The Effectiveness of Digital Storytelling on Self-Management of Diabetes Mellitus Patients: A Systematic Review

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Artikel info

Abstract. The global prevalence of diabetes in adults increased over the last few decades. This study aimed to iden... and analyze scientific evidence on the effectiveness of dig... storytelling on the self-management of diabetes mell... patients. Method: This systematic review is based on ... PRISMA checklist. Literature search via PubMed, Goo... Scholar, DOAJ, ScienceDirect, Cochrane, and Wil... Structured research questions used the PICO electronic met... (patient, intervention, comparison, and outcome). There ... three different models of digital storytelling interventi... namely, using videos, slide shows, and photovoice. From a t... of 581 respondents who were studied, the most frequently u... digital storytelling content was diabetes self-management s... as drug management, glucose self-monitoring, physical activ... and nutrition. The effects of digital storytelling found wer... description of the patient's experience after being given dig... storytelling intervention. The impact of digital storytelling ... cognitive, affective, patient skills related to their illness, ... effect of digital storytelling on psychological aspects (s... efficacy, self-confidence, self-awareness, and motivation)... storytelling. An alternative educational strategy for pati... groups who have low health literacy and older age grou... Conclusion: There are three models for implementing dig... storytelling intervention, namely digital storytelling us... video, digital storytelling using slide shows, and dig... storytelling using the photovoice technique with Instagr... modification. For this reason, Further research Needs ... examine the digital storytelling intervention found in this rev... for self-management of DM patients.

Keywords: Digital storytelling, Self-Management, Diabetes mellitus

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia due to abnormalities in insulin secretion, insulin action, or both. Chronic hyperglycemia in DM will be accompanied by damage to the function of several body organs, especially the eyes, kidneys, nerves, heart, and blood vessels (1). Therefore, DM is also known as the silent killer (2). The DM could impact microvascular complications (retinopathy, nephropathy, neuropathy) (3) and macrovascular (coronary heart disease, kidney failure, lower limb ischemic disease, stroke) (4). The global prevalence of diabetes in adults has increased over the last few decades. About 382 million people worldwide, or 8.3% of adults, are estimated to suffer from diabetes, and 80% live in low and middle-income countries. If the current trend continues, by 2035, around 592 million people or one adult in 10 will have diabetes. This means the equivalent of 3 new cases every 10 seconds or nearly 10 million per year, and the most significant increase occurred in developing economies [5]. It is projected that up to one in three adults in the United States could build DM by 2050 [6]. Adults who are elderly 45 years and over are the largest population of people with diabetes [7]. Then, the diabetes incidence rate among adults in China was 11.6% [8]. At the same time, Indonesia is the seventh-largest house globally with the number of DM patients with 7.6 million people [9].

Physiologically, the control of blood sugar in DM patients could be influenced by stress. In addition, DM sufferers may experience impaired ability to regulate themselves in daily care, such as monitoring blood sugar regularly, following a diet plan, and taking medication at the right time [10]. Therefore, patients suffering from DM are critical to good self-management so that the risk of complications can be reduced [11]. One of the most innovative interventions [12] and can improve the self-management of DM patients is digital storytelling (13-18)

Although digital storytelling is an effective intervention in the self-management of diabetes mellitus patients. The reviews on digital storytelling only discuss the storytelling side, but studies regarding its impact on patients do not yet exist, such as the effect of digital storytelling on the patient's ability to perform self-management, a description of patient experience after being given digital storytelling intervention, the impact of digital storytelling on cognitive, affective, patient skills related to the disease, the effect of digital storytelling on psychological aspects (self-efficacy, self-confidence, self-awareness, and motivation), an intervention model for implementing digital storytelling, digital storytelling as an alternative educational strategy for patient groups have low health literacy and older age groups besides that reviews about digital storytelling are not regular, so it is essential to compile [19].

OBJECTIVE

This study aimed to identify and analyze available scientific evidence on the effectiveness of digital storytelling on the self-management of diabetes mellitus patients.

METHOD

This systematic review is based on the PRISMA checklist 2009 [20]. A literature search was conducted via PubMed, Google Scholar, DOAJ, ScienceDirect, Cochrane, and Wiley. Structured research questions used the PICO (patient, intervention, comparison, and outcome) electronic method [21]. The PICO in this article was: P: patients with diabetes mellitus I: digital storytelling, C: no comparison, O: self-management. Meanwhile, the search keywords are based on the database in the abstract title.

The research questions formulated through the PICO strategy are as follows: "What is the effect of digital storytelling on the management of diabetes mellitus patients?. Six hundred seventy-six articles were identified from the six literature search data published from 2011-

2020; All studies are human only and relate to research questions). The authors independently assessed all identified articles for inclusion in the systemic review. Of the 676 potential articles, 66 were excluded because of double publication, 198 were excluded because they were not full text, 321 were excluded because they did not fit the research question.

The studies included for this literature review should 1) focus on interventions for managing diabetes mellitus patients, 2) be written in English as a scripting language, and 3) be published from 2011-2020. Of the 91 articles taken, 86 did not meet the requirements because they were not following the research results. Thus only 5 articles met the inclusion criteria consisting of 4 intervention articles, 2 cross-sectional studies, 1 cohort study, and 4 Qualitative research designs. Figure 2 illustrates the study inclusion process.

PubMed	Google Scholar	DOAJ	ScienceDirect	Cochrane	Wiley
42	584	3	30	2	15

Identification — Article identified (n=676) — Excluded : Duplicates (n=66)

Screening — Candidate studies exported (n=585) — Excluded : Abstract Only (198) Does not match the research question (n=321)

Eligibility — Full text assessed for eligibility (n=91)

Inclusion — Total study included (n=5) — Excluded : Not original research (n=86)

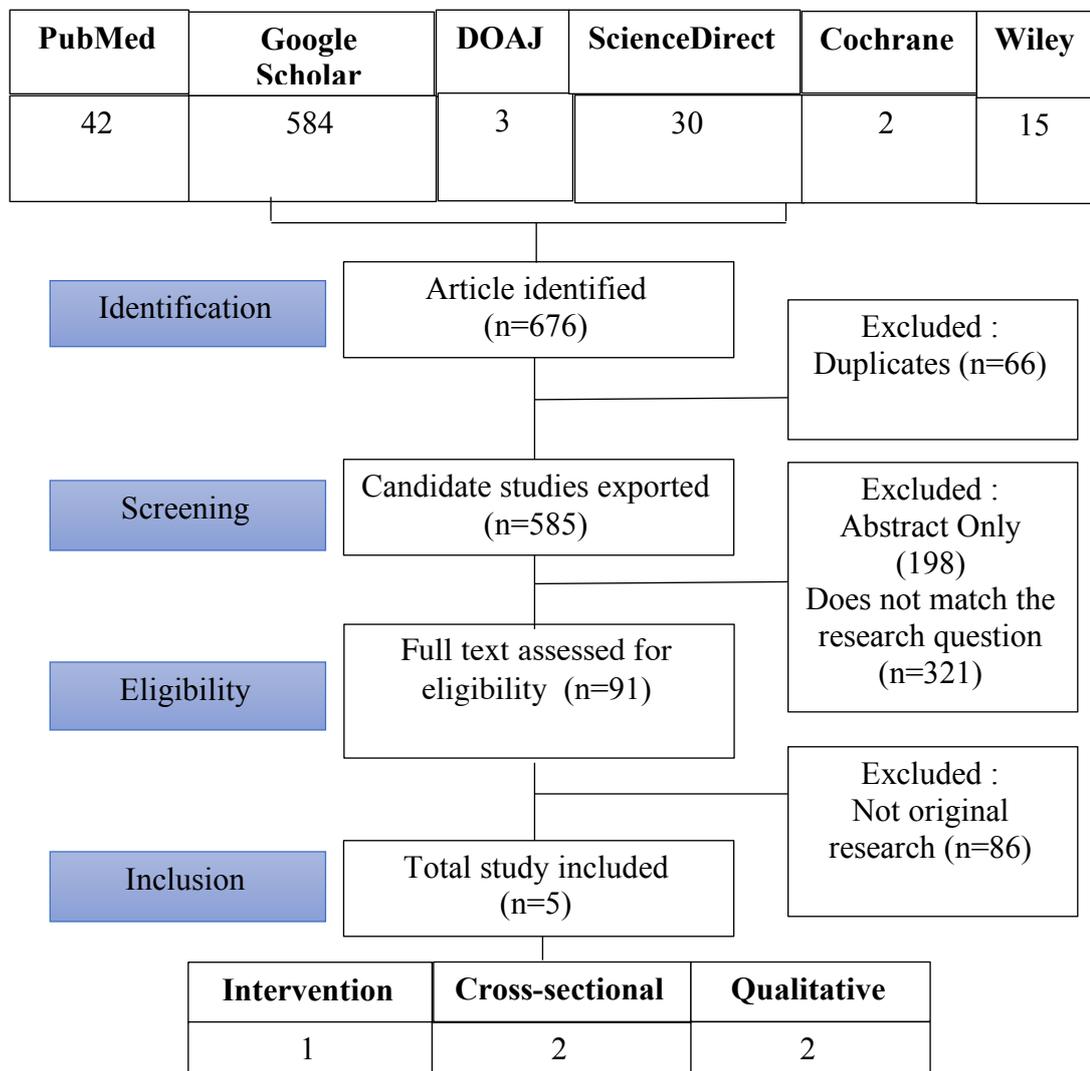| Intervention	Cross-sectional	Qualitative
1	2	2

Figure 2: Flow diagram for study inclusion and exclusion

The included articles were criticized using the Critical Appraisal Skill Program (CASP) Checklist (Critical Appraisal Program, 2018) and Critical Appraisal from the Center for Evidence-Based Management (2014). Studies are selected according to the level of evidence, grade of recommendation, and quality. The recommendation level is a measure of quality linked to the level of research evidence and helps in the interpretation of recommendations.

For the analysis of the quality of clinical studies, the Oxford Center for Evidence-Based Medicine (CEBM) was used to classify studies into five levels of evidence according to the study design (1,2,3,4 and 5), studies were grouped into four recommendation levels (A, B, C,

and D). Class A, i.e., level 1 studies (1a, 1b, and 1c) were used for systematic reviews of randomized clinical trials and represented a higher level of evidence. Class B (2a, 2b, 2c, 3a, and 3b) was used for systematic reviews of cohort studies, study results, and case-control studies. Class B represents a moderate level of evidence. The scores of C (4) and D (5) describe the lowest level of evidence. Class C is used for case studies, and Class D is for expert opinion [23].

RESULTS
Research design
In this systematic review, 5 clinical studies were identified according to research criteria regarding the effectiveness of digital storytelling on the self-management of DM patients. There is 1 intervention study, which consists of non-controlled studies, [17] and 2 cross-sectional studies [14;15], and there are 2 qualitative studies [18;16].

The intervention model for implementing digital storytelling
The intervention model for applying digital storytelling to the self-management of DM patients varies in each study. Three studies use the same digital storytelling application intervention model [14;15;18], namely conducting digital storytelling interventions using video. Meanwhile, 1 study provides digital intervention storytelling uses slide shows consisting of photos accompanied by dialogue used in story slide shows [17]. One research uses a digital storytelling intervention with the photovoice technique (a research method developed to help people share images as a tool for discussion about major problems) to tell stories and share via Instagram [16].

Content of digital storytelling
There are two studies with the same narrative content for digital storytelling content [15;14]. The content of digital storytelling is a strong narrative from storytelling based on their respective cultures by conveying the four domains of diabetes self-management (Drug management, independent glucose monitoring, physical activity, and nutrition. Furthermore, research by Bertera, 2014 uses a narrative in knowledge, attitudes, and practices related to diabetes. Then a study was conducted by Yi-Frazier et al., 2015. The content of digital storytelling is in the form of a photo sent with a message representing their feelings about their diabetes [16]. The research conducted by Goddu et al., 2015 shows that digital storytelling is presented as a film with a scenario of family decisions about diabetes care [18]. The film also presents two sketches of joint decision-making regarding interrupted diabetes. The film is also culturally designed using African and American actors.

Digital storytelling effect on patient's ability to perform self-management
A study conducted by Njeru et al., 2015 digital storytelling on diabetes mellitus patients' self-management shows a strong and interesting story in managing the four domains of diabetes mellitus: drug management, independent glucose monitoring, physical activity, and nutrition [15]. Furthermore, research conducted by Wieland et al., 2017 patients reported that this intervention attracted their attention and was very useful, which then generated motivation to self-confidence and impacted changes in AIC [14]. The mean baseline A1C level for the intervention participants was 9.3% (78 mmol/mol). Change from baseline to first follow-up A1C was -0.8% (-10 mmol / mol) (P <0.05). Then research by Bertera, 2014 digital storytelling intervention shows benefits in increasing the self-efficacy of DM patients and an alternative educational strategy in groups of patients who have low health literacy and older age groups [17]. The research conducted by Yi-Frazier et al., 2015 states that this digital storytelling intervention provides a positive experience for DM patients regarding their self-management [16]. For research conducted by Goddu et al., 2015 shows increased patient confidence

accompanied by increasing their knowledge and skills. Besides, this intervention is also social support for DM sufferers [18].

Table 1: Synthesis of evidence regarding self-management of diabetes mellitus patients

Digital Storytelling Intervention	Citation In Studies	Levels Of Evidence	Grade Of Recommendation
Digital storytelling using video	2	2b	B
Digital storytelling using slide shows	1	2b	C
Digital storytelling using the Photovoice technique	1	2b	C

DISCUSSION

In this systematic review, 5 clinical studies were identified according to the research criteria using digital storytelling interventions on the self-management of DM patients. There were 1 intervention non-controlled study, 2 cross-sectional studies, and 2 qualitative studies. For the intervention model for digital storytelling application, three studies use the same intervention model. 1 study provides digital storytelling intervention using slide shows [17]. One study used a digital storytelling intervention with a modified photovoice technique via Instagram [16].

Of the five articles, 581 respondents were studied with digital storytelling narrative content that most often used in the study were diabetes self-management such as drug management, glucose self-monitoring, physical activity, and nutrition. Then fill in other narratives such as knowledge, attitudes, and practices related to diabetes, photos sent with messages representing their feelings about their diabetes, and films with scenarios of family decisions about diabetes care.

The effects of digital storytelling on the self-management of DM patients are very diverse. Starting from a description of the patient's experience after being given digital storytelling intervention, digital storytelling effects on cognitive, affective, patient skills related to the disease, digital storytelling effects on psychological aspects (self-efficacy, self-confidence, self-awareness, and motivation). Therefore, storytelling becomes an alternative educational strategy for patients with low health literacy and older age groups.

However, the highlight of the various summaries of the results of this study is the absence of digital storytelling effects that touch the spiritual realm and the impact on the social life of DM patients. Moreover, we know that the poor quality of life on spiritual well-being and the high prevalence of depression in patients with DM. It was indicated the need for psychosocial and spiritual support in caring for patients suffering from DM (22-23). In the future, the development of digital storytelling interventions needs to be seen from the spiritual dimension and its effects on life. The social patient so that it can be measured comprehensively.

CONCLUSION

In this literature search, we identified 5 clinical studies of digital storytelling interventions on the self-management of DM patients. There are three different models of implementing digital storytelling intervention in DM patient self-management: digital storytelling using video, digital storytelling using slide shows, and digital storytelling using photovoice technique with Instagram modification.

The aim of identifying evidence of digital storytelling interventions on self-management of DM patients has been achieved. However, some limitations found in this study, such as the design that still does not use RCT, the intervention model for implementing digital storytelling is still lacking. Another limitation regarding the absence of digital storytelling effects that touch

the spiritual realm and the impact on the social life of DM patients so that it can be measured in a measured manner. Comprehensive. For this reason, the digital storytelling intervention found in this review can be carried out for the self-management of DM patients.

REFERENCES

(1) American Diabetes Association. Diagnosis and classification of autoimmune diabetes mellitus. Diabetes Care. 2009;32.
(2) Jakhmola V, Tangri P. Diabetes Mellitus A Silent Killer : Role of DPP4 Inhibitors in Treatment. 2012;2(2):49–53.
(3) Mvogo CE, Mandengue SH. Micro and macrovascular complications of diabetes mellitus in Cameroon: risk factors and effect of a diabetic check-up - a monocentric observational study. 2013;8688:1–10.
(4) Kanter JE, Bornfeldt KE. Impact of Diabetes Mellitus. Arterioscler Thromb Vasc Biol. 2016 Jun;36(6):1049–53.
(5) IDF Diabetes Atlas Group. Update of mortality attributable to diabetes for the IDF Diabetes Atlas: Estimates for the year 2011. Diabetes Res Clin Pract. 2013;100(2):277–9.
(6) Boyle JP, Thompson TJ, Gregg EW, Barker LE, Williamson DF. Projection of the year 2050 burden of diabetes in the US adult population: dynamic modeling of incidence, mortality, and prediabetes prevalence. Popul Health Metr. 2010 Oct;8:29.
(7) Thomas DR, Rao JN. Small-sample comparisons of level and power for simple goodness-of-fit statistics under cluster sampling. J Am Stat Assoc. 2011;82(398):630–6.
(8) Yu Xu, PhD; LiminWang, PhD; Jiang He, MD, PhD; Yufang Bi, MD, PhD; Mian Li, PhD; TiangeWang P, LinhongWang, PhD; Yong Jiang, MS; Meng Dai, BS; Jieli Lu, MD, PhD; Min Xu, PhD; Yichong Li, MS; Nan Hu M, Jianhong Li, MS; Shengquan Mi, PhD; Chung-Shiuan Chen, MS; Guangwei Li, MD, PhD; Yiming Mu, MD P, Jiajun Zhao, MD, PhD; Lingzhi Kong, MD; Jialun Chen, MD; Shenghan Lai, MD, MPH;WeiqingWang, MD P, Wenhua Zhao, PhD; Guang Ning, MD P. Prevalence and Control of Diabetes in Chinese Adults. 2013;310(9):948–58.
(9) Guariguata L. By the numbers: New estimates from the IDF Diabetes Atlas Update for 2012. Diabetes Res Clin Pract [Internet]. 2012;98(3):524–5. Available from: http://dx.doi.org/10.1016/j.diabres.2012.11.006
(10) Lloyd C, Smith J, Weinger K. Stress and Diabetes : A Review of the Links. Diabetes Spectr. 2005;18:2.
(11) Goyena R, Fallis A. Self-Efficacy Dalam Pelaksanaan Manajemen Diri (Self-Management) Pada Pasien Diabetes Mellitus. J Chem Inf Model. 2019;53(9):1689–99.
(12) Lal S, Donnelly C, Shin J. Digital storytelling: an innovative tool for practice, education, and research. Occup Ther Heal care. 2015;29(1):54–62.
(13) Gucciardi E, Richardson A, Aresta S, Karam G, Sidani S, Beanlands H, et al. Storytelling to Support Disease Self-Management by Adults With Type 2 Diabetes. Can J diabetes. 2019 Jun;43(4):271-277.e1.
(14) Wieland ML, Njeru JW, Hanza MM, Boehm DH, Singh D, Yawn BP, et al. Pilot Feasibility Study of a Digital Storytelling Intervention for Immigrant and Refugee Adults With Diabetes. Diabetes Educ. 2017 Aug;43(4):349–59.
(15) Njeru JW, Patten CA, Hanza MMK, Brockman TA, Ridgeway JL, Weis JA, et al. Stories for change: development of a diabetes digital storytelling intervention for refugees and immigrants to Minnesota using qualitative methods. BMC Public Health. 2015 Dec;15:1311.
(16) Yi-Frazier JP, Cochrane K, Mitrovich C, Pascual M, Buscaino E, Eaton L, et al. Using Instagram as a Modified Application of Photovoice for Storytelling and Sharing in

Adolescents With Type 1 Diabetes. Qual Health Res. 2015 Oct;25(10):1372–82.

(17) Bertera EM. Storytelling Slide Shows to Improve Diabetes and High Blood Pressure Knowledge and Self-Efficacy: Three-Year Results Among Community-Dwelling Older African Americans. Educ Gerontol [Internet]. 2014 Nov 1;40(11):785–800. Available from: https://doi.org/10.1080/03601277.2014.894381

(18) Goddu AP, Raffel KE, Peek ME. A story of change: The influence of narrative on African-Americans with diabetes. Patient Educ Couns. 2015 Aug;98(8):1017–24.

(19) Gucciardi E, Jean-Pierre N, Karam G, Sidani S. Designing and delivering facilitated storytelling interventions for chronic disease self-management: A scoping review. BMC Health Serv Res [Internet]. 2016;16(1). Available from: http://dx.doi.org/10.1186/s12913-016-1474-7

(20) Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JPA, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. Vol. 62, Journal of clinical epidemiology. 2009. 1–34 p.

(21) Da Costa Santos CM, de Mattos Pimenta CA, Nobre MRC. The PICO strategy for the research question construction and evidence search. Rev Lat Am Enfermagem. 2007;15(3):508–11.

(22) Safari N, Farajzadegan Z, Loghmani A, Majlesi M, Jafari N. Spiritual well-being and quality of life of Iranian adults with type 2 diabetes. Evidence-based Complement Altern Med. 2014;2014.

(23) Pamungkas RA, Chamroonsawadi K, Vatanasomboon P. Family functioning integrated with diabetes self-management: A concept analysis. Frontiers of Nursing. 2018; 5(3): 199-206