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Virtual reality technology on health intervention for women: a literature review

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Abstract. Virtual Reality (VR) technology application has become more affordable, immersive and portable. This is also happening in the health intervention domain. While the usage of the VR applications is still dominated by man, we conduct a literature review study to see the state-of-the-art in the application for recent VR technologies for women's health intervention. This study is done since women are more susceptible to some disease than men, feel pain more easily, more susceptible to autoimmune diseases, and experience anxiety and phobia more easily. It will help future studies to lookup the big impact of VR health intervention for women. The result of the literature review shows that there are three types of VR technology are used in the application (non-immersive, semi-immersive, and full-immersive), there are four category of health interventions done through VR (prevention, diagnosis, treatment, diagnosis-treatment), and the domain of the disorder are focused mostly to psychological and physical aspect.

1. Introduction

In recent years, Virtual Reality (VR) technology has become increasingly affordable, immersive and portable. This allows the use of VR in various environments, including in the domain of health interventions. Some areas of VR use in health intervention domains have promising applications, including anxiety, phobia, obesity, chronic diseases, mental illness, to surgical simulations. VR is able to present subjective experiences that make it an attractive intervention in the realm of health, including preventive, diagnosis and treatment.

Several surveys conducted on VR consumers in America [1] and China [2] showed that the usage of VR was still dominated by men. This shows that men have more alternatives that can be chosen to support health problems and women have fewer opportunities in the experience of using VR as a health intervention. Women have their own problems which in some cases need better health interventions, such as: women are more susceptible to Alzheimer's disease than men [3], women feel pain more easily than men [4], women are more susceptible to autoimmune diseases [5], and women experience anxiety and phobia more easily [6].

In this paper, we conduct a novel review on the studies of VR-based treatments for female patients in global health interventions. This literature study aims to examine VR technology developed over the past few years in dealing with health problems in women. The development of these technologies



includes topics of the targeted health issues, types of VR used in health interventions, and VR technology used. In its presentation, this paper divides the research into three technology categories: Full-Immersive; Semi-Immersive; and Non-Immersive VR. According to [7], Full-Immersive VR System is a type of VR that encapsulates audio and visual perceptions of users in cyberspace and cuts all outside information so that the experience is truly immersive. Non-immersive systems are often called a desktop virtual reality (without an input device) and are rely on the displayed screen. This is the window to go into virtual worlds without any additional devices, such as HMD (Head-mounted display). The system is sometimes called Window on World (WoW) systems. A semi-immersive system consists of VR and real-world attributes by realizing computer graphic objects into real scenes. The input to this type of system is entered and controlled by the user such as by using a mouse, keyboard, interaction style, glasses, and joystick. This allows users to interact using hands and sometimes using HMD or DataGloves. The results of this literature study are expected to provide a new knowledge as point of views and reference for the development of VR technology in dealing women's health problems.

2. Methods

2.1. Inclusion and Exclusion Criteria

The chosen research in this study meet the following inclusion and exclusion criteria: (1) The research publication papers are published in or after 2015; (2) Research's respondents are all or dominated by women; (3) The research only discussing women's health problems; (4) The research uses virtual reality technology; (5) There is an explanation of the use of the virtual reality; (6) There is clear data about virtual reality effects for patients. We did not include research that has is aimed for health education, since we are focusing on health service interventions.

2.2. Searching Method

To find out the application of virtual reality technology to deal with women's health problems, a systematic literature review is done. Searching related researches are done by using several appropriate keywords. The used keywords are related to the discussed topic. Keywords are divided into two parts, namely a) "virtual reality" or "health technology" and b) "women" or "female". By using the keywords, we searched for relevant researches using several search engines: Google Scholar, EBSCOhost, Scopus, and ScienceDirect.

2.3. Data Extraction and Analysis

The search results from different search engines are combined and the result duplicates are eliminated. Finally, the result is filtered to match the selection criteria. A spreadsheet tool is used to present the complete attributes, descriptions, and categories of the papers. Research that meets the selection criteria is included in the literature review process. This paper categorizes the review findings based on the type of virtual reality technology and the type of health interventions (preventive, treatment, and diagnosis).

3. Result and Finding

The selection process gives 24 studies as the result, which is then included in the review process (as shown in Table 1). The studies are analyzed and discussed based on two topics: the kind of VR technology used and the kind of health intervention which use the VR technology. Figure 1 shows the finding on the use of VR technology for women's health intervention, based on the two topic given. From the figure, we can see that the three type of VR technology is broadly used on the treatment intervention. Further discussion on the finding is given as follows.

3.1. VR Technology in Women's Health Intervention

The three type of VR technology, namely non-immersive, semi-immersive, and full-immersive, are used in women's health intervention. The following are the finding found.

Table 1. Recent Researches in Virtual Reality Technology on Health Intervention for Women

| Year | Ref | VR Type | Health Condition | Purpose | Tools |
|------|------|----------------|---|-----------------------|---|
| 2015 | [19] | Semi immersive | Food craving | Treatment | Notebook with Intel pentium processor, 4 GB RAM, Radeon HD 4570 up to 2301 Hyper Memory graphic card, 15,6 inch monitor, Polarized glasses; Noise cancelling earphone |
| 2015 | [8] | Non immersive | Self management strategy | Preventive | XBOX 360; Microsoft Kinect; 1625.6 mm monitor |
| 2015 | [23] | Semi immersive | Pain reduction on women who are having their first child (Primiparity). | Preventive | 3D Blu-ray/DVD player full HD, BD660 model, connected with video glasses (Wrap 920 system, Vuzix factory, USA) and one 3D movie (IMAX Dolpne and Whales 3D 1080p). External headphones. |
| 2015 | [10] | Semi immersive | Urinary Symptoms | Treatment | Wii Fit Plus |
| 2015 | [9] | Non immersive | Alzheimer | Treatment | Video game capable computer. |
| 2015 | [12] | Semi immersive | Urinary Symptoms | Treatment | Virtual environment with freeware dance game StepMania; Dance mat as motion sensor. |
| 2015 | [26] | Full immersive | Fear of crowd | Treatment | 300 x 225 cm2 stereoscopic passive screen, CAVE, HMD. |
| 2016 | [28] | Full immersive | Eating Disorder; Body Image Disturbance (BID) | Diagnosis; Treatment | Display: nVisor SX111 resolution 1,280x1,024 pixels, 280x1024 with headphone; Advanced Video Control Unit (NVIS, Reston, VA). |
| 2016 | [17] | Semi immersive | Social Phobia | Treatment | PC: OS Windows 7, i7, RAM 4GB, NVIDIA 540M; 3D Head-mounted display |
| 2016 | [25] | Full immersive | Persecutory Delusions | Treatment | Laboratory room as the environment; Head-mounted display; |
| 2016 | [11] | Semi immersive | Urinary Symptoms | Treatment | Wii Fit Plus; Wii Balancing Board |
| 2016 | [29] | Full immersive | Eating and weight disorder | Treatment | Head-mounted display; Oculus Rift DK2; Portable computer, intel i7 |
| 2016 | [15] | Non immersive | Depression | Treatment | Second Life (played by participants) |
| 2016 | [22] | Semi immersive | Post stroke | Treatment | 27" monitor, 3D vision glasses, robotic pen |
| 2017 | [18] | Semi immersive | Anorexia Nervosa | Treatment | 3D Head-mounted display |
| 2017 | [20] | Semi immersive | Alzheimer | Diagnosis; Treatment | 2 monitors; Head-mounted display |
| 2017 | [31] | Non immersive | Pregnancy; Kinematic motion | Diagnosis; Treatment | Nintendo Wii Fit Plus |
| 2017 | [24] | Full immersive | Anterior Cruciate Ligament (ACL) injury | Preventive | 10mx15m room for VR environment (TEAM VR); Unity 3D Pro to develop the software; Windows 7 NVIDIA GeForce GTX 980; Wireless HMD 1280x720 HD, 60 frames/s |
| 2017 | [27] | Full immersive | PTSD | Preventive; Treatment | Head-mounted display (TriVisio VR Vision for 3D visual); Headphone for audio; Olfactor sensor to spray smoke smells through ventilator for multi-sensory stimulation; Joystick for motion control |
| 2017 | [30] | Full immersive | Pain management: Gynecology operation | Treatment | VR environment "Enchanted Forest"; Joystick as a game controller; Patient body sensor; Head-mounted display |
| 2017 | [13] | Non immersive | Anorexia Nervosa | Treatment | 19" flat panel LCD screen 1280x1024 pixel; 32 bit colour depth |
| 2017 | [21] | Semi immersive | Post stroke | Treatment | 1 or 2 markerless infrared sensors, workstation touch screen, camera supports, BTS NIRVANA software, and Webcam. The system is connected to a projector or a big screen; |
| 2018 | [14] | Non immersive | Diabetes | Preventive | Participant plays Second Life GoWoman |
| 2018 | [16] | Semi immersive | Military Sexual Trauma | Treatment | Head-mounted display; Audio |

3.1.1. Non-Immersive. Several studies have been conducted using non-immersive VR technology that targets health interventions for elderly women. In [8], the researchers developed the Individualized feedback-based virtual reality (IFVR), a virtual reality which aims to be a strategy for managing health.

This intervention utilizes XBOX 360, Microsoft Kinect, and the monitor screen to train independence in maintaining personal health for women in old age. IFVR interventions have been shown to improve quality of life, mental health, body strength, vitality, emotional health, and general health. Research conducted by [9] raised health interventions for women with Alzheimer's. The therapy is done by inviting women who have Alzheimer's disease and aims to improve their memory. Using VR with the background of a kitchen, the application is run on a laptop. The media of user interaction in the application is by using the mouse. The application was developed using the Unity 3D game engine. Research conducted in [10] involved 46 female respondents to treat Urinary Symptoms. The research uses VR games from Wii Fit Plus. The use of the VR is twice a week for 30 minutes, with a total of 10 sessions. As a result, using the VR program is reducing urinary symptoms in menopausal women. The work in [11] also examined the same thing by inviting 60 women who had experienced menopause. From the results of the interventions carried out with the VR, participants have better muscle endurance. Furthermore, research conducted by Elliot et al. [12] is also related to Urinary Symptoms. The therapy was carried out by combining Pelvic Floor Muscles (PFM) and Virtual Reality Rehabilitation (VRR) exercises. The training is carried out for 12 weeks with assessment done before and after the training. Virtual Reality in this study uses a computer in which free StepMania dance game is installed. Trainees will do the exercises in front of a screen that shows the direction of movement and Dance Mat is used as the motion sensor of the game.

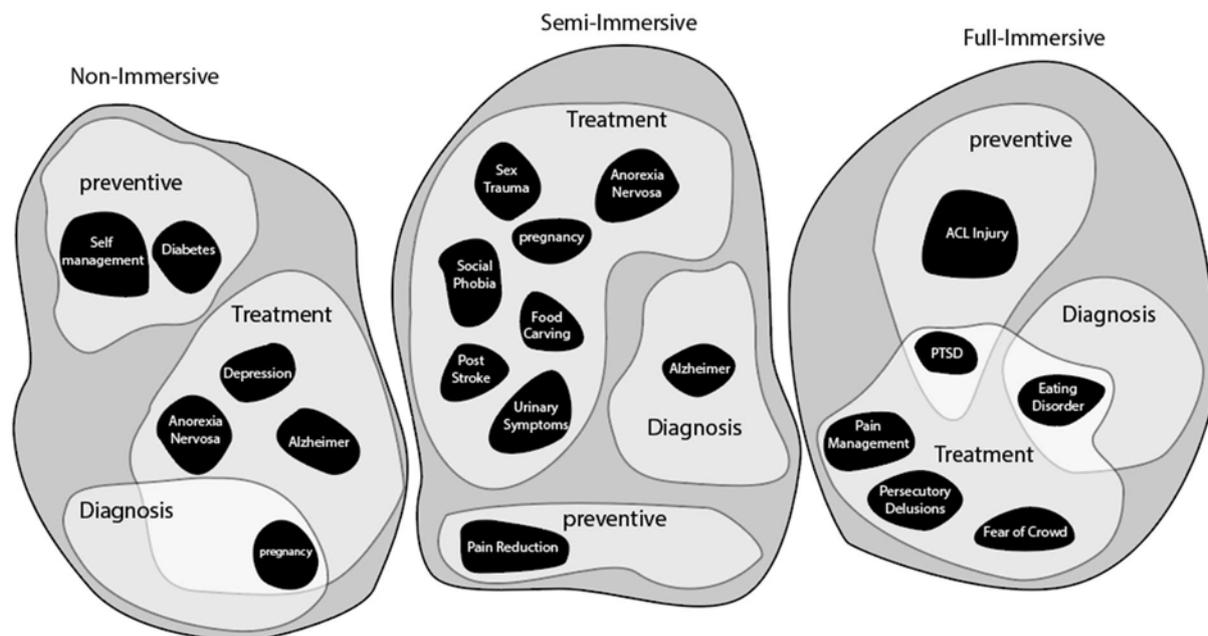


Figure 1. The finding of the use of VR technology for women's health intervention.

Non-immersive virtual reality is also performed on women to increase self-confidence and self-respect. Research conducted by [13], raised the problem of Anorexia Nervosa. Including 15 women who experienced this problem, participants will see their body simulation with VR according to the ideal BMI of each patient. Using VR technology, the participants will be scanned by sensors to measure up their estimated weight and produce their 3D body shapes. Research conducted by [14] developed the GoWoman program based on Second Life virtual reality. GoWoman will help women to maintain their health from the risk of diabetes. Participants will play GoWoman through their respective computers or

laptops. Research using Second Life virtual reality was also carried out in [15]. In this study, therapy sessions were conducted for one week using the Second Life application and significantly succeeded in increasing the confidence of participants in depressed women with disability.

The subsequent research conducted in [31] is about diagnosis and therapy for kinematic movements of pregnant women using the Nintendo Wii Fit Plus®. All pregnant women were divided into four groups. The test was carried out in 12 sessions, 30 minutes in a session and three times a week. The results obtained show that the use of Nintendo Wii Fit Plus® is not able to influence the kinematic variables sit-to-stand in the women analyzed. Furthermore, research conducted [17] reported that the use of VR can increase patient motivation to recover from a stroke.

3.1.2. Semi-Immersive. Several studies that use semi-immersive VR technology were conducted by targeting mental health problems. Research conducted in [16] raised the issue of Military Sexual Trauma (MST). This study utilizes HMD and audio stimuli as its virtual technologies. The therapy was carried out for 3 months and has been proven safe and promising for the treatment of MST, especially mental disorders. Furthermore, another study targeting mental health was carried out in [17], which raised the problem of Social Phobia. By using VR technology installed on a computer and 3D glasses as visual media, participants underwent 12 therapy sessions with each 50-minute duration session. The therapy was held for 6 months. Overall participants experienced positive improvement in their phobia symptoms.

Research utilizing semi-immersive VR technology was also conducted to address the problem of self-confidence in body shape and diet. Research [18] utilizes VR to help women who experience problems with Anorexia Nervosa. Participants underwent three-dimensional body scans and conducted treatment sessions using 3D HMD. Participants who experienced Anorexia Nervosa can determine the target weight according to the ideal body weight. Furthermore, research [19] developed a semi-immersive virtual reality to control appetite (cravings). Food craving is a condition where someone wants to consume a food but not based on hunger.

Virtual reality for diagnosis was developed by research [20], namely the use of virtual reality technology to diagnose the inhibition of cognitive function in adult women who are starting to age using two monitor screens and head-mounted displays. 89 participants were divided into two groups. Each group compared its performance on the Three Stroop Modalities, namely multi-item paper-and-pencil Stroop, Single-item Computerized Stroops (no distractions) and Virtual Reality-based Stroops (with Distractions). The results show that the use of Virtual Apartment Stroop Task has the potential to distinguish between inhibition of prepotent response and resistance to inhibition of distractors in aging adult women.

Research of VR which take after stroke domain is carried out by [21]. The research utilizes markerless infrared sensors, touch screen workstations, camera supports, BTS NIRVANA software, and webcams. The system is connected to a projector or a big screen. Nirvana base stations are able to improve attention processes, spatial cognition, and mood in patients. In addition, [22] uses VR tools called RehAtt, succeeded in increasing spatial attention in the activities of daily life of post-stroke patients. RehAtt works by using 27" monitors, 3D vision glasses, and robotic pens.

The study in [23] develops virtual reality to reduce pain postpartum episiotomy. 30 women were divided into two groups. Intervention Group gets regular treatment using VR and Control Group gets treatment without using VR. The result shows that VR can be used as a complementary non-pharmacological method that is effective for reducing pain during episiotomy repair.

3.1.3. Full-Immersive. Research [24] aims to develop virtual reality for female athletes that can reduce the risk of ACL injury. In this intervention, virtual reality was developed in a room measuring 10m x 15m for a VR environment (TEAM VR); Software developed with Unity 3D Pro; Windows 7 NVIDIA GeForce GTX 980; 1280x720 HD HMD wireless, 60 fps. The result shows that virtual reality technology can be used as an immersive and simulation-based exercise scenario to evaluate the patient's biological condition and as a neuromuscular training intervention to reduce the risk of ACL injury.

Several studies have been conducted using VR technology on mental health problems. In [25], the research raised the domain of Persecutory Delusions. The test is carried out for 60-90 minutes each period. The virtual environments are designed with two different environments, namely Subway and Lifts. Therapy is carried out in a virtual lab which use sensors to support the assessment of patient behavior. Patients wear HMD during therapy sessions. For therapy conducted in the virtual subway environment, patients can walk as if they are on a train. Stages of difficulty in the therapy are done by raising an avatar. The number of avatars that appear is a stage of the difficulties faced by patients. Through the results of the therapy obtained, the use of VR technology can prove high effectiveness in treating delusions. Research conducted in [26] shows that VR can be used as a therapeutic tool for phobia patients with crowds. The study utilizes VR technology by displaying visual scenes on a stereoscopic passive screen 300 x 225 cm². Users wear polarized stereoscopic glasses. Auditory scenes are presented via Sennheiser HD650 headphones and sound stimuli are processed through binaural rendering using Head Related Transfer Functions (HRTF). The virtual environment reproduces the campus environment of Trinity College Dublin which consists of buildings, alleys and vegetation. Animated virtual individuals, referred to as humanoids, can be placed in this environment. The auditory component of a virtual environment consists of a human voice and an ambient audio environment consisting of bird sounds and urban activities. In virtual scenes used 12 to 96 humanoids can be distributed in virtual environments. Furthermore, Virtual reality used for Anxiety Level diagnosis in PTSD (Post-Traumatic Stress Disorder) patients was developed in [27]. This virtual reality technology uses Head-mounted display Type TriVisio VR Vision for 3D visuals; Headphones for sound; Olfactor sensor to emit smoke odor through a ventilator to ensure multi-sensory stimulation; Joystick for movement control. In this study, 80 participants were divided into 2 groups, High Anxiety (HA) and Low Anxiety (LA). The results show that the HA group manifest higher stress. The VR can be used to prevent stress with interventions that target risk factors for peri-traumatic and post-traumatic in real time.

Several studies have been conducted in the intervention addressing the problem of Eating and Weight Disorder. Research [28] developed a London Bus virtual reality to diagnose Body image disturbance (BID) in women which provide therapy to women who experience BID. The virtual environment used is a 4-minutes trip using the London bus. The simulation environment was developed using the Unity software package. The environment is displayed in color through HMD; the screen used is n SX111 Shield with a resolution of 1,280x1,024 pixels, 280x1024 resolution, and 111 ° field of view. Furthermore, research [29] took 21 female participants with symptoms of Eating and Weight Disorder. Participants will be asked about their ideal body shape. Then they will see the ideal body shape they want through VR. VR technology used is HMDs that are connected to a computer. The computer has the Skinny Belly application which is used to view the participants' virtual body shape. After conducting an experiment using the VR, participants are shown a decrease in the estimation of their ideal body shape and body shape. This application can be developed for women who suffer from weight disorders and appetite.

Finally, a study was carried out in [30], taking a related problem on Pain Management in women who would perform gynecological surgery. VR technology used includes Full-Immersive, using HMD, sensors that are installed in the patient's body and joystick as an interaction tool in the game. As a result, VR patients showed lower pain indicators than patients who did not use VR.

3.2. Health Intervention of VR

Based on the type of the health intervention, we found that there are four types of VR application for women. Three of them are granular intervention: preventive, diagnosis, and treatment. The other one is the combination of diagnosis and treatment. We elaborate them as follows.

3.2.1. Preventive. Several studies have developed virtual reality as a preventive effort for several diseases ([19], [8], [23], [24], and [14]). The preventive interventions given are (i) develops a virtual reality to control appetite (cravings/food craving) to control health [19], (ii) regulates self-health for

women in old age to improve the quality of healthy life in mental health, body strength, vitality, emotional health, and general health [8], (iii) reduces pain postpartum episiotomy [23], (iv) evaluates the patient's biological condition and as a neuromuscular training intervention to reduce the risk of ACL injury [24], and (v) maintains the health from the risk of diabetes by taking 16 practice session to experience weight loss, waist circumference, increased physical activity, diet and self-desire in diet [14].

3.2.2. Diagnosis. Virtual reality application for diagnosis can be seen in [20]. The use of virtual reality technology to diagnose inhibition of cognitive function in mature women who are aging. It is proved that the VR has the potential to distinguish between inhibition of prepotent response and resistance to inhibition of distractors in aging adult women.

3.2.3. Treatment. Most of VR applications are developed in treatment intervention. Research [12] combines Pelvic Floor Muscles (PFM) and Virtual Reality Rehabilitation (VRR) exercises. As a result, the incorporation of training using PFM and VRR is acceptable, efficient and satisfying for the elderly with urine problems. The same thing was done in the study [10] using the VR program, that can be promoted in PFM training and reduce urine symptoms in menopausal women. [11] also examined the same thing by inviting 60 women who had experienced menopause. It also shows good results for PFM and can be practiced in a clinical environment. Research conducted in [9] raised Alzheimer's. Therapy is done by inviting a woman who has Alzheimer's disease to be able to improve her memory. With 4 days of therapy with cooking tasks, the result shows that respondents can learn the tasks given in the application and are able to do it in real life stably according to what is done during therapy. Conducting research on Eating and Weight Disorder, the study in [29] took 21 female participants with symptoms of Eating and Weight Disorder to participate. Participants will be asked about their ideal body shape. Then they will see the ideal body shape they want through VR. This can be developed for women who suffer from weight disorders and appetite. Furthermore, in the study [17] raised the topic of Social Phobia therapy with each 50-minute duration session which was lived for 6 months. Overall participants experienced an increase in the value of their phobia symptoms. In [25], the research about Persecutory Delusions is conducted. The test carried out for 60-90 minutes each period. Through the results of the therapy obtained, the use of VR technology can prove high effectiveness in treating delusions. In [30], took the related problems of Pain Management in women who would perform gynecological surgery. In the intraoperative phase, the VR group will use VR as an intervention during this phase. As a result, VR patients showed lower pain indicators than patients who did not use VR. In [13], proposed the problem of Anorexia Nervosa. Using VR technology, the participants will be scanned by sensors to measure shapes up to their estimated weight and produce their 3D body shapes. Patients who underwent therapy showed a decrease in the ideal body shape with their ideal BMI. This shows that VR Environment is able to make patients more realistic in determining diet targets to achieve an ideal body. Another research that develops virtual reality for Anorexia Nervosa is in [18]. After undergoing experiments, the two groups can determine the target weight according to the ideal body weight. In [16], which took the issue of Military Sexual Trauma (MST). respondents were given 6 training sessions for 3 months. Training using VR is carried out for 30-45 minutes within 2 weeks of working days. The results indicate that the Virtual Reality Environment (VRE) provides the delivery of training materials safely and promising for the treatment of MST, especially mental disorders.

3.2.4. Diagnosis and Treatment. Some studies also develop virtual reality that can be used for diagnosis and treatment of a disease. As in the study [28] developing virtual reality diagnoses BID in women and provides therapy to women who experience BID. Subsequent research is about diagnosis and therapy for kinematic movements of women who are pregnant [31]. The test was carried out in 12 sessions and 30 minutes in session and 3 times a week.

4. Discussion

Based on the findings, most virtual reality technologies developed for women health interference were aimed for the treatment of psychological problems and physical exercise. This statement is strengthened using word cloud analysis depicted in Figure 2. The focus of the VR usage in physical treatment is reflected by the high frequency number of the word *body*, *bmi*, *weight*, and *physical* (in year 2018). As for psychological problem, the word cloud gives a visualization of the word *trauma*, *stress*, *esteem*, and *anxiety*.



Figure 2. Word cloud visualization of the studies.

Psychology therapy requires a situation that is able to present a real picture of the situation that affects the patient psychologically. As an example, is the treatment of Persecutory Delusions [25]. Persecutory Delusions are psychological problems that make sufferers experience delusions of persecution, so they have excessive fear and alertness when interacting with strangers. Virtual reality environments are designed like underground train stations and elevators. Patients try to play virtual reality as if they were in these two places. Through virtual reality games, patients can practice reducing their anxiety and delusion towards persecution. In addition, in the case of social phobias [17], virtual reality can help people with social phobias to practice interacting with other people with 3-dimensional avatars.

In addition to psychological therapy, virtual reality is also widely developed for physical exercise. With sensors that can record body movements, virtual reality can help patients to do physical exercise therapy according to their needs. The important thing that must be considered during physical exercise is the condition of the patient when doing the exercise and the suitability of the patient in carrying out physical exercise movements. If during the training session there is a clear report on improving the patient's condition and the patient is able to exercise properly, the physical exercise therapy session can be declared successful. Virtual reality technology is able to present a real environment, provide simulations of situations that exist in the real world, and is able to record patient sensors during use.

Trends in the development of virtual reality technology based on the findings will lead to technology for therapy. This can be seen from many studies that develop virtual reality technology that is used as a therapy for health problems, especially psychological problems, and physical exercise. Not only specifically for therapy, but virtual reality technology can also be combined with diagnoses such as in [28] and [31] or combined with preventive as in [27]. In addition, although not many have researched, virtual reality can also be developed into preventive technology.

Virtual reality technology for diagnosis has not been widely developed by researchers. From the search results, only one study developed virtual reality technology for diagnosis. In the case of women's health, the developed virtual reality is a combination of diagnosis and therapy [28], [31]. However, in both studies, the results obtained were not in accordance with the hypothesis. Research [31] is a study that discusses virtual reality technology for the sitting-standing movement of pregnant women. The study was the first study to discuss the effect of virtual reality for diagnosis and sitting-standing therapy for pregnant women. There are several things that affect the research instrument that was recently discovered after the study. One of them is the influence of maternal hormones that change frequently. The hormonal conditions of pregnant women when making a diagnosis with virtual reality compared to their daily hormonal conditions can be different. Likewise, with the state of the hormone when making a diagnosis in each session. In addition to hormonal conditions, physiological changes in pregnant women also affect the results of diagnosis and therapy using virtual reality.

In developing virtual reality for the diagnosis of women's health, it is important to note the side effects that arise during the experiment, such as dizziness, nausea, headaches, eye strain, and the development of responses that are not in accordance with the real world [32]. These side effects can also be affected by the condition of female hormones when conducting experiments. Development of virtual reality technology for women's health in the future must pay attention to the side effects and influences of other conditions that may be experienced by women.

5. Conclusion

Virtual Reality (VR) technology are used broadly in the health intervention domain. This study elaborates the state-of-the-art in the application for recent VR technologies for women's health intervention. The findings of this study show that there are three types of VR technology are used in the application (non-immersive, semi-immersive, and full-immersive). The three technology are used pretty much equally. However, we could see that non-immersive technology is rather be used highly in aged women. From the same findings, from the four category of health interventions done through VR (prevention, diagnosis, treatment, diagnosis-treatment), treatment is one health interventions with the highest number. Finally, the domain of the disorder are focused in disorders related to psychological and physical aspect.

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