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Effect of the OTO Model on Glycemic Control and Self-Management Behaviors in Community-Dwelling Elderly Patients with Type 2 Diabetes: Postprint

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Abstract

Objective: To investigate the application effectiveness of the OTO model in community-dwelling elderly patients with type 2 diabetes mellitus. Methods: Using convenience sampling, 110 elderly patients with type 2 diabetes mellitus referred from a hospital in Shenyang to five communities in the same city were selected and randomly divided into a control group (n=55) and an intervention group (n=55) using the random number table method. The control group received conventional health management, while the intervention group received health management based on the OTO model. Fasting blood glucose (FBG), 2-hour postprandial blood glucose (2hPBG), and glycated hemoglobin (HbA1c) were compared before intervention and at 6 and 12 months post-intervention; Self-Management Behavior Scale (SDSCA) scores were compared before intervention and at 12 months post-intervention. Results: There was a significant interaction effect between intervention method and time on FBG, 2hPBG, and HbA1c ($P<0.05$), and the main effects of intervention method and time on these indicators were also significant ($P<0.05$). At 6 and 12 months post-intervention, FBG, 2hPBG, and HbA1c levels in the intervention group were significantly lower than those in the control group ($P<0.05$). Within the intervention group, FBG, 2hPBG, and HbA1c at 6 and 12 months post-intervention were significantly lower than baseline levels ($P<0.05$). At 12 months post-intervention, the total SDSCA score and scores across all dimensions in the intervention group were significantly higher than those in the control group ($P<0.05$). Conclusion: Following 12 months of OTO model health management, patients in the intervention group exhibited improved FBG, 2hPBG, and HbA1c levels compared with the control group, with superior total SDSCA scores and scores across all dimensions. OTO model health management can effectively control blood glucose levels, enhance self-management capabilities in diabetic patients, and

facilitate long-term effective diabetes management.

Full Text

Effect of Online-to-Offline Mode on Glycemic Control and Self-Management Behavior in Community-Dwelling Elderly Patients with Type 2 Diabetes

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Abstract

Objective To investigate the effectiveness of Online-to-Offline (OTO) mode in managing elderly patients with type 2 diabetes in community settings.

Methods A total of 110 elderly patients with type 2 diabetes referred from a hospital in Shenyang to five community health centers were conveniently sampled and randomly divided into a control group (n=55) and an intervention group (n=55) using a random number table. The control group received routine health management, while the intervention group received OTO-based health management. Fasting blood glucose (FBG), 2-hour postprandial blood glucose (2hPBG), and glycated hemoglobin (HbA1c) were compared at baseline and at 6 and 12 months post-intervention. The Summary of Diabetes Self-Care Activities (SDSCA) scale scores were compared at baseline and 12 months post-intervention.

Results Significant interaction effects between intervention method and time were observed for FBG, 2hPBG, and HbA1c ($P<0.05$), with significant main effects for both intervention method and time ($P<0.05$). At 6 and 12 months post-intervention, the intervention group showed significantly lower FBG, 2hPBG, and HbA1c levels compared to the control group ($P<0.05$). Within the intervention group, FBG, 2hPBG, and HbA1c at 6 and 12 months were significantly lower than baseline ($P<0.05$). At 12 months post-intervention, the intervention group demonstrated significantly higher total SDSCA scores and all subscale scores compared to the control group ($P<0.05$).

Conclusion Twelve months of OTO-based health management improved FBG, 2hPBG, and HbA1c levels and enhanced SDSCA scores compared to conventional management. The OTO model effectively controls blood glucose and improves self-management capabilities, facilitating long-term diabetes management.

Keywords: Online-to-Offline; Diabetes Mellitus, Type 2; Glycemic Control; Self-Management Behavior

Introduction

China has the largest diabetic population worldwide [1], with elderly individuals representing a high-risk group predominantly affected by type 2 diabetes. This population often presents with long disease duration, multiple complications, and 普遍 deficiencies in self-management behaviors due to cognitive decline and memory impairment [2]. Community-based continuous health promotion has been identified as a crucial strategy for diabetes control [3]. However, uneven development of community health services in China, lack of standardized chronic disease management models, insufficient doctor-patient communication, and discontinuity of community care constitute major barriers to effective health promotion for diabetic patients [4]. Consequently, exploring innovative community-based diabetes management models has become an urgent public health priority.

With advances in information technology, digital management models have been widely applied in chronic disease management [5]. The OTO (Online-to-Offline) concept, first proposed by Alex Rampell and extensively applied in the tertiary sector [6], integrates online support with offline experiences through interactive transformation between virtual and physical platforms, thereby innovating service systems and enhancing service value. While current OTO research primarily focuses on e-commerce [7], government administration [8], and education [9], its application in chronic disease management involves establishing online channels and integrating offline medical resources to provide appointment scheduling, health consultation, telemedicine, and follow-up services [10]. Although OTO-based health education is relatively common in Chinese chronic disease management [11,12], no studies have specifically examined its use in elderly diabetic patients. Therefore, this study developed an OTO-based health management platform targeting lifestyle management, leveraging synergistic collaboration among hospitals, communities, and universities to provide comprehensive online-to-offline health management services for community-dwelling elderly patients with type 2 diabetes and evaluate its effectiveness.

Methods

Sample Size Calculation The primary outcome was HbA1c level. Based on previous literature [13] and the sample size formula for comparing two means ($n=2[(Z\alpha+Z\beta)\sigma/\delta]^2$), we set $\alpha=0.05$, $\beta=0.1$, with $Z_{0\cdot05}=1.96$, $Z_{0\cdot1}=1.28$, $\sigma=0.74$, and $\delta=0.5$. The calculated sample size was 46 per group, which was increased by 20% to account for attrition, resulting in 55 patients per group.

Inclusion, Exclusion, and Termination Criteria **Inclusion criteria:** (1) Diagnosed with type 2 diabetes according to WHO 1999 criteria [14]; (2) Age $ $60 years; (3) Diabetes duration $ $1 year; (4) Proficient in using smartphones or computers; (5) Clear consciousness with normal communication ability; (6) Provided informed consent.

Exclusion criteria: (1) Severe psychiatric illness or cognitive dysfunction; (2) Severe diabetes complications including serious cardiovascular/cerebrovascular disease, unstable angina, blood pressure >200/100 mmHg, severe infection, stage IV/V diabetic nephropathy, or proliferative retinopathy; (3) Malignancy with radiotherapy/chemotherapy within 6 months; (4) Other severe physical illnesses; (5) Poor compliance or inability to complete the study protocol.

Termination criterion: Disease deterioration or development of complications requiring treatment modification during the study. All eligible patients signed informed consent forms. The study was approved by the Ethics Committee of Liaoning University of Traditional Chinese Medicine Affiliated Hospital.

Clinical Data Using convenience sampling, 110 patients with type 2 diabetes referred from a Shenyang hospital to five community health centers between August and October 2020 were enrolled. Participants were randomly assigned to control and intervention groups (n=55 each) using a random number table. The control group received conventional management, while the intervention group received OTO-based platform management.

Interventions

Control Group Upon enrollment, health managers established health records and collaborated with endocrinologists, nurses, nutritionists, and psychologists to develop treatment plans, which were transferred to community healthcare providers before discharge. Patients received routine community chronic disease management according to *National Basic Public Health Service Standards* [15], including annual free physical examinations (internal/external examination, blood glucose, blood pressure, lipids, HbA1c). Community nurses conducted monthly follow-ups via telephone, outpatient visits, or home visits, monitoring blood glucose, blood pressure, psychological status, diet, exercise, and medication adherence. Problems were assessed, nursing plans implemented, and outcomes evaluated. Community physicians adjusted treatment regimens. The health management team organized monthly health education lectures and consultations (30 minutes each, 12 sessions total) covering exercise, nutrition, medication, psychology, monitoring, emergency knowledge, and complication prevention. Participants received a *Type 2 Diabetes Prevention and Treatment Manual* identical to the intervention group.

OTO-Based Health Management Platform

Pre-Development Needs Assessment To ensure systematic and rational platform design, the research team conducted surveys in Liaoning communities to assess functional requirements and current diabetes management practices. Methods included: (1) Questionnaire surveys using "Community Elderly Diabetes Health Management Needs Questionnaire" and "Elderly Diabetes Health Literacy Questionnaire" ; (2) Interviews with community administrators, mental health workers, and elderly diabetic patients; (3) Expert consultation on platform framework design with ongoing supervision during development.

Health Management Team Composition The team comprised 4 endocrinologists, 8 endocrinology nurses, 4 internal medicine nursing faculty, 1 health manager, 2 nutritionists, 2 psychologists, and community physicians with $ $8 years of experience and intermediate or higher professional titles. Health promotion volunteers were recruited from undergraduate medical students who passed diabetes knowledge/skills tests, committed to 8 hours weekly for online/offline service, and participated voluntarily. All team members received training on platform operation and relevant knowledge. Community healthcare providers, faculty, and volunteers underwent centralized diabetes management training (8 theory hours, 4 practice hours, 8 simulation hours over 4 weeks) covering diabetes literacy, diet management, exercise, medication, mental health, self-monitoring, insulin pen/pump use, and complication prevention. Volunteers elected leaders and were assigned to online information update, Q&A, booking, offline service, and emergency response groups.

Platform Design Co-developed with a software company, the platform synchronized across computer and mobile interfaces with separate portals for healthcare providers and patients. The provider portal allowed team members to access patient information and manage care. The patient portal enabled registration, health record viewing, health knowledge acquisition, and service booking. The platform included seven modules: personal information, health records, health assessment, service booking (with six sub-modules: nutrition, exercise, medication management, indicator monitoring, psychological adjustment, complication prevention), health education, statistical queries, and consultation/follow-up [Figure 1: see original paper]. The platform was pre-tested by the health management team before implementation, with the company responsible for maintenance.

Intervention Protocol The intervention group received conventional management plus platform access. Endocrinology nurses instructed patients on platform login and use before discharge, followed by 12 months of online-to-offline management and follow-up [Figure 2: see original paper].

Online Management: (1) *Personal Information Module:* Registration and data entry for statistical queries. (2) *Health Records Module:* Automatic electronic record generation including medical history, family history, diet, exercise, medication, glucose monitoring, psychological status, and complications, with

data entry guidelines and alert thresholds. (3) *Health Assessment Module:* Validated domestic and international diabetes-related scales and questionnaires. (4) *Service Booking Module:* A core feature providing personalized professional guidance via video/voice, with six sub-modules: Nutrition (ideal weight, food types, composition, distribution, precautions); Exercise (type, amount, duration, intensity); Medication management (hypoglycemic, antihypertensive, lipid-lowering drug actions, dosages, adverse effects); Indicator monitoring (normal ranges, measurement methods); Psychological adjustment (disease perception, mood changes, anxiety/depression assessment, self-regulation); Complication prevention (acute/chronic complication management). (5) *Health Education Module:* Content on exercise physiology, nutrition, mental health, chronic disease prevention, emergency knowledge, and medical science, with learning points redeemable for rewards funded by research grants to enhance engagement. (6) *Statistical Queries Module:* Data analysis and visualization of health records and assessments. (7) *Consultation/Follow-up Module:* Patient messaging with volunteer Q&A responses, common question repository, online follow-up scheduling, and peer communication (with privacy-protected identifiers).

Offline Services: The volunteer booking group recorded service requests and coordinated with offline service and emergency response teams. Community nurses led offline services with volunteer support, following evidence-based guidelines [17-19] compiled in the *Type 2 Diabetes Prevention and Treatment Manual*. For exercise guidance, nurses conducted assessments, screened contraindications, instructed warm-up activities, recommended aerobic (walking, Tai Chi, dancing) and resistance training based on preferences, with intensity following NICE guidelines (increased heart/respiratory rate but comfortable conversation, body warmth) [18], frequency of 3-7 times/week for 30-60 minutes, with enhanced glucose monitoring for safety. After each service, the information update group revised electronic records, patients/families shared experiences, and submitted daily data for one week post-service, enabling team members to identify issues and adjust treatment plans. Research staff conducted monthly community visits to monitor implementation.

Outcome Measures

(1) FBG, 2hPBG, and HbA1c were measured at baseline, 6 months, and 12 months. (2) The Summary of Diabetes Self-Care Activities (SDSCA) scale, developed by Toobert et al. [21] and revised by Li Yanfei et al. [22], was administered at baseline and 12 months. The scale comprises 11 items across four dimensions: diet (4 items), exercise (2 items), blood glucose monitoring (2 items), and foot care (2 items), scored 0-7 per item (total 28 points). Scores >23 indicate good compliance, <17 poor compliance, and intermediate scores moderate compliance. Higher scores indicate better self-management. Cronbach' s α was 0.840 for the original scale and 0.865 in this study.

Statistical Analysis

SPSS 16.0 was used for data analysis. Continuous data were expressed as (±S) and compared between groups using independent samples t-tests, within groups using paired t-tests, and across time points using two-way repeated measures ANOVA. Categorical data were compared using ^{2} tests. $P<0.05$ was considered statistically significant.

Results

Comparison of Baseline Characteristics At 12 months, 53 questionnaires were collected in the intervention group (1 relocated, 1 withdrew) and 52 in the control group (1 relocated, 1 withdrew, 1 lost to follow-up). No significant differences in baseline characteristics were observed between groups ($P>0.05$), ensuring comparability .

Comparison of Glycemic Control Across Time Points Significant interaction effects between intervention method and time were found for FBG, 2hPBG, and HbA1c ($P<0.05$), with significant main effects for both factors ($P<0.05$). At 6 and 12 months, the intervention group showed significantly lower FBG, 2hPBG, and HbA1c compared to the control group ($P<0.05$). Within the intervention group, all three parameters at 6 and 12 months were significantly lower than baseline ($P<0.05$) .

Comparison of Self-Management Behavior Scores No significant differences existed between groups at baseline ($P>0.05$). At 12 months, the intervention group demonstrated significantly higher scores in all SDSCA dimensions and total score compared to the control group ($P<0.05$) .

Discussion

OTO-Based Health Management Improves Glycemic Control Glycemic control is closely associated with diabetes complication rates [24], and blood glucose monitoring is crucial yet represents the weakest aspect of self-management among elderly patients [25-26]. Our findings show that FBG, 2hPBG, and HbA1c in the intervention group were significantly lower than both the control group and baseline at 6 and 12 months, consistent with previous studies [27-28]. Moreover, glycemic control at 12 months was superior to both baseline and 6-month values, indicating sustained effectiveness. This may be attributed to effective online-to-offline interactions between patients and the health management team, facilitating access to professional, systematic, and personalized disease knowledge and skills. This approach enhanced patient initiative, promoted self-care behaviors, and improved self-efficacy and confidence [29], ultimately optimizing glycemic control. Platform-based uploading of monitoring data enabled timely treatment adjustments and continuous tracking, contributing to stable long-term glucose control. In

contrast, conventional management lacked interactivity and specificity, often failing to promptly identify and resolve daily management issues, resulting in inferior glycemic outcomes.

OTO Platform Enhances Self-Management Capabilities Diabetes requires lifelong scientific self-management. Our results demonstrate that the intervention group achieved significantly higher total and subscale SDSCA scores at 12 months ($P<0.05$), aligning with similar research [23]. The developed platform, managed by a professionally trained team, enabled long-term health data collection and electronic record establishment. Seven functional modules facilitated hospital-community-home integration, information sharing, remote consultation, and comprehensive management, allowing both providers and patients to track disease progression and management processes clearly. The online-to-offline transition reduced management costs and improved efficiency [30]. For elderly patients who face difficulties with frequent medical visits, this platform provided essential support [31]. Health promotion volunteers played a critical auxiliary role, especially during the COVID-19 pandemic, enabling patients to contact healthcare providers for professional guidance when unable to visit hospitals, thereby addressing staffing shortages and meeting management needs [32]. Online consultations and two-way referrals were arranged when necessary, facilitating continuous community follow-up and improving management effectiveness.

Dietary self-management is particularly challenging for diabetic patients [33]. Our intervention group' s superior dietary management at 12 months primarily resulted from the health records and service booking modules. After booking nutrition services, volunteers coordinated with community providers to deliver personalized offline guidance based on gender, age, ideal weight, and lifestyle. Daily dietary data submission for one week post-service enabled team members to provide feedback and adjust recommendations, promoting self-care behaviors. Regarding psychological challenges and weak monitoring/foot care awareness common in elderly type 2 diabetes [34], the platform' s online consultation and peer support features effectively alleviated negative emotions and sustained long-term management engagement.

Implementation Considerations As a novel community service model, several issues require attention: (1) For elderly users with technology difficulties, family assistance, audio/video recordings, or volunteer telephone support can improve engagement; future development should include TV/multimedia screen projection with large fonts, images, and micro-videos. (2) Regular platform maintenance is essential to prevent personal information breaches, representing an area for improvement. (3) This study evaluated outcomes at 12 months; future research should include extended follow-up to assess long-term effectiveness.

Conclusion

OTO-based health management via a dedicated platform, leveraging synergistic collaboration among hospitals, communities, and universities, enables continuous dynamic management with long-term tracking. This approach effectively controls blood glucose, improves self-management capabilities, meets personalized service needs, and facilitates long-term diabetes management, warranting broader implementation.

References

[1] WANG L, GAO P, ZHANG M, et al. Prevalence and ethnic pattern of diabetes and prediabetes in China in 2013[J]. JAMA, 2017, 317(24):2515-2523. DOI: 10.1001/jama.2017.7596.

[2] REUSCH JE, MANSON JE. Management of type 2 diabetes in 2017: getting to goal[J]. JAMA, 2017, 317(10):1015-1016. DOI: 10.1001/jama.2017.0241.

[3] GYAWALI B, BLOCH J, VAIDYA A, et al. Community-based interventions for prevention of type 2 diabetes in low-and middle-income countries: a systematic review[J]. Health Promot Int, 2019, 34(6):1218-1230. DOI: 10.1093/heapro/day081.

[4] CAI Xixuan, WANG Jianbang, WU Jiang, et al. Challenges for sustainable development of general practice in China: strategies for community-based multimorbidity management[J]. Chinese General Practice, 2020, 23(34):4279-4284+4290. DOI:10.12114/j.issn.1007-9572.2020.00.576.

[5] DORSEY ER, TOPOL EJ. State of telehealth[J]. New England Journal of Medicine, 2016, 375(2):154-161. DOI:10.1056/NEJMra1601705.

[6] TU Jianwen. Research on Tmall OTO Business Model[D]. Tianjin: Tianjin University, 2018.

[7] He B, MIRCHANDANI P, SHEN Q, et al. How Should Local Brick-and-mortar Retailers Offer Delivery Service in a Pandemic World? Self-building Vs. O2O Platform[J]. Transp Res E Logist Transp Rev, 2021, Oct;154:102457. DOI:10.1016/j.tre.2021.102457.

[8] WANG Youxia. Research on Urban Community Party Building Work in China[D]. Shenyang: Liaoning University, 2018. DOI:10.27209/d.cnki.glniu.2018.000019.

[9] Su G, Li J, Wu H, et al. Online and offline mixed teaching mode of medical genetics[J]. Sheng Wu Gong Cheng Xue Bao. 2021 Aug 25;37(8):2967-2975. Chinese. DOI: 10.13345/j.cjb.200609.

[10] SHEN Jinbo. Exploration and Practice of New Chronic Disease Management Model Based on OAO Mode[J]. Fujian Computer, 2017, 33(2):29-30. DOI:10.16707/j.cnki.fjpc.2017.02.015.

[11] PENG Cuie, LI Zan, MAO Huangxing, et al. Effect of online and offline rehabilitation intervention on upper limb function and body image self-assessment in breast cancer patients after breast reconstruction[J]. Chinese Nursing Management, 2020, 20(11):1637-1642. DOI:10.3969/j.issn.1672-1756.2020.11.009.

[12] CHEN Juhong, XIE Hongwen, RUAN Yonglan, et al. Structured health education for pregnant women with gestational diabetes via online and offline platforms[J]. Journal of Nursing Science, 2020, 35(11):5-8. DOI:10.3870/j.issn.1001-4152.2020.11.005.

[13] LI Xiaosong. Medical Statistics[M]. 2nd ed. Beijing: Higher Education Press, 2013.

[14] QIAN Rongli. New diagnostic criteria and classification of diabetes[J]. Chinese Journal of Diabetes, 2000, 8(1):5-6. DOI:10.3321/j.issn:1006-6187.2000.01.001.

[15] National Health and Family Planning Commission. Notice on Issuing the National Basic Public Health Service Standards (Third Edition)[J]. Gazette of the National Health and Family Planning Commission of the People' s Republic of China, 2017(3):21.

[16] WANG Suiqin, GUAN Yun, LI Xiaomei. Effect of community nurse-led multidisciplinary management model on self-management level of diabetic patients[J]. Journal of Nursing, 2020, 27(6):9-11. DOI:10.16460/j.issn1008-9969.2020.06.009.

[17] Chinese Diabetes Society. Guidelines for Exercise Therapy in Diabetes in China[EB/OL]. (2012-12-20)[2019-03-16]. http://guide.medlive.cn/guideline/4659.

[18] National Institution for Health and Care Excellence. Type 2 Diabetes in Adults: Management[EB/OL]. (2015-12-02)[2019-04-08]. https://www.nice.org.uk/guidance/ng28.

[19] Chinese Diabetes Society. Guidelines for the Prevention and Treatment of Type 2 Diabetes in China (2020 Edition)[J]. International Journal of Endocrinology and Metabolism, 2021, 41(5):482-548. DOI:10.3760/cma.j.cn115791-20210221-00095.

[20] ZHU Miaomiao, PAN Hongying, LI Sijia, et al. Summary of best evidence for exercise programs in patients with type 2 diabetes[J]. Chinese Journal of Nursing, 2019, 54(12):1887-1893. DOI:10.3761/j.issn.0254-1769.2019.12.024.

[21] TOOBERT DJ, HAMPSON SE, GLASGOW RE. The summary of diabetes self-care activities measure: results from 7 studies and a revised scale[J]. Diabetes Care, 2000, 23(7):943-950. DOI:10.2377/diacare.23.7.943.

[22] LI Yanfei, CHEN Weiju, XU Wanping, et al. Revision and validation of the Type 2 Diabetes Self-Management Behavior Scale[J]. Modern Hospital, 2011, 11(3):148-150. DOI:10.3969/j.issn.1671-332X.2011.03.074.

[23] HAN Yun, XU Yuhong, YE Xinhua, et al. Application of "Internet+"chronic disease management model in patients with type 2 diabetes[J]. Chinese Journal

of Nursing, 2018, 53(7):789-794. DOI:10.3761/j.issn.0254-1769.2018.07.004.

[24] LIU M, LIU SW, WANG LJ, et al. Burden of diabetes, hyperglycaemia in China from 1990 to 2016: findings from the 1990 to 2016 global burden of disease study[J]. Diabetes Metab, 2019, 45(3):286-293. DOI: 10.1016/j.diabet.2018.08.008.

[25] YAO J, WANG H, YIN J, et al. Factors associated with the utilization of community-based diabetes management care: a cross-sectional study in Shandong Province, China[J]. BMC Health Serv Res, 2020, 20(1):407. DOI:10.1186/s12913-020-05292-5.

[26] LUO Mingliang, LIANG Xinglun, LYU Peng. Effect of intensive blood glucose monitoring by family doctors on glycemic control in patients with type 2 diabetes[J]. Chinese General Practice, 2020, 23(9):1181-1184. DOI:10.12114/j.issn.1007-9572.2019.00.796.

[27] YUAN X, WANG F, HSU C, et al. Effect of case management on glycemic control and behavioral outcomes for Chinese people with type 2 diabetes: a 2-year study[J]. Patient Educ Couns, 2016, 99(8):1382-1388. DOI:10.1016/j.pec.2016.03.010.

[28] MEGHAN B, GERIT P, RAGNAR J, et al. Analysing health usage logs in RCTs: explaining participants' interactions with diabetes self-management tools[J]. Plos One, 2018, 13(8):e0203202. DOI:10.1371/journal.pone.0203202.

[29] SU Xiuyu, CHEN Xiangyun. Effect evaluation of individualized guidance and computer-assisted intervention for community type 2 diabetic patients[J]. Journal of Nursing, 2015, 22(2):72-74. DOI:10.16460/j.issn1008-9969.2015.02.072.

[30] DENG Yufeng, WANG Haimin, PENG Ruoxuan, et al. Clinical application of mobile health in elderly patients with type 2 diabetes[J]. Chinese Journal of Endocrinology and Metabolism, 2017, 33(10):841-844. DOI:10.3760/cma.j.issn.1000-6699.2017.10.007.

[31] JIA Shulei, FANG Xiaoqun, FENG Qiong, et al. Application of online and offline interactive platform in community stroke rehabilitation[J]. Chinese Journal of Rehabilitation Medicine, 2017, 32(3):340-343. DOI:10.3969/j.issn.1001-1242.2017.03.021.

[32] S. RATHNAYAKE, Y. ATHUKORALA, S. SIOP. Attitudes toward and willingness to work with older people among undergraduate nursing students in a public university in Sri Lanka: A cross-sectional study[J]. Nurse Educ Today, 2016, 36:439-444. DOI: 10.1016/j.nedt.2015.10.007.

[33] YIN Rongping, WANG Qi, WANG Lili, et al. Knowledge, attitude, and practice survey on dietary self-management among patients with type 2 diabetes[J]. Journal of Nursing, 2017, 24(2):11-13. DOI:10.16460/j.issn1008-9969.2017.02.011.

[34] YE Rui, MIAO Xiuxin, CHEN Hanwen, et al. Construction of a nursing problem assessment system for elderly patients with type 2 diabetes[J]. Journal of Nursing, 2017, 24(04):6-10. DOI:10.16460/j.issn1008-9969.2017.04.006.

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