be implemented and delivered.

Evaluation

Evaluation is integrated throughout each activity of the instructional development process. It starts in the planning stage with development of an evaluation plan and continues for the life cycle of the training system. The focus of evaluation is continuous improvement in instructional system quality. Evaluation phase consists of formative and summative evaluation.

Significance of the study

Obstetric nurses overlooked occasions for improving health teaching of postpartum women arise during the scheduled maternity care. Besides Each health medium has its advantages and drawbacks, but the evolution of health care specifically in the obstetric nursing context puts new demands of technology. Computer, as a tool of new technology, is used to disseminate such knowledge and thus improves quality of care and health teaching. It is necessary to encourage the creation and use of educational technologies that are able to mediate care between obstetric nurses and women in the form of information dissemination⁽¹³⁵⁾. But also, Print materials are an important mode of public education about many reproductive health issues. It is necessary **to evaluate which health media; the interactive digital or the printed one** is more useful for mothers regarding perineal discomfort.

II. Materials and Method

Materials

Research hypothesis:

- Mothers who receive health teaching using interactive digital health media exhibit more knowledge and better practice regarding perineal discomfort than those who receive health teaching using printed health media.
- Mothers who receive health teaching using digital health media have decreased the perineal pain interfering with postpartum women's daily activities than those who receive health teaching using printed health media.

- **Operational definition:**

Interactive Digital Health Media refers to PowerPoint presentation prepared by the researcher and Printed Health Media refers to printed booklets prepared by the researcher using catalog template.

Research design:

This study was conducted by using quasi- experimental research design.

Setting:

This study was carried out at the outpatient antenatal clinic in El -Shatby Maternity University Hospital in Alexandria.

Subjects:

The study subjects comprised of a purposive sample of 60 pregnant mothers at the previously mentioned setting selected based on the G power program using alpha error = 0.05; precision of 5% and dropout rate = 10% would provide a study power of 80 %.The selected subject was further subdivided into two groups, allocated using simple random sampling technique as follows:

- Interactive digital media group (group A) comprised 30 mothers who received the health education program using Power Point Presentation.
- Printed media group (group B) comprised 30 mothers who received the health education program using booklet.

Inclusion criteria:

- Mothers in the third trimester that can read and write and can deal with computer.
- Mothers at the ninth month of gestation
- Mothers who were free from chronic illness and previous obstetrical complication.
- Mothers with normal course of current pregnancy.
- Mothers who were expected to deliver normal vaginal delivery.
- Mothers who were willing to participate in the study.

Tools:

Four tools were used by the researcher for data collection as follows:

Tool I: Socio- demographic and reproductive data structure interview schedule.

This tool was designed and used by the researchers after a thorough review of related literature. **It was composed of three parts;**

Part (A) general characteristics: to collect data about the subjects' general characteristics such as age, level of education, as well as their reproductive history.

Part (B) mothers' previous knowledge about perineal discomfort: This part was developed to investigate mothers' knowledge regarding perineal discomfort. It was consisted of different types of questions including: true and false statements as well as open ended questions included complete definition of perineal discomfort, predisposing factors, nursing management, signs and symptoms of inflammation or infection in the perineum if episiotomy done (Redness, Edema, Ecchymosed, Discharge, and Approximation) as mentioned by the Standardized REEDA Scale.

Scoring system:

- It was done on the basis of scalar-scoring method. As there were two types of questions. Those questions having two possible answers were given 2 points for correct response and 1 point for wrong or uncertain response (true and false questions). The other type of questions (open ended questions) had 3 levels of scores, 1, 2, & 3 representing wrong answer or don't know, correct but incomplete answer and correct complete answer.

- Mothers who took grades ranging from $10 \geq 20$ had poor knowledge, $21 \geq 32$ had fair knowledge and $32 \geq 42$ had good level of knowledge.

Tool II: Follow up cheat about mothers' practice regarding perineal discomfort:

It was composited of statements that focused inclusively to assess the *practices* regarding perineal discomfort among postpartum women. The questions focused on self perineal care as removing soiled pad, pour the solution over her perineal area, dry the perineal area with dry tissue and apply clean perineal pad all from front to, Perineal pad should be changed regularly to prevent infection. Also if the mother assumes comfortable positions to relieve pain, performs Kegel exercise regularly and appropriately applies ice packs during the first 24 hours followed by worm backs for the first 7 days postpartum. The participated subjects are requested to be responded with either " yes" or "no" for each question,

Scoring system:

- The responses are scored and coded as (2) with " Yes" or (1) if "No" is the answer.
- The total scores ranged from 20 – 10
- Mothers practice was ranked as good if scores is >12 and poor if <12

Tool III: The Numerical Rating Scale (NRS) ⁽¹³⁾ ('0-10' point pain intensity scale) developed by **McCaffery & Pasero**. It is a self-reporting scale, was used by mothers to measure the intensity of perineal pain's interference with daily activities. Rating is as follows; 0 No Pain 1–3 Mild Pain (nagging, annoying, interfering little with daily activities) 4–6 Moderate Pain (interferes significantly with daily activities) 7–10 Severe Pain (disabling; unable to perform with daily activities)

Tool VI: Mothers' opinions about health media used structure interview schedule questionnaire.

This tool was developed by the researcher after a thorough review of related literature ^(137, 138) to assess mothers' opinions about developed printed or digital health media. It had two formats;

Format of interactive digital media consisted of:

1. Seven items to assess content as; clear to the mother, interconnected with each other, explained the subject comprehensively, consistent with each other, there is some information that can be dispensed with, important and useful for mothers at this stage, easy and easily applied.
2. Four items to assess writing styles as; the sentences are written in a simplified and smooth manner, the terms used are appropriate for culture, customs and traditions, and if the sentences used are long, terms are complex and or incomprehensible.
3. Five items to assess organization as; the general objective is stated at the beginning, educational objectives are written in an understandable manner, there is a menu that facilitates access to topics, there is a title for each topic, or the sequence of ideas is not organized.
4. Six items to assess slides design as; if the slides are packed with words, font size is suitable for vision, types of lines used clear to the mother, the color of the font and the background are proportional to each other, design is not attractive, and if the colors are consistent with each other.
5. Five statements to assess images as; suitable for subjects in slides, clear to the mother, the number of images is not sufficient for the content, unexplained and difficult to understand, and there are pictures of most annotated health guidelines
6. Three statements to assess animation and transition as; movements of texts and images are acceptable, transitions between the segments presented distract attention and transition movements are consistent with each other
7. Two statements to assess sound used as; the feedback votes for questions are effective or the feedback to the questions distracted me.
8. Four statements to assess control buttons as; effective and important, fast response, helped to move between segments and easy to use
9. Four statements about the final questions as; it is meaningful, helps to comprehensively assess the subject, help to focus on important points, and written in a smooth manner

Format of printed media consisted of:

1. Seven items to assess content such as; content is clear to the reader, topics are interrelated to each other, the content explains the topic comprehensively content is consistent with the objectives mentioned, there is some information that can be excluded, content is important and useful for mothers in this period, content is easy to apply, and health instructions are suitable for all mothers

2. Four items to assess writing styles as; sentences are written with simplified and smooth manner, the words used are appropriate to culture, customs and traditions, sentences used are long, or if the terminologies are incomprehensible and complex
3. Six items to assess organization as; the general objective is written at the beginning of booklet, specific objectives are written in understandable manner, there is an index of the catalog for easy access to the topics, there is a title for each subject, there is a page number as mentioned in the index, sequence of ideas are disorganized
4. Six items to assess pages design as; pages crowded in word, font size is appropriate to the reader, the types of font use dare clear to the reader, font and background colors are consistent with each other, design is attractive and decoration is not acceptable, and colors are in harmony with each other
5. Five statements to assess images as; images are suitable for the written words in the booklet, images are clear, number of images are not enough to content, images are difficult to understand and non-expressive, there are images of most of health instructions explained

Scoring system:

- The above mentioned items measured using a 4 point likert scale ranging from strongly agree (4) to strongly disagree (1) for the positive statements and vice versa for the negative statements.

- **Reversed items were converted for scoring purposes.**

Cutoff point for digital media format=

$$\frac{\text{Number of statements(Max for positive - Min for negative)}}{3}$$

- Mothers who had a score of 40-80 were low satisfied and those who had a score of 81-120 were moderate satisfied, while those who had a score of 121-160 were high satisfied.

Cutoff point for printed media format=

$$\frac{\text{Number of statements(Max for positive - Min for negative)}}{3}$$

- Mothers who had a score of 28-56 were low satisfied and those who had a score of 57-84 were moderate satisfied, while those who had a score of 85-112 were high satisfied.

III. Method

The study conducted as follows:

1. An official permission to conduct the study was obtained from the faculty of nursing to the manager of El-Shatby Maternity University Hospital in Alexandria and then permission was obtained from the manager of outpatient antenatal clinic.
2. Study tools were developed by the researcher after extensive review of related literature.
3. Content validity of tools and both health media were tested by seven experts in the related fields then the necessary modifications were accordingly made.
4. A pilot study was carried out on 10% of pregnant mothers represented as 6 mothers to ascertain the clarity, feasibility and applicability of the developed tools and to identify difficulties that may be faced during data collection then necessary modifications were done. Examples of modification include; remove questions considering characteristics of perineal discomfort that were vague to mothers. Mothers included in the pilot study were excluded from the study.
5. The reliability of the tools was tested for their internal consistency using the Cronbach Alpha reliability test, two tools were reliable and the coefficient values were (0.763, 0.937 & 0.953 respectively) for tools I, II & IV.
6. **ADDIE model** was used as a conceptual framework for designing and using health media. It included 5 phases:-

Phase I (Analysis):-

- Analysis of subject matter by thorough review of literature was done by the researcher to determine subject outline and content.

Tool I was distributed to mothers at outpatients' antenatal clinic where setting and time were suitable for execution of the study as the postpartum stay is short and this be considered a **limitation of the study**. However after explaining the aim of the study when they were in waiting area to collect socio demographic data and telephone number as well as assess their knowledge level regarding postpartum discomfort (pretest) as a baseline. This structured interview was taken approximately 10 minutes on individual basis.

Phase II (Designing):-

According to the results of phase I, task analysis was done

Perineal discomfort:

- Definition
- Causes
- Predisposing factors
- Signs and symptoms of inflammation or infection
- Kegel exercise
- Medical management and nursing intervention
- Self perineal care with instructions for home care on how and when to use peribottle home (fill the bottle with cleaning warm water) or pour warm water or cleansing solution over perineum after the first 24hours. Reinforce this practice each time she changes her pad, voids, or defecates, making sure that she understands to direct the flow of water from front to back.

A storyboard for both teaching health media was developed including text, images, narration, layout, animation for power point slides and Text, images, layout for printed health media

Phase III (development):-

- Digital health media were developed by the researcher based on the predetermined storyboard using Microsoft office power point presentation 2010 to digital media group (group A) and for printed media group (group B) using catalog template; booklets were designed and printed according to sample size.

Phase IV (Implementation):-

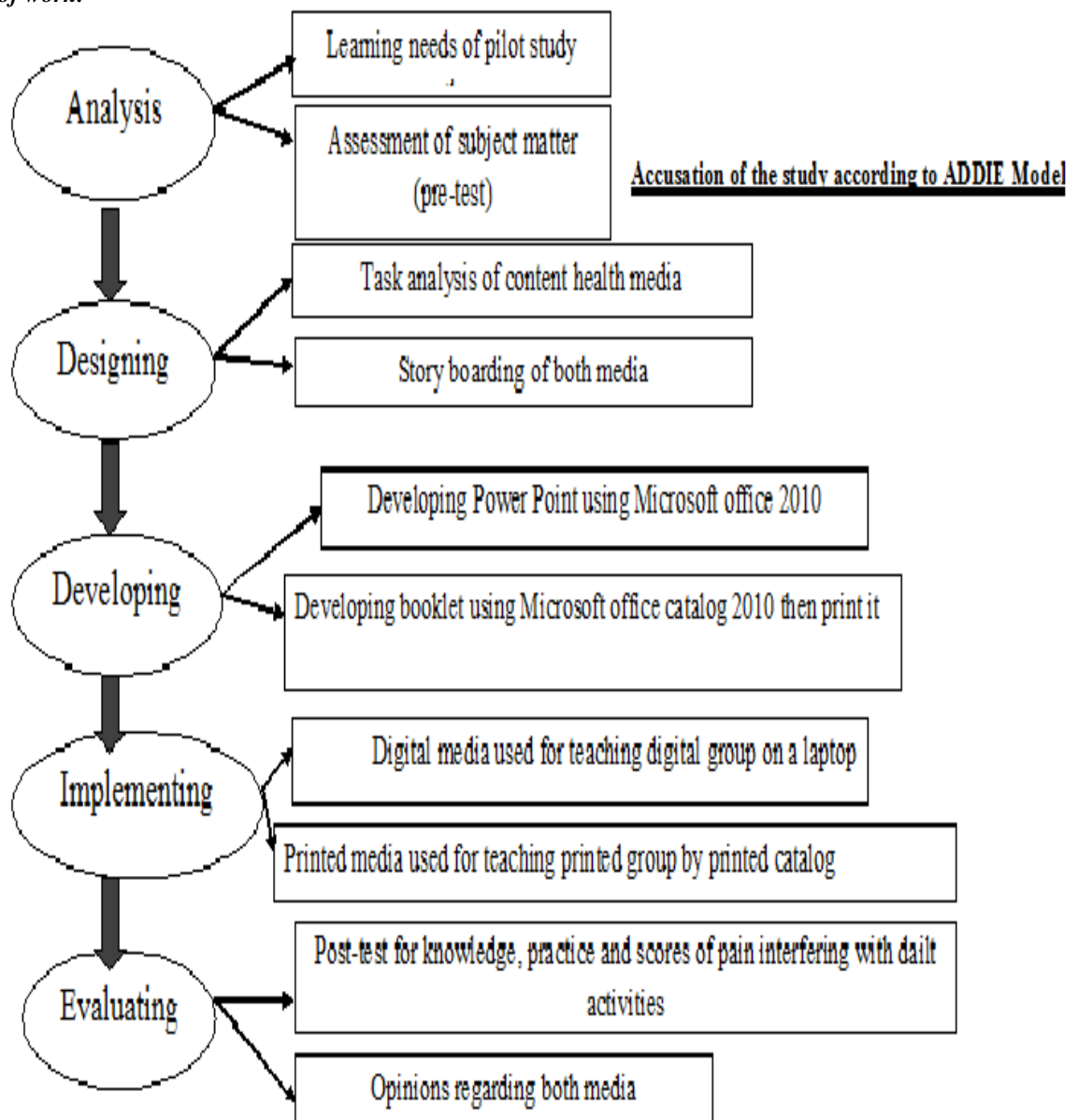
- Mothers were given power point presentation projected on a laptop on individual basis under the guidance of the researcher. It took approximately 30 minutes divided into two sessions 15 minutes for each session.
- Verbal instructions and illustrated digital CDs were distributed for mothers (group A) for re-education and demonstration at home
- Mothers were given individual printed booklet to read it under the guidance of the researcher. It was taken approximately 20- 30 minutes.
- Verbal instructions and illustrated printed booklets using a series of detailed drawings were distributed for mothers (group B) for ensuring, retention of knowledge followed by re demonstration at home.
- Encourage mothers in both groups to continue self education using these measures after postpartum hospital discharge.

Phase V (Evaluation):-

Mothers' knowledge about perineal discomfort was reassessed again for both groups immediately after the implementation of health media used for perineal discomfort by using part B of tool I (posttest). It took approximately 10 minutes.

- Practice of perineal care (tool II) and pain interference with daily activity (tool III) at 2nd and 7th day postpartum were assessed through telephone calls (posttest only).
- Mothers' opinions regarding digital and printed health media used for postpartum discomfort (tool IV) were determined immediately after implementation. It took approximately 10 minutes.

Field of work:



7. Data was collected through interview and telephone for a period of three months started from mid February to end of April 2018.

8. Ethical considerations:

- A written informed consent was obtained from all pregnant women after explanation of the study aim.
- Confidentiality of data will be assured.
- Anonymity and privacy will be assured.
- Participation will be on a voluntary basis.
- Withdrawal will be guaranteed without any penalties.

Statistical analysis of the data

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0.(Armonk, NY: IBM Corp) Qualitative data were described using number and percent Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level.

The used tests were

1 - Chi-square test

For categorical variables, to compare between different groups

2 - Fisher's Exact or Monte Carlo correction

Correction for chi-square when more than 20% of the cells have expected count less than 5

3 - McNemar and Marginal Homogeneity Test

Used to analyze the significance between the different stages

4 - Student t-test

For normally distributed quantitative variables, to compare between two studied groups

5 - F-test (ANOVA)

For normally distributed quantitative variables, to compare between more than two groups

IV. Results

➤ Part I:

Results related to Mothers' knowledge and practice regarding perineal discomforts.

In relation to socio-demographic and reproductive data; it was found that one fifth (20%) of group A and 13.3% of group B were less than twenty years while more than one fifth (23.3%) of group A and 40% of group B were $20 \geq 25$ years. Around one third (36.7% and 30% respectively) of both groups was 25-30 years. About one fifth (20% and 16.7% respectively) of both groups was more than thirty years. Regarding **residence**, slightly more than two third (66.7% and 70% respectively) of both groups were from urban residence. In relation to **level of education**, it was noticed that 43.3% of group A was read and write and half of the same group was graduated in secondary school. On the other hands, more than half (53.3%) of group B was read and write and more than one third (36.7%) of the same group was graduated in secondary school. The minority of both groups (6.7% and 10% respectively) were university education. (Figure 1, 2, 3)

Regarding reproductive data, it was observed that two fifth (40%) of group A and half of group B were primigravida. (Figure 4)

Generally, both groups showed homogeneity in all aspects of socio demographic and reproductive profile as there were no statistically significant differences found.

Table (1) shows number and percent distribution of group A versus group B in relation to their knowledge about perineal discomforts before and after health education.

When asking mothers before health education about the **definition of perineal discomfort**, it was found that 83.3% of group A and 73.3% of group B said yes for the correct definition of perineal discomfort while all of both groups defined perineal discomfort correctly after health education.

In relation to **causes of perineal discomfort**, minority of group A (6.7%) and none of group B gave answer corrected and completely before health education while 90% of group A and nearly three quarter (73.3%) of group B gave the same response after health education. According to **characteristics of perineal discomfort**, it was found that (46.7%, 26.7% respectively) of both groups gave correct and complete answer before health education while the majority of both groups 93.3% of group A and 73.3% of group B gave the same response about the previously item after health education.

As regards **predisposing, relieving factors and comfortable positions to decrease perineal discomfort**, none of both groups responded correct and complete answer before health education to those items while 76.7% of group A gave correct and complete answer about predisposing factors and relieving factors correspondingly and 50% of group B responded correctly and completely for the previously mentioned items after health education. The majority (90%) of group A and almost three quarters (73.3%) of group B gave correct and complete answer about comfortable positions assumed to decrease perineal discomfort after health education. Moreover, it was noticed that more than three quarters (76.7%) of group A and nearly two thirds (63.3%) of group B responded yes about **physician prescribe analgesics** as a medical management to decrease **perineal discomfort** before health education in the main while all of group A and 96.7% of group B responded the same answer after health education.

As regards the level of knowledge before and after health education using interactive digital versus printed health media, it was noticed that majority of mothers in both groups have fair knowledge about perineal discomfort with no statistical significant difference found ($P=0.263$) witch neutralize the previous background effect as an extraneous variable can contaminate the results.

On the other hand, was found that the majority (90%) of group A had fair level of knowledge before health education while the entire of the same group (100%) had good level of knowledge after intervention with highly statistical significant difference before and after health education $P=<0.001$

Additionally, it was found that 80% of group B had fair level of knowledge before intervention while after intervention the same percent of them had good level of knowledge with highly statistical significant difference before and after health education $P < 0.001$

In comparison between the effect of each medium; a significant difference was found between both groups after health education in the favor of the interactive digital health media $p = 0.024^*$. (Table 2, figure 5)

Table (3) shows number and percent distribution of group A versus group B in relation to their practice of perineal care at 2nd and 7th day Postpartum.

At 2nd day postpartum

By telephoning mothers to ask them about **their practices done at home** to decrease perineal discomforts, it was found that equal proportions 80% of group A responded yes about cleanness of perineal area, changing the pad frequently and maintaining perineal area clean and dry while when asking group B about the previously mentioned practices 73.3%, 80%, 73.3% respectively of them performed those practices.

The minority of group A and none of group B responded yes about applying cold compresses in the first 24 hours then apply warm compresses to decrease perineal discomfort while 90% of participant in group A and 83.3% of group B responded yes about increase protein intake during postpartum period.

In addition, It was also noticed that equal proportion 83.3% of group A and 73.3% of group B said yes about clean perineal area from front to back and sleep on left lateral position while more than one third 36.7% of group A and nearly two thirds 63.3% of group B said yes about clean perineal area from front to back. Regarding Sitze bath as prescribed, it was found that 63.3% of group A and 83.3% of group B said yes and minority of group A 13.3% and only 3.3% of group B said yes about perform perineal exercises.

7th day Postpartum

Almost all of participant in both groups chose yes answer about clean the perineal area, change perineal pad frequently, maintain perineal area clean and dry, and increase protein intake and clean perineal area from front to back. Additionally, all of group A said yes about applying warm compresses to the perineal area, sleep on left lateral position and 80%, 93.3% respectively of group B gave the same answer.

According to Sitze bath as prescribed and clean the perineal area from front to back, it was noticed that 100%, 93.3% respectively of group A and equal proportion 76.7% of group B said no about these two items. The majority 90% of group A and more than two third 70% of group B said yes about performing perineal exercise to decrease perineal discomfort during postpartum period.

Table 4 points out that the mean practice scores among group A & group B were significant during the 2nd and 7th day postpartum, ($t = 4.433$, & $t = 2.33P$) respectively $P \leq 0.05$. The mean practice score elaborates those women in group A (interactive digital media) had higher scores of practice than women in group B (printed health media).

➤ **Part II**

Results related to Mean Score of Pain Interference with Daily Activities

Table 5 shows the Mean Score of Pain Interference with Daily Activities at 2nd and 7th days Postpartum among Both Groups. Generally it is obvious that the scores of pain impede day activities for both study samples ranging from mild to moderate showing improvements in the 7th day postpartum. Also the results of the current study indicated that the perineal pain scores reduced during sitting and walking with statistical significant differences was found between group A and group B with decreased scores of pain among women used the interactive Power Point (group B) ($p < .05$). While there was no statistical difference between the two groups upon 2nd and 7th day postpartum in pain scores during urination or defecation.

➤ **Part III**

Results related to opinions of mothers regarding media used for postpartum discomforts.

Table (6) reveals opinions of mothers regarding digital media used for postpartum discomforts. Nearly almost all of group A had strongly agreement about the **content** that is clear, interrelated, consistent with each other, comprehensive, important, applicable, the **writing style** as it was written in simplified manner, not too long, simple, and appropriate to culture, **organization** that there is goals, objectives, titles and outlines, **slides design** which is not crowded with suitable font size, has harmony in color, well organized and attractive, **images** that it is suitable for text, clear with enough number, **animation and transitions** as it is accepted and not distractible, sounds which attract attention and give feedback, **action buttons** that is effective, speedy in response and easy to use and **questions** as it is evaluating understanding, simple and meaningful of PowerPoint.

Figure (6): shows number and percent distribution of digital media group level of satisfaction about digital media. It was noticed that almost all of digital media group were highly satisfied about digital media used for health teaching.

Table (7) reveals **Opinions of mothers regarding printed media used for postpartum discomforts**. Nearly almost all of group B had agreement about the **content** that is clear, interrelated, consistent with each other, comprehensive, important, applicable, the **writing style** as it was written in simplified manner, not too long, simple, and appropriate to culture, **organization** that there is goals, objectives, titles, outlines and number of pages, **pages design** which is not crowded with suitable font size, has harmony in color, well organized and attractive, **images** that it is suitable for text, clear with enough number of catalog.

Figure (7): shows number and percent distribution of printed media group level of satisfaction about printed media. It was noticed that almost all of printed media group were highly satisfied about printed media used for health teaching.

V. Discussion

Although nurses have accepted health education as an important role in patient health care, they sometimes neglected this major role. There are vast materials that are used for health education like verbal health instruction, printed material and electronic materials. The printed materials are the next most frequently used patient educational materials after verbal instruction health education has concurrently invaded by new technology like computer based instruction and internet health websites⁽¹³⁾. From observation of the researcher such form of maternal education material has no place inside the maternity hospitals' so that the researcher aimed to compare between the effect of interactive digital versus printed health media on postpartum perineal discomfort to evaluate the effectiveness of such interactive digital method of information dissemination while obstetric nurses and midwives are knowledge workers in an information age.

Before discussing the main finding of the current study, generally both groups were homogenous in relation to socio-demographic and reproductive data as well as level of knowledge before intervention. Generally from the study results, the level of knowledge and practice improved after using both health educational media in the two studied groups. Interns they enhanced better toleration and decreased scores of perineal pain interfering with daily activities. The results of the current study may be attributed to many reasons. First, nearly half of both groups were primigravida that had scarce knowledge about how to adapt with postpartum discomforts. Additionally, multiparous mothers in both groups reported that perineal discomfort is the most bothering problems they faced that is why, they were very attended in both groups during instruction regardless of the kind of medium used.

Furthermore, the pre-test guided mothers to focus on the missing knowledge that they have in concern to manage postpartum discomforts. All women participated in the study sample were at the ninth month of gestation, so they were too excited to learn how to deal with these discomforts, which they would be confronted. Generally in the health facilities, there is little attention directed toward health education specifically in providing mothers with knowledge related to postpartum discomforts. Thus, mothers are eager to learn and gain knowledge in regard this area.

Additionally content presented in both media were prepared carefully. The using of images, colors, and proper design enhance their ability to understand and assimilate new information. At last but not the least, every mother used health media by herself with the guidance of the educator so that concentration increased during health teaching session. The current study result supported by many other researches. Recently two research papers, Yashaswi 2018⁽¹⁴⁾ and Shabaan 2018⁽¹⁵⁾ showed that knowledge of expectant mothers improved extensively after health education.

The effect of interactive digital versus printed health media on postpartum perineal discomfort Mothers' knowledge and practice regarding perineal discomforts.

The hypotheses posed in this study were mothers who receive health education using digital health media would exhibit more knowledge and better practice as exhibited by decreased scores of perineal pain interfering with daily activities than those receive health education using printed health media. As regards these hypotheses, the results of this study validate the effect of interactive digital health media over printed health media, as there was a significant difference in level of studied variables between both groups.

The results of the current study may be attributed to many reasons; among which are; PowerPoint presentations integrate multiple modes as videos, images, graphics and sounds. Mothers became more interested by organization of the content, themes backgrounds and colors. Action buttons made them more actively involved in choosing which information they want to begin with. Moreover, they received feedback regarding their responses. Their attention had been hold till the end of the session by adding hyperlinks, transition as well as custom animation. PowerPoint presentation also added many tools that helped in reinforcement of information like images, questions and feedback sounds when answering the questions.

Mothers were highly motivated and had enthusiasm to use this new technology in acquiring new knowledge. They also were comfortable when receiving health teaching by PowerPoint presentations. This point of view was supported by Alkash and Al-Dersi (2013)⁽¹⁶⁾ who mentioned that using PowerPoint presentation with learners is a productive learning activity. Additionally, they explained that various audio, visual, and audio-visual features were

embedded in the use of PowerPoint can surely help in making the ideas simple and easy to grasp and sustain attention for the learners.

This result was consistent with the finding of Logsdon et al. (2015)⁽¹⁷⁾ stated that when they used printed health materials (pamphlets) and YouTube videos on an iPad to give new mothers knowledge and practice about self-care and infant care. The iPad was more effective in improving knowledge of mothers than printed health materials. They described both as feasible and acceptable for health education.

Likewise, Mohamadirizi et al. (2014)⁽¹⁸⁾ found electronic education method had a higher effect on level of awareness about postpartum breastfeeding among mothers compared to paper based method. Mohamadirizi emphasized that when educating new mothers about advantages and disadvantages of breastfeeding with complementing the electronic media with pictures, slides, text and animation; this had a significant impact on their learning.

Abbasi et al.(2017)⁽¹⁹⁾ concluded that both software and booklet are effective in improving maternal knowledge and practice about how to manage the labor pain and that software is more effective than booklet, because of its interactive nature, self-guidance and flexibility that enhance and enrich training programs. Additionally, Farajollahi et al. (2012)⁽²⁰⁾ found that computer based group had more score in self-regulated learning strategies scale as compared to printed based group.

Furthermore, the pre-eminence of interactive digital media (power point) is clear even in differ setting with different subjects where Lari (2014)⁽²¹⁾ evaluated the impact of using power point presentations on students' learning and motivation in secondary schools. The study showed the effect of superiority of power point as compared to traditional textbook. Lari also stressed that learning became better when attention was captured via highlighting, color, different fonts, and visual effects of power point presentation.

Incongruent with the current study finding, Kim et al.(2002)⁽²²⁾ mentioned in his study on medical students that textbook may be more effective than computer for acquiring simple information about advanced cardiac life support. This contradiction may be due to that mothers, who are a different sample represents laypersons, prefer interaction done in PowerPoint presentation.

Mothers mean Score of Pain Interference with Daily Activities

Scars research papers evaluated the effect of health teaching on acute pain generally and postpartum perineal discomfort particularly. However the scientific logic supposed that successful healthiness teaching will change the health behavior to proper practice of self perineal care and reduces perineal discomfort which interns improves postpartum mothers mean score of pain interference with daily activities. This fact was supported by Glowack 2015⁽²³⁾, as mentioned that health education can enhance scores and satisfaction regarding pain tolerance. In the same context Mohamed 2012⁽²⁴⁾ who concluded that women who taught and applied self perineal care during postpartum stage had, decreased perineal pain, hinder mothers' activities every day. Moreover the current study results illustrate that Power Point media is more effective than printed booklet in reducing scores of pain interferes with activities during the day as walking, sitting and urination. But no difference was found in relation to the process of defecation. This result may be attributed to that Power Point and use of computer may divert mother's attention more than printed media and use of booklets. On the other hand this result was in disagreement with study done by Marco CA 2016⁽²⁵⁾ who found that both educational interventions (video and printed brochure) resulted in decreased self-reported pain scores with no substantial differentiation between the two intervention groups. The discrimination between different study results may be attributed to that acute pains like perineal discomfort differ in nature than chronic pains like Marco's study subjects.

Mothers' opinions about media used

By asking mothers about their opinions about each medium used, overall pregnant mothers were satisfied with PowerPoint and booklet as health media used in health education. Pertaining to PowerPoint, mothers were satisfied with content, writing style, organization, slides design, images, sounds, transition and animation, action buttons and questions used in PowerPoint. All of them assisted learners' engagement and active learning as more than one sense can be utilized in learning. Integrating images and sounds with text made retrieval of information easier. Selective transitional buttons facilitated control and dominancy on the teaching session. Attention was attracted by using colors, backgrounds and effective animation.

Concerning mothers' opinions regarding PowerPoint were confirmed by the result of Apperson et al.(2008)⁽²⁶⁾

who reported that learners preferred the use of key phrase outlines, pictures and graphs, sound, slides to be built line by line and color backgrounds in power point presentation. Additionally, Cingi (2013)⁽²⁷⁾ reported in his study about computer animation in teaching surgical procedures that learning would be more effective with animation and use visual devices such as diagrams, drawings, and pictures.

Another study was done by Hashemiet al. (2012)⁽²⁸⁾ proved that when the PowerPoint was designed poorly, the students became dissatisfied. He added that excessive use of graphics, irritating noises and slide transitions made media distracting rather than a source to maintain attention

Concerning mothers' opinions about booklet, mothers in the current study showed high degree of satisfaction regarding content, writing style, page design and images. This was supported by Wao et al. (2014)⁽²⁹⁾ who put emphasis on the eligibility of brochure content to participants' needs and problems, simplicity, organization, layout and readability as important criteria that achieved participants' satisfaction and acceptability. Oliveira et al. (2014)⁽³⁰⁾ declared that when asking pregnant mothers about their opinions of booklets, they expressed positive opinions about booklets. It was relevant with respect to the graphics, the complementary texts, the motivation to read, respect to the cultural aspects, as well as the clarity of writing.

On the other side of the coin, Buck(1998)⁽³¹⁾ mentioned that there are some obstacles in written information provided to the patient as difficulty in selection of content which are always at reading levels higher than those patients. Further, Hill-briggs et al. (2008)⁽³²⁾ declared that when assessing printed patient education materials prepared for diabetic and cardiac patients, the materials consistently met few criteria for usability by patients. They specified text case; graphics, illustrations, use of cues (e.g., bullets) as the consistently few criteria. On the other hand, reading level, sentence and line length, and font size, visual organization clear and specific recommendation as the least achievement criteria in printed material.

At the last but not least, instructional media is an important factor in achievement of health education. To promote successful maternal health education, it requires careful planning, specific learning objectives, and orientation to the health media, convenient access, opportunities to question what is not understood, instructional design, and sound evaluation of learning. Computer technology can help revolutionize education in formal healthcare programs, continuing education, and consumer education. It also provides informal opportunities for networking among professionals' via-mail, and social networking systems, such as wikis, blogs, and podcasts so it should be used in most health care sectors⁽³³⁾.

VI. Conclusion and Recommendation

It can be concluded from the current study that both health media change mothers' knowledge, practice and decreased scores of perineal pain interfering with daily activities. But interactive digital medium is more effective than printed one for mother's teaching. Both medium (digital & printed) yielded a high level of satisfaction for mothers.

Researchers recommended

Embed using interactive digital health media in mother's health teaching with Ensuring provision of policies, equipment, resources, time, proper setting and environment in every maternity hospital to integrate advanced methods of health teaching.

Educational workshop should be conducted to all maternity nursing staff concerning the powerful role of power point in changing or providing patients' knowledge and how to use it effectively. **Further studies should be made** to investigate factors that affect use of electronic health media and computer gaming in health teaching in Egypt.

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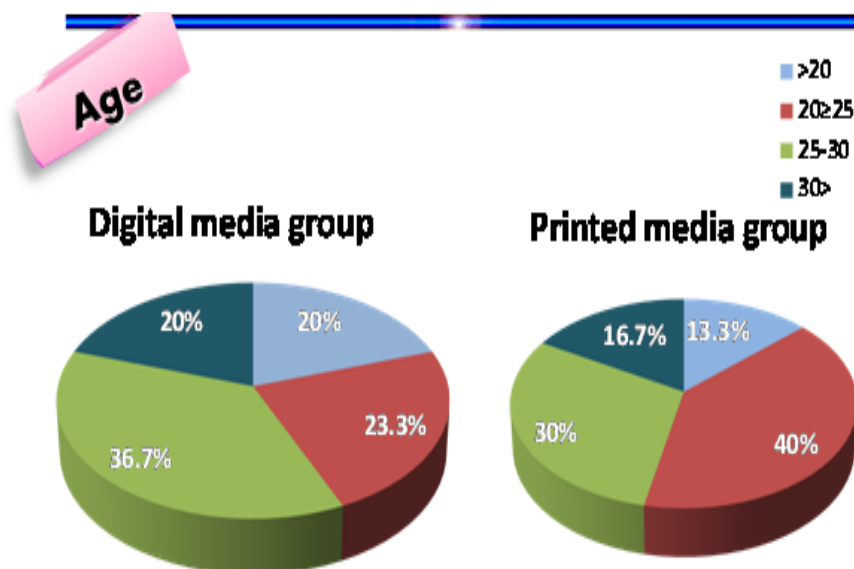


Figure (1): Percent distribution of interactive digital (group A) and printed media (group B) in relation to their age

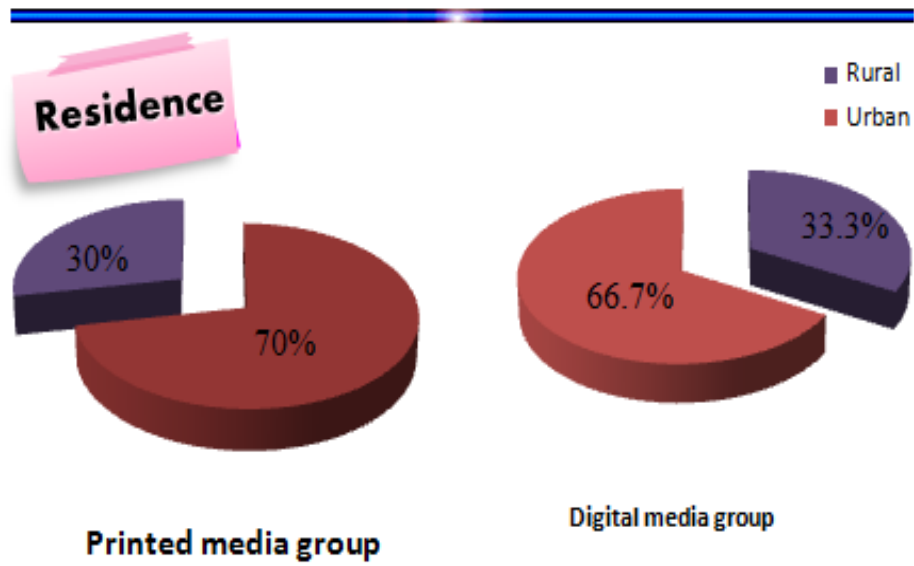


Figure (2): Percent distribution of interactive digital (group A) and printed media (group B) in relation to their residence

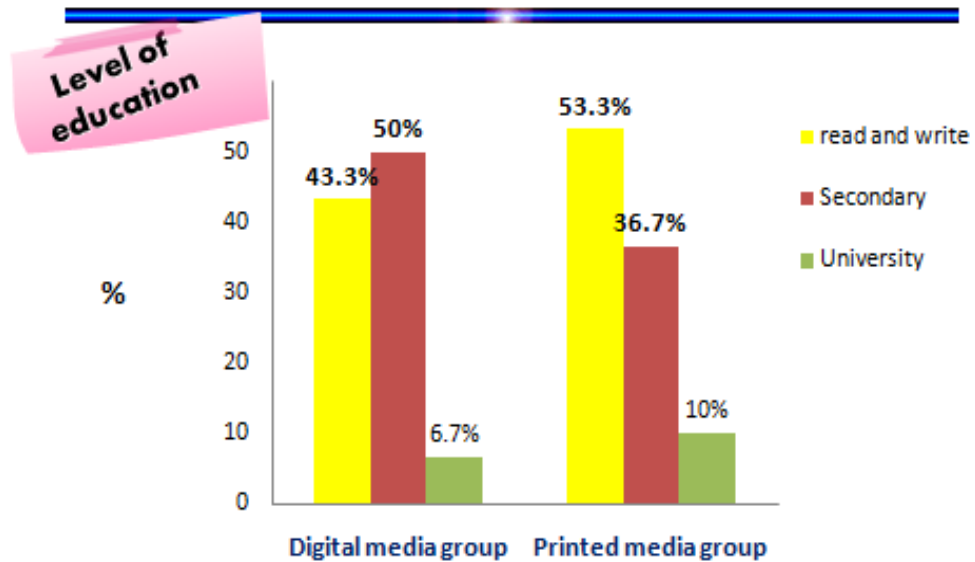


Figure (3): Percent distribution of interactive digital (group A) and printed media (group B) in relation to their level of education

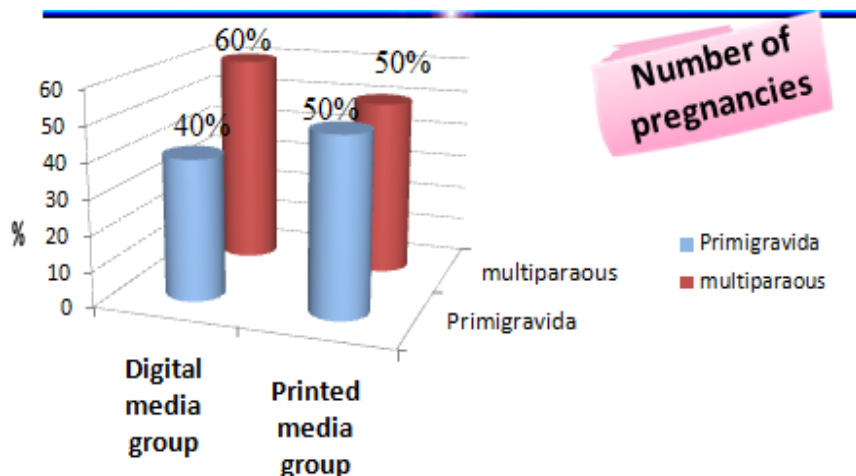


Figure (4): Percent distribution of interactive digital (group A) and printed media (group B) in relation to their number of pregnancies

Table (1): number and percent distribution of interactive digital (group A) and printed media (group B) in relation to their knowledge about perineal discomfort before and after health education

Mothers' knowledge about perineal discomfort	Before using health media				After using health media			
	Group A N=30		Group B N=30		Group A N=30		Group B N=30	
	No	%	No	%	No	%	No	%
Definition of perineal discomfort								
• Yes	25	83.3%	22	73.3%	30	100%	30	100%
• No	5	16.7%	8	26.7%	0	0%	0	0%
Causes of perineal discomfort								
- Correct and complete	2	6.7%	0	0%	27	90%	22	73.3%
- Correct but incomplete	11	36.7%	8	26.7%	3	10%	7	23.3%
- Wrong answer	17	56.7%	22	73.3%	0	0%	1	3.3%
Characteristics of perineal discomfort								
- Correct and complete	14	46.7%	8	26.7%	28	93.3%	22	73.3%
- Correct but incomplete	11	36.7%	13	43.3%	2	6.7%	8	26.7%
- Wrong answer	5	16.7%	9	30%	0	0%	0	0%
Predisposing factors of perineal discomfort								
- Correct and complete	0	0%	0	0%	23	76.7%	15	50%
- Correct but incomplete	10	33.3%	2	6.7%	7	23.3%	9	30%
- Correct but incomplete	20	66.7%	28	93.3%	0	0%	6	20%
- Wrong answer								
Relieving factors of perineal discomfort								
- Correct and complete	0	0%	0	0%	23	76.7%	15	50%
- Correct but incomplete	8	26.7%	2	6.7%	7	23.3%	14	46.7%
- Wrong answer	22	73.3%	28	93.3%	0	0%	1	3.3%
Comfortable positions to relieve perineal discomfort								
- Correct and complete	0	0%	0	0%	27	90%	22	73.3%
- Correct but incomplete	25	83.3%	22	73.3%	3	10%	8	26.7%
- Correct but incomplete	5	16.7%	8	26.7%	0	0%	0	0%
- Wrong answer								
Physician prescribe analgesics								
• Yes	23	76.7%	19	63.3%	30	100%	29	96.7%
• No	7	23.3%	11	36.7%	0	0%	1	3.3%

Table (2): Level of knowledge before and after health education using interactive digital versus printed health media

Level of knowledge	Group A		Group B		χ^2	P
	No.	%	No.	%		
Pre						
0≥11 Poor	2	6.7	6	20.0	3.004	0.263
11≥22 Fair	27	90.0	24	80.0		
22-32 Good	1	3.3	0	0.0		
Post						
0≥11 Poor	0	0.0	0	0.0	6.667*	0.024*
11≥22 Fair	0	0.0	6	20.0		
22-32 Good	30	100	24	80.0		
McN_P2	<0.001*		<0.001*			

χ^2 , p: χ^2 and p values for **Chi square test**
_{FE}p: : p value for **Fisher Exact** for Chi square test
 p₂: p value for **McNemar test**

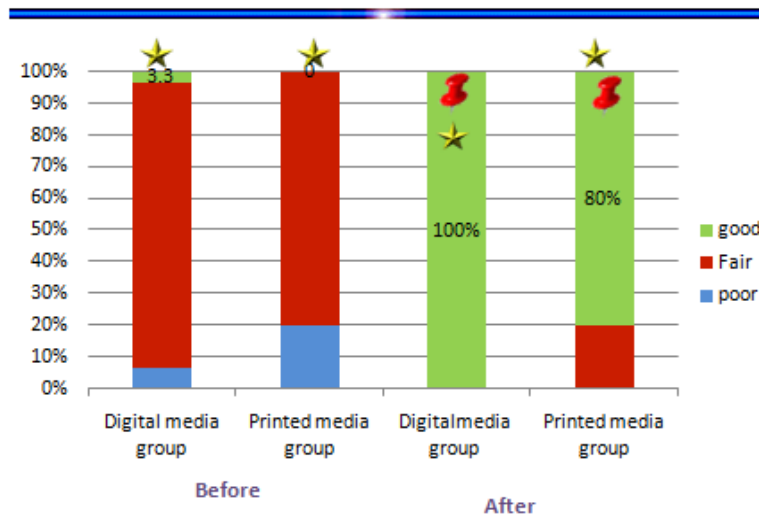


Figure (5): Level of knowledge before and after health education using interactive digital versus printed health media

Table (3) shows number and percent distribution of interactive digital (group A) and printed media (group B) in relation to their practice regarding perineal discomfort at 2nd and 7th day Postpartum.

Mothers' practice about perineal discomfort	2 nd day Postpartum				7 th day Postpartum			
	Group A N=30		Group B N=30		Group A N=30		Group B N=30	
	No	%	No	%	No	%	No	%
Clean the perineal area								
• Yes	24	80%	22	73.3%	30	100%	30	100%
• No	6	20%	8	26.7%	0	0%	0	0%
Change the perineal pad frequently								
• Yes	24	80%	24	80%	30	100%	30	100%
• No	6	20%	6	20%	0	0%	0	0%
Apply cold compresses in the first 24 hours then apply warm compresses								
• Yes	3	10%	0	0%	30	100%	24	80%
	27	90%	30	100%	0	0%	6	20%

• No								
Maintain perineal area clean and dry	24	80%	22	73.3%	30	100%	30	100%
• Yes	6	20%	8	26.7%	0	0%	0	0%
• No								
Increase protein intake	27	90%	26	86.7%	30	100%	30	100%
• Yes	3	10%	4	13.3%	0	0%	0	0%
• No								
Clean perineal area from front to back								
• Yes	25	83.3% 1	22	73.3%	30	100%	30	100%
• No	5	6.7%	8	26.7%	0	0%	0	0%
Dry perineal area from front to back	11	36.7%	19	63.3%	2	6.7%	7	23.3%
• Yes	19	63.3%	11	36.7%	28	93.3%	23	76.7%
• No								
Sitze bath as prescribed	19	63.3%	25	83.3%	0	0%	7	23.3%
• Yes	11	36.7%	5	16.7%	30	100%	23	76.7%
• No								
Sleep in left lateral position	25	83.3%	22	73.3%	30	100%	28	93.3%
• Yes	5	16.7%	8	26.7%	0	0%	2	6.7%
• No								
Perform Kegel exercise								
• Yes	4	13.3%	1	3.3%	27	90%	21	70%
• No	26	86.7%	29	96.7%	3	10%	9	30%

Table (4): The mean scores among interactive digital (group A) and printed media (group B) in relation to their practice regarding perineal discomfort at 2nd and 7th day Postpartum.

Mothers' practice about perineal discomfort	χ +SD	T	P
2 nd day			
• Group A	3.992+9.01	6.240	P = 0 .015*
• Group B	2.389+7.07		
7 th day			
• Group A	6.950+8.36	4.433	P = 0.048*
• Group B	5.738+2.04		

*: Significant at P ≤ 0.05

Table (5): Means Score among interactive digital (group A) and printed media (group B) in relation to their Pain Interference with Daily Activities at 2nd and 7th day Postpartum

Daily activities		Group A N=30	Group B N=30	t. test P. value
		X+S.D	X+S.D	
Sitting	• 2 nd day	5.02 +1.30	6.50+0.75	7.248 P. 0.03*
	• 7 th day	2.18+1.32	3.10+1.72	
Walking	• 2 nd day	4.62+ 1.41	5.27 +0.54	1.694 P. 0.05*
	• 7 th day	2.48+1.60	3.34+1.64	
Urination	• 2nd day	4.41 +0.62	4.45+0.74	0.939 P. 0.65
	• 7th day	3.51+1.17	3.32+1.38	
Defecation	• 2nd day	5.20+ 1.38	5.45 +1.23	0.82 0 P. 0.472
	• 7th day	3.27+1.32	3.975+2.42	

*: Significant at P ≤ 0.05

Table (6): Opinions of mothers regarding interactive digital health media (Power Point) used for postpartum perineal discomfort.

Digital media used for postpartum discomforts	digital media group (n=30)							
	Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%
1- Content	29	96.7%	1	3.3%	0	0%	0	0%
2- The writing style	27	90%	3	10%	0	0%	0	0%
3-The organization	28	93.3%	2	6.7%	0	0%	0	0%
4- Slides design	28	93.3%	2	6.7%	0	0%	0	0%
5- Images	29	96.7%	1	3.3%	0	0%	0	0%
6- Animation and transition between slides	27	90%	3	10%	0	0%	0	0%
7- Sounds	26	86.7%	3	13.3%	0	0%	0	0%
8- Action buttons	28	93.3%	2	6.7%	0	0%	0	0%
9- Questions	28	93.3%	2	6.7%	0	0%	0	0%

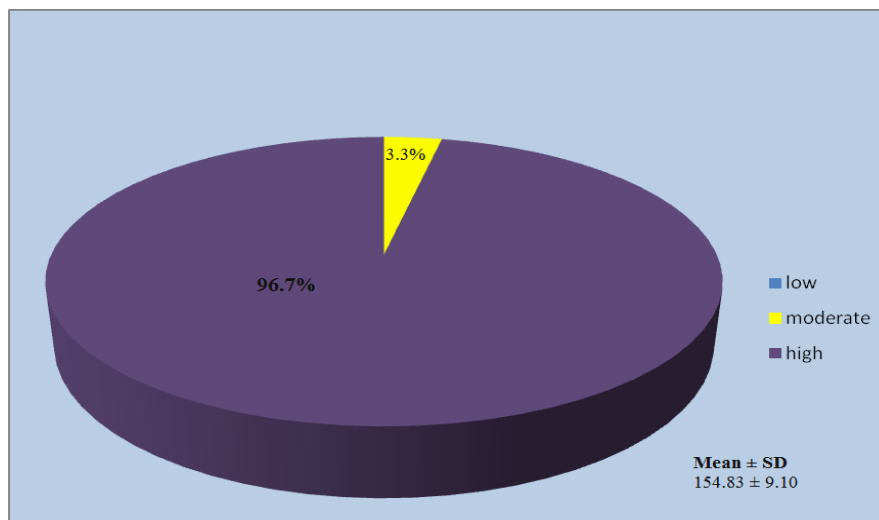


Figure 6: Number and percent distribution of digital media group level of satisfaction about digital media

Table (7): Opinions of mothers regarding printed media (booklet) used for postpartum perineal discomforts.

Printed media used for postpartum discomfort	printed media group (n=30)							
	Strongly agree		Agree		Disagree		Strongly disagree	
	No	%	No	%	No	%	No	%
1- Content	24	80%	6	20%	0	0%	0	0%
2- The writing style	22	73.3%	7	23.3%	1	3.3%	0	0%
3-The organization	25	83.3%	5	16.7%	0	0%	0	0%
4-Pages design	24	80%	6	20%	0	0%	0	0%
5- Images	24	80%	6	20%	0	0%	0	0%

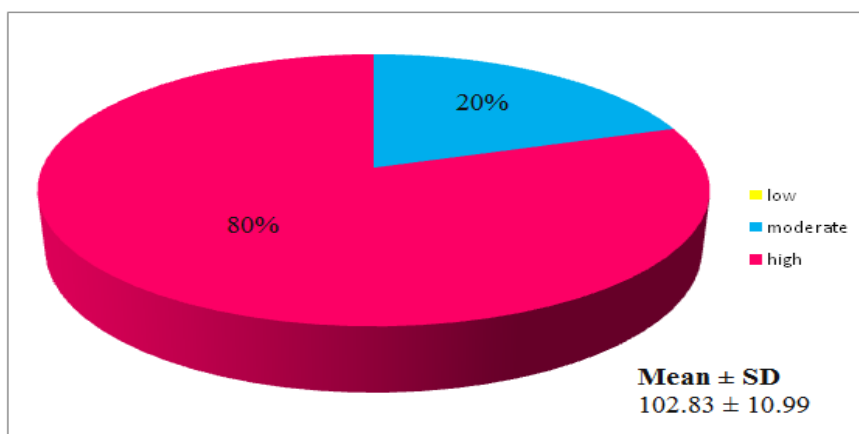


Figure 7: Number and Percent distribution of printed media group level of satisfaction about printed media