Diabetes, Metabolic Syndrome and Obesity

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Evaluation of Social Platform-Based Continuity of Care in Improving Cognitive and Prognostic Effects of Young Patients with Diabetic Retinopathy

Guo-lan Cao[1], Ke-jian Chen[2]

[1]Ophthalmic Clinic, The First Affiliated Hospital of Soochow University, Suzhou, 215006, People's Republic of China; [2]Internal Medicine Clinic, The First Affiliated Hospital of Soochow University, Suzhou, 215006, People's Republic of China

Correspondence: Ke-jian Chen, Internal Medicine Clinic, The First Affiliated Hospital of Soochow University, No. 188, Shizi Street, Gusu District, Suzhou, 215006, People's Republic of China, Email jiangde1817720@163.com

Objective: This study was performed to evaluate the effectiveness of social platform-based continuity of care in improving cognitive and prognostic effects of young age diabetic patients without diabetic retinopathy (DR).

Methods: A total of 88 young age diabetic patients admitted to the outpatient clinic of First Affiliated Hospital of Soochow University (Endocrine and Ophthalmology Outpatient) from January 2021 to May 2022 were recruited and assigned via random number table method to receive either routine follow-up care (routine group) or social platform-based continuity of care (WeChat group), with 44 patients in each group. Treatment compliance, cognitive-behavioral ability, self-care ability (self-care responsibility, self-care skills, self-status, knowledge of diabetic retinopathy), quality of life (physical function, psychosocial, symptom and visual function, social activity), and prognosis of the patients were analyzed to investigate the effectiveness of WeChat social platform-based continuity of care. All patients were followed up for one year.

Results: Patients receiving WeChat social platform-based continuity of care exhibited obviously higher treatment compliance and better cognitive-behavioral ability, self-care responsibility, self-care skills, self-state, and diabetic retinopathy knowledge follow-up than those with routine care ($P<0.05$). Patients in the WeChat group had significantly better physical function, mental psychology, symptoms and visual function, and social activity levels than those in the routine group ($P<0.05$). WeChat-based continuity of care resulted in a significantly lower incidence of visual acuity loss and diabetic retinopathy during follow-up than routine care ($P<0.05$).

Conclusion: WeChat social platform-based continuity of care effectively improves treatment compliance and diabetic retinopathy awareness, and enhances self-care ability of young patients with diabetes mellitus. The life quality of these patients is improved and the risk of poor prognosis has been reduced.

Keywords: social platform-based continuity of care, young patients, diabetic retinopathy, cognitive and prognostic

Introduction

Diabetic retinopathy (DR) is one of the most common and serious complications in diabetic patients.[1] In recent years, the incidence of DR in younger age groups is increasing as the standard of living of Chinese people continues to improve.[2] While the pathogenesis of DR are complicated and people do not know it well, the evidence indicated that hypoxia plays an important part in its development and progression.[3] Diabetes linked to insufficient oxygen delivery to retina. Retinal hypoxia may be evident even before clinically detectable microvascular damage develops.[4] Complete clinical control of DR is currently unattainable. It has been shown in clinical research[5] that patients with diabetic disease often suffer from severe vision loss or DR due to factors such as poorly controlled blood sugar levels and vitreous blood accumulation caused by retinal detachment. Moreover, a study[6] indicated that the majority of diabetic patients discharged from the hospital lack knowledge of relevant treatment and awareness of regular checkups, resulting in lower compliance and risks

Received: 23 March 2023
Accepted: 9 June 2023
Published: 27 June 2023

of poor glycemic control and DR. Early and effective nursing interventions, symptomatic treatment and glycemic control can significantly delay the development of DR in patients. Therefore, effective continuity of care is essential to improve patient prognosis.[7]

Wewer Albrechtsen et al[8] found that massive Open Online Courses (MOOCs) are educational tools for institutions to teach and share their research around the world. The medical education based on MOOCs can provide accessible and free research-based education for health professionals who live in the developing and developed countries. This project looks promising. Christensen et al[9] suggested that successful weight loss maintenance was related to an interplay between behavioral, affective and contextual changes. "Instrumentalization of eating behavior" seems to be an necessary part in long-term weight maintenance.

WeChat-based continuity of care is a new model of care with the integration of the continuity of care and WeChat.[6] The WeChat-based continuity of care model is more coordinated, collaborative, continuous, and comprehensive than conventional continuity of care, allowing patients to return to families and society with good physical and psychological functions.[7] The WeChat-based continuity of care model has been frequently adopted in several clinical studies of chronic diseases[8] and produces excellent clinical outcomes. This research was undertaken to evaluate the validity of WeChat-based continuity of care in improving cognitive and prognostic effects of patients with diabetes without DR.

Materials and Methods

Participants

A total of 88 young age diabetic patients admitted to the outpatient clinic of First Affiliated Hospital of Soochow University (Endocrine and Ophthalmology Outpatient) from January 2021 to May 2022 were solicited and appointed via random number table method to receive either routine follow-up care (routine group) or WeChat-based continuity of care (WeChat group), with 44 patients in each group. The study was approved by the ethics committee of the hospital.

Inclusion and Exclusion Criteria

Inclusion criteria: 1) patients were diagnosed with diabetes by clinically relevant test results; 2) aged 18–40 years; 3) patients undergoing treatment; 4) with good visual function with a baseline BCVA letter score (approximate Snellen equivalent) of 23 (20/400); 5) who were able to use smartphones; 6) patients and their families were informed about the research and voluntarily signed the relative informed consent forms; 7) patients who were from inpatient to the outpatient clinic, and whose main compliant was diabetes acute complication.

Exclusion criteria: 1) patients with co-morbid psychiatric disorders or communication disorders; 2) Have a serious pre-existing medical condition like cardiovascular, liver or kidney disease or mental illness; 3) with other ocular complications, like glaucoma, severe cataracts, poor vision, retinal detachment, ophthalmic nerve disease, uveitis and retinopathy not linked to DM; 4) patients and family members who could not fully cooperate with the study.

Treatment Methods

(1) Patients in the routine group received routine follow-up care. These patients were given discharge instructions 1 week before discharge and were instructed to receive regular home health education and develop good lifestyle habits. Patients were informed to perform regular reviews and seek medical attention for any abnormalities. The frequency of follow-up by telephone was once every 2 weeks.

(2) Patients in the WeChat group received a WeChat-based continuity of care intervention. 1) Establishment of a WeChat education team. The education team consisted of three diabetologists, three ophthalmologists, and four nurses. All members were trained in relevant knowledge as well as intervention and follow-up measures prior to their assignment to ensure uniformity of nursing measures. 2) Details of specific nursing measures: ① The education team leader created and invited all patients into a WeChat group chat. ② The patients were educated by the medical staff through the WeChat group chat between 15:00 and 17:00 every Wednesday and Saturday, such as nutritional matching plan of food or efficacy and contraindication of foods, so as to strengthen the patients' awareness of reasonable diet, promote the adjustment of their diet structure and improve their consciousness of blood glucose control. ③The patients recorded their daily blood

glucose and provided unified feedback at 18:00 every Saturday, and medical staff provided guidance on medication, diet and exercise according to the patient's blood glucose control. ④ The patients were educated about the contraindications related to exercise to avoid impact on the retina. Patients with good blood sugar control were instructed to carry out appropriate exercises. ⑤ Medical staff regularly post eye care-related articles in the WeChat group to help patients learn proper eye care, and conduct ophthalmologic follow-up weekly for fundus condition review and vision testing. ⑥ The medical staff answered patients and their families' questions in a timely manner. The medical staff encouraged patients to actively share their personal experiences in the group, thus improving their treatment compliance.

Outcome Measures

Treatment Compliance

The compliance standards were established and defined by the medical staff in our department. Complete compliance: Patients were fully compliant with daily medication and rehabilitation care. Good compliance: Patients were relatively more cooperative with daily medication and rehabilitation care. Poor compliance: Patients were uncooperative with daily dosing and rehabilitation care and frequently showed resistant behaviors.

Cognitive-Behavioral Ability

During outpatient examination and follow-up for 1 year, the cognitive-behavioral ability of the patients was evaluated using the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25). The patients would evaluate specific the severity of specific visual symptoms or the difficulty of activities among the twenty-five items which have been listed in the NEI VFQ-25 and presented in Likert scale format. The activities including driving, reading newspapers, etc. There is also a general health subscale generated from the questionnaire besides 11 VRQoL subscales in the below. It is consisted of general vision, eye pain, near range activities, distance range activities, social functioning, mental health, role difficulties, dependency, driving, color vision, and peripheral vision. The overall composite score will be calculated as the average of the 11 visual-related subscales finally. Scores range from 0 to 100, with higher scores showing better cognitive performance.[10]

Self-Care Ability

At discharge and 1 year after discharge from hospital, patients' self-care ability was evaluated using the Exercise of Self-Care Agency (ESCA). The ESCA scale involves 4 dimensions, which means self-concept (9 items, 36 points in all), self-responsibility (8 items, 32 points in all), self-care skills (12 items, 48 points in all), and health knowledge level (14 items, 56 points in all), totaling 43 items. On the basis of the 3-level scoring method, the score was 0–172 points in total. The score status demonstrates the patient's self-care ability, and the two are directly proportional to each other. Low: 0–57 points; medium: 58–115 points; high: 116–172 points.[4]

Quality of Life

Patients' life quality was evaluated using the Low Vision Quality of Life Questionnaire (LVQOL). LVQOL was developed by Wolffsohn and Cochrane13 specifically for low vision patients. It includes 25 items in 4 dimensions, eg, distance vision, mobility, and lighting; adjustment; reading and fine work; and activities of daily life. The instrument is adapted to understand the needs of low vision patients in everyday life and to assess whether these requests can be met through low vision rehabilitation. The assessment system requires patients to answer questions on a five-point scale, with 5 being no difficulty and 1 being very difficult. The total score ranges from 0 to 125 points, and the score is directly proportional to the quality of life. It has been shown that LVQOL is a reliable, internally consistent and sensitive measure of life quality in low vision patients.[11]

All questionnaires were answered by the participants.

Prognosis

A poor prognosis was indicated when patients showed loss of visual acuity or developed DR at follow-up and review. An optokinetic reflex system was applied to discover abnormalities in visual acuity (a measure of percentage (%) head-tracking movement per unit time or optokinetic reflex (OKR). The visual acuity in the left and right eyes is tested and

evaluated weekly. Briefly, visual acuity testing was conducted by rotating clockwise and counter-clockwise at an angular speed of 2.61rpm for 2min in each direction, with an interval of 30s between the two rotations.

Sample Size

To achieve an effect size =0.40 between two groups (conventional nursing and WeChat-based nursing), assuming a type 1 error of 0.2 and 95% confidence level, the total sample size will be 88 participants distributed into 2 groups. The sample calculation was performed in Excel, based on the calculation formula described by Kadam and Bhalerao. Considering a 20% drop-out, 3 extra participants will be inserted into each group, if there is said drop-out this will provide a final sample of participants per group.

Statistical Analysis

The data in the present study were organized and analyzed using SPSS 22.0, and GraphPad Prism 8 was used to plot the graphics. The measurement data such as VRQoL and ESCA were expressed as mean ± standard deviation ($\bar{x} \pm s$) and examined using a *t*-test. The count data such as treatment compliance were expressed as the number of cases and tested using the chi-square test. $P<0.05$ indicates that the difference is statistically significant. If datasets are normally distributed and satisfied with the assumption of variance homogeneity, a multivariate analysis of variance were adopted to evaluate statistical differences among these groups. Bonferroni-corrected post hoc comparisons were applied to figure out discrepancies between the groups. Should the dependent variables exhibit non-normal distributions, the non-parametric Kruskal–Wallis test would be carried out.

Results

Patient Characteristics

Patients in the routine group included 25 males and 19 females, aged 22–39 (30.43±3.82) years, with a disease duration of 2–7 (3.46±1.07) years. There were 17 cases of high school and below and 27 cases of junior college and above in terms of education level. Patients in the WeChat group included 28 males and 16 females, aged 20–40 (30.48±3.79) years, with a disease duration of 1–8 (3.52±1.11) years. There were 20 cases of high school and below and 24 cases of junior college and above in terms of education level. The two groups were well-balanced in terms of patient characteristics (P>0.05) (Table 1).

Table 1 Patient Characteristics

	Routine Group (n=44)	**WeChat Group (n=44)**	**t/x^2**	**P**
Sex			0.427	0.513
Male	25	28		
Female	19	16		
Age (year)	22–39	20–40		
Mean age (year)	30.43±3.82	30.48±3.79	−0.062	0.951
Course of disease (years)	2–7	1–8		
Mean course of disease (years)	3.46±1.07	3.52±1.11	−0.258	0.797
Education level			0.42	0.517
High school and below	17	20		
Junior college and above	27	24		

Table 2 Treatment Compliance

Group	n	Complete Compliance	Good Compliance	Poor Compliance	Compliance (%)
Routine group	44	12	22	10	77.3% (34/44)
WeChat group	44	13	3	1	97.7% (43/44)
x^2	–	–	–	–	8.416
P	–	–	–	–	0.004

Treatment Compliance

The treatment compliance of the routine group was 77.3% (34/44), in which 12 cases were completely compliant, 22 cases were well compliant, and 10 cases were poorly compliant. The treatment compliance of the WeChat group was 97.7% (43/44), in which 13 cases were complete compliance, 30 cases were good compliance, and 1 case was poor compliance. The WeChat group showed higher treatment compliance than the routine group (P<0.05) (Table 2).

Cognitive-Behavioral Ability and Self-Care Ability

The cognitive-behavioral abilities of the routine group at outpatient examination and 1-year follow-up were (69.82±3.31, 76.29±2.34), self-care responsibility scores were (18.23±6.11, 23.25±12.86), self-care skills scores were (16.42±7.73, 22.36±10.25), self-state status scores were (18.33±5.52, 21.28±13.44), and DR knowledge scores were (17.85±6.42, 22.47±11.61). The cognitive behavioral abilities of the WeChat group patients at outpatient examination and 1-year follow-up were (69.74±3.48, 93.21±1.52), self-care responsibility scores were (18.74±5.39, 31.54±10.93), self-care skills scores were (16.34±7.85, 29.39±13.54), self-state status scores were (18.72±5.41, 30.16±12.31), and DR knowledge scores were (17.68±6.33, 31.52±13.99). The difference in cognitive-behavioral ability, self-care responsibility, self-care skills, self-state, and diabetic retinopathy knowledge upon discharge from the hospital between the two groups did not come up to the statistical standard (P>0.05). Patients receiving WeChat-based continuity of care exhibited significantly higher scores of cognitive-behavioral ability, self-care responsibility, self-care skills, self-state, and diabetic retinopathy knowledge during follow-up than those with routine care (P<0.05) (Figure 1).

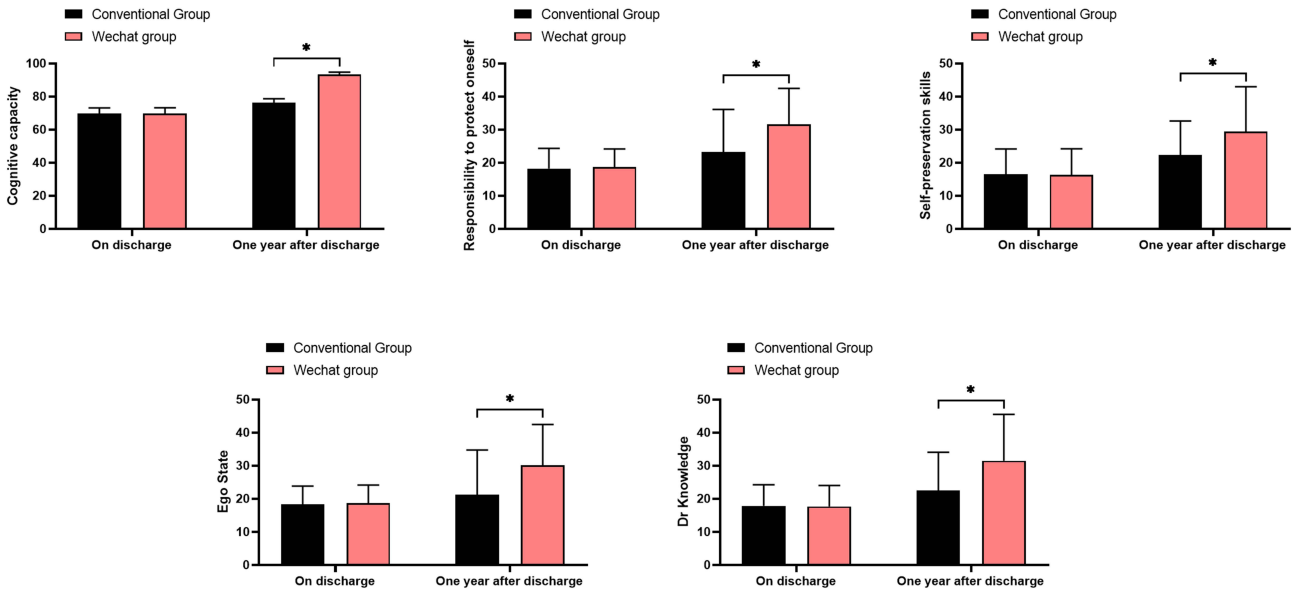

Figure 1 Cognitive-behavioral ability and self-care ability.
Note: *Indicates P<0.05.

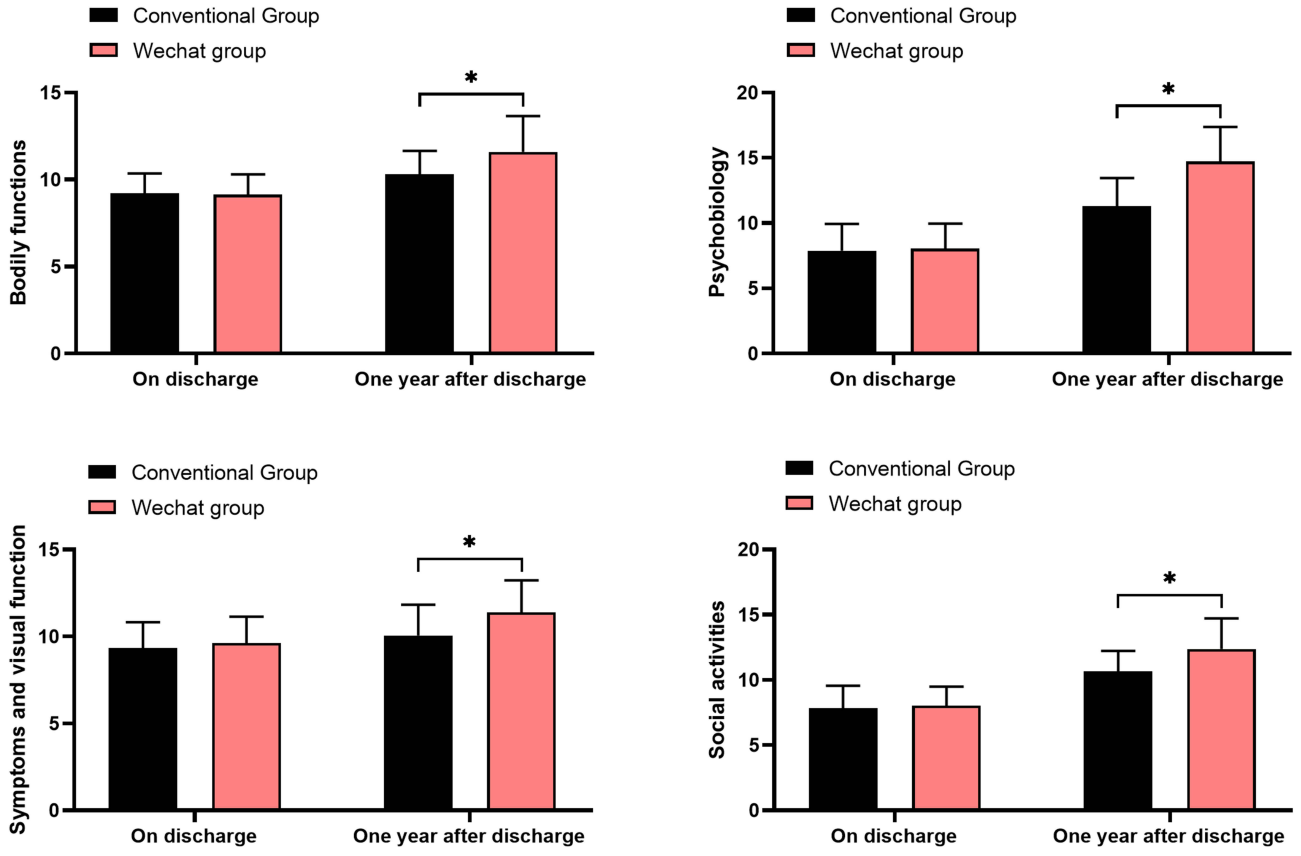

Figure 2 Quality of life ($\bar{x} \pm s$).
Note: *Indicates P<0.05.

Quality of Life

The physical functioning scores at outpatient examination and 1-year follow-up in the routine group were (9.21±1.15, 10.32±1.34), psycho-psychological scores were (7.89±2.05, 11.31±2.14), symptoms and visual function scores were (9.35±1.47, 10.05±1.78), and social activity was (7.82± 1.74, 10.65±1.58). The physical functioning scores outpatient examination and 1-year follow-up in the WeChat group were (9.13±1.17, 11.59±2.06), psycho-psychological scores were (8.04±1.92, 14.72±2.65), symptoms and visual function scores were (9.62±1.52, 11.38±1.85), and social activity scores were (8.03± 1.46, 12.37±2.36). Patients in the WeChat group had a significantly better physical function, mental psychology, symptoms and visual function, and social activity levels than those in the routine group (P<0.05) (Figure 2).

Prognosis

In the routine group, the incidence of vision loss was 29.5% (13/44) and of diabetic retinopathy was 15.9% (7/44). In the WeChat-based group, the incidence of vision loss was 6.8% (3/44) and of diabetic retinopathy was 2.3% (1/44). WeChat-based continuity of care resulted in a significantly lower incidence of visual acuity loss and diabetic retinopathy during follow-up than routine care (P<0.05) (Table 3).

Table 3 Prognosis [n (%)]

Group	n	Vision Loss	Diabetic Retinopathy
Routine group	44	29.5% (13/44)	15.9% (7/44)
WeChat group	44	6.8% (3/44)	2.3% (1/44)
x^2	–	7.639	4.95
P	–	0.006	0.026

Discussion

Diabetes mellitus is a common clinical endocrine disease that causes a substantial impact on the metabolic function of the patient.[12] As the disease progresses, hyperglycemia, hypertension, and urinary microalbumin may lead to peripheral neurological complications in the foot, liver, kidney, and eyes.[13] Diabetic retinopathy is a metabolic disease caused by insulin abnormalities and is a clinical retinal vascular disease that contributes significantly to blindness in adults.[14] The lack of specific symptoms at the early onset of DR, insufficient attention to the ocular risk, and high cost of regular check-ups in most diabetic patients usually result in untimely treatment.[15] Research[16] indicated that most diabetic patients develop DR due to poor self-management and weak complication awareness, which seriously compromises the patient's subsequent recovery and prognosis. Christensen et al[17] reviewed the major anti-obesity drugs and the benefit-risk profiles of the long-acting glucagon-like peptide-1 receptor agonists (GLP-1 RAs) liraglutide and semaglutide (a modified version of liraglutide with longer half-life and tripled receptor affinity), and concluded that the safety profiles for both drugs were similar, with transient gastrointestinal disorders being the most commonly reported adverse events. The longest running trial and the most recent trials have not raised any new safety concerns.

Thus, it is of great importance to provide patients with proper out-of-hospital care for their subsequent recovery and to reduce the risk of DR. Continuity of care after patient discharge is an emerging concept of care in recent years.[18] A study[19] has concluded that continuity of care effectively reduced the incidence of adverse reactions in patients at the early stage of discharge, thereby contributing to the improvement of patients' post-discharge quality of life and consequently lowering the risk of readmission such as disease recurrence. WeChat is an instant chat software that features simple operation and high public acceptance. Thus, the use of WeChat for continuity of care can improve the efficiency of nursing care and the satisfaction and recognition of nursing care by patients and their families to a certain extent.[20]

The results of the present study showed that patients receiving WeChat-based continuity of care exhibited significantly higher treatment compliance, better cognitive-behavioral ability, self-care responsibility, self-care skills, self-state, and diabetic retinopathy knowledge during follow-up, better physical function, mental psychology, symptoms and visual function, and social activity levels, and a significantly lower incidence of visual acuity loss and diabetic retinopathy than those with routine care. The above results confirm the effectiveness of WeChat-based continuity of care in improving young age diabetic patients' knowledge of DR and improving their prognosis. The convenience of WeChat allows for easy and rapid communication between doctors and patients, thereby effectively enhancing patients' understanding of their diseases for better disease control during home care.[21] In addition, patients can encourage each other through WeChat, significantly improving patient compliance and reducing the risk of complications.[22] Furthermore, the integration of WeChat into the continuity of care for patients effectively reduces the cost of patient management.[23] In communication with patients, assistance in improving patients' knowledge about the disease may be crucial to improve the outcome of care, patients' self-care ability, and disease awareness.[24] No patients in this study were found to be resistant to the continuity of care based on the WeChat social platform. In the patient feedback at the end of the care, all the tested patients gave positive comments about this care modality.[25] Through the Wechat-based program, we speculated that (1) patients might learn effective methods to assist patients in recovering to normal life; (2) patients were in close contact with professional nurses in time for any problems during the process of nursing, thus strikingly reducing the risk of adverse responses; (3) the patients could report psychological clinical responses to the experts timely and obtain some effective feedbacks, which might play a potential role in the prevention of anxiety and depression; (4) anxiety and depression are associated with prognosis of DR.

Consistent with the findings of our study, many scholars have drawn similar conclusions. Zhou et al[26] found a significant improvement in the health-related quality of life of postoperative women with breast cancer who adopted a WeChat-based multimodal nursing program during early rehabilitation. This demonstrated that the program is effective for postoperative rehabilitation in such patients. Findings of the study will provide evidence for health services in clinical and transitional nursing care. Yan et al[27] revealed that WeChat-based remote follow-up management of premature infants after discharge could effectively improve parents' ability to care and their psychological state and reduce the burden of care. Guo et al[28] suggested that WeChat-based mobile health (mHealth) intervention Run4Love significantly reduced depressive symptoms among people living with HIV

(PLWH), and the effect was sustained. An app-based mHealth intervention could provide a feasible therapeutic option for many PLWHD in resource-limited settings.

Conclusion

WeChat social platform-based continuity of care effectively improves treatment compliance and diabetic retinopathy awareness among young age diabetic patients, and enhances their self-care ability, thereby improving quality of life and reducing the risk of poor prognosis.

Data Sharing Statement

All data generated or analysed during this study are included in this published article.

Ethics Approval

This clinical study protocol has been approved by the Ethics Committee of The First Affiliated Hospital of Soochow University, and was conducted in accordance with the Declaration of Helsinki.

Informed Consent

All subjects enrolled in the study signed an informed consent form and were informed of the purpose, content, and use of the study.

Acknowledgments

Special thanks to all subjects and researchers for their great support of this clinical study.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

There is no funding to report.

Disclosure

The authors declare that there are no conflict of interests, we do not have any possible conflicts of interest.

References

1. Lechner J, O'Leary OE, Stitt AW. The pathology associated with diabetic retinopathy. *Vision Res*. 2017;139:7–14. doi:10.1016/j.visres.2017.04.003
2. Cheung N, Mitchell P, Wong TY. Diabetic retinopathy. *Lancet*. 2010;376(9735):124–136. doi:10.1016/S0140-6736(09)62124-3
3. Kusuhara S, Fukushima Y, Ogura S, Inoue N, Uemura A. Pathophysiology of diabetic retinopathy: the old and the new. *Diabetes Metab J*. 2018;42(5):364–376. doi:10.4093/dmj.2018.0182
4. Liu A, Kuang Y, Huang R, Ge Q. Application value of information-based health education and continuity of care in patients with peptic ulcer. *Front Public Health*. 2021;9:694128. PMID: 34540784; PMCID: PMC8440824. doi:10.3389/fpubh.2021.694128
5. Wang W, Lo ACY. Diabetic retinopathy: pathophysiology and treatments. *Int J Mol Sci*. 2018;19(6):1816.
6. Simó-Servat O, Hernández C, Simó R. Diabetic retinopathy in the context of patients with diabetes. *Ophthalmic Res*. 2019;62(4):211–217. doi:10.1159/000499541
7. Lin KY, Hsih W-H, Lin Y-B, et al. Update in the epidemiology, risk factors, screening, and treatment of diabetic retinopathy. *J Diabetes Investig*. 2021;12(8):1322–1325. doi:10.1111/jdi.13480
8. Wewer Albrechtsen NJ, Poulsen KW, Svensson LØ, Jensen L, Holst JJ, Torekov SS. Health care professionals from developing countries report educational benefits after an online diabetes course. *BMC Med Educ*. 2017;17(1):97. PMID: 28566091; PMCID: PMC5452380. doi:10.1186/s12909-017-0935-y
9. Christensen BJ, Iepsen EW, Lundgren J, et al. Instrumentalization of eating improves weight loss maintenance in obesity. *Obes Facts*. 2017;10(6):633–647. PMID: 29207396; PMCID: PMC5836264. doi:10.1159/000481138

10. Sheppard J, Joshi A, Betts KA, et al. Effect of adalimumab on visual functioning in patients with noninfectious intermediate uveitis, posterior uveitis, and panuveitis in the VISUAL-1 and VISUAL-2 trials. *JAMA Ophthalmol*. 2017;135(6):511–518. PMID: 28426849; PMCID: PMC5847080. doi:10.1001/jamaophthalmol.2017.0603
11. Wolffsohn JS, Cochrane AL. Design of the Low Vision Quality of Life Questionnaire (LVQOL) and measuring the outcome of low-vision rehabilitation. *Am J Ophthalmol*. 2000;130:793–802. doi:10.1016/S0002-9394(00)00610-3
12. He Q, Zhao J, Fan M, et al. Effect of continuous nursing based on WeChat platform on postoperative rehabilitation of patients with lumbar disc herniation. *Jpn J Nurs Sci*. 2021;18(2):e12382. doi:10.1111/jjns.12382
13. Li J, Li QP, Yang BH. Participatory continuous nursing using the WeChat platform for patients with spinal cord injuries. *J Int Med Res*. 2021;49 (5):3000605211016145. doi:10.1177/03000605211016145
14. Liu J, Zhao Q, Wang J, et al. Effects of continuous nursing based on WeChat platform on the functional recovery and quality of life in elderly patients after total Hip arthroplasty. *Am J Transl Res*. 2021;13(5):5623–5628.
15. Kollias AN, Ulbig MW. Diabetic retinopathy: early diagnosis and effective treatment. *Dtsch Arztebl Int*. 2010;107(5):75–83; quiz 84. doi:10.3238/arztebl.2010.0075
16. Moreno A, Lozano M, Salinas P. Diabetic retinopathy. *Nutr Hosp*. 2013;28(Suppl 2):53–56. doi:10.3305/nh.2013.28.sup2.6714
17. Christensen RM, Juhl CR, Torekov SS. Benefit-risk assessment of obesity drugs: focus on glucagon-like peptide-1 receptor agonists. *Drug Saf*. 2019;42(8):957–971. PMID: 30972641. doi:10.1007/s40264-019-00812-7
18. Jampol LM, Glassman AR, Sun J. Evaluation and care of patients with diabetic retinopathy. *N Engl J Med*. 2020;382(17):1629–1637. doi:10.1056/NEJMra1909637
19. Yin L, Zhang D, Ren Q, et al. Prevalence and risk factors of diabetic retinopathy in diabetic patients: a community based cross-sectional study. *Medicine*. 2020;99(9):e19236. doi:10.1097/MD.0000000000019236
20. Zhou SH, Huang S-T, Xu N, et al. Application of the WeChat platform to implement continuous nursing for patients after percutaneous coronary intervention. *Med Sci Monit*. 2020;26:e925444. doi:10.12659/MSM.925444
21. Bi J, Yang W, Hao P, et al. WeChat as a platform for baduanjin intervention in patients with stable chronic obstructive pulmonary disease in china: retrospective randomized controlled trial. *JMIR Mhealth Uhealth*. 2021;9(2):e23548. doi:10.2196/23548
22. Liu X, Cheng J, Huang S. Mobile phone training platform for the nursing staff in the emergency department. *Telemed J e-Health*. 2019;25 (1):66–70. doi:10.1089/tmj.2017.0317
23. Wu Q, Huang Y, Helena van Velthoven M, et al. Feasibility of using WeChat to improve infant and young child feeding in rural areas in China: a mixed quantitative and qualitative study. *PLoS One*. 2021;16(2):e0246942. doi:10.1371/journal.pone.0246942
24. Wang J, Tong Y, Jiang Y, et al. The effectiveness of extended care based on Internet and home care platform for orthopaedics after Hip replacement surgery in China. *J Clin Nurs*. 2018;27(21–22):4077–4088. doi:10.1111/jocn.14545
25. Wong TY, Sun J, Kawasaki R, et al. Guidelines on diabetic eye care: the International Council of Ophthalmology Recommendations for screening, follow-up, referral, and treatment based on resource settings. *Ophthalmology*. 2018;125(10):1608–1622. doi:10.1016/j.ophtha.2018.04.007
26. Zhou K, Wang W, Zhao W, et al. Benefits of a WeChat-based multimodal nursing program on early rehabilitation in postoperative women with breast cancer: a clinical randomized controlled trial. *Int J Nurs Stud*. 2020;106:103565. PMID: 32272281. doi:10.1016/j.ijnurstu.2020.103565
27. Yan Z, Liu F, Lin XP, et al. WeChat-based remote follow-up management alleviates the home care burden and anxiety of parents of premature infants: randomized controlled study. *Child Care Health Dev*. 2022;48(4):651–657. PMID: 35083757. doi:10.1111/cch.12973
28. Guo Y, Hong YA, Cai W, et al. Effect of a WeChat-Based Intervention (Run4Love) on depressive symptoms among people living with HIV in China: a randomized controlled trial. *J Med Internet Res*. 2020;22(2):e16715. PMID: 32044751; PMCID: PMC7058168. doi:10.2196/16715