The Dual Impact of Time and Content Exposure of Social Media on Diabetes Self-management in Older Adults: A Cross-sectional Study

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Abstract

Background: Self-management is critical for older adults with type 2 diabetes mellitus, but the practice of the self-management remains suboptimal. Social media has become an accessible and effective stimulus source for the public which has the potential to promote health behaviors, but its effect on self-management of older adults with type 2 diabetes mellitus remains unknown.

Objective: To investigate the relationships between social media exposure, specifically time exposure and content exposure, and the self-management of older adults with type 2 diabetes mellitus.

Methods: In this cross-sectional study, we enrolled 257 older adults with type 2 diabetes mellitus and who used short-form video Apps from community healthcare centers. We assessed subjective and objective time and content exposure. We transformed the text-based content exposure into the diabetes-related content exposure encompassing irrelevant, harmful, hypobeneficial and hyperbeneficial categories using Q-methodology. The self-management was assessed through a validated questionnaire. We used restricted cubic splines and linear regression models to model the relationships between time exposure and content exposure and the self-management, respectively.

Results: Of 257 older adults with type 2 diabetes (median age 69 [65-72] years), 53.3% were women, the mean sum score of self-management was 35.7 (10.4). the median subjective time exposure was 120 (60-120) minutes, and 61.1% of them were exposed to hyperbeneficial content. There was an approximate L-shaped dextrorotatory relationship between time exposure and self-management, with a decline in self-management when time exposure surpassed 139.8 minutes daily. Exposure to hyperbeneficial content was positively associated with the overall self-management (B = 3.46, 95%CI 0.71 to 6.21). For participants exposure more than 139.8 minutes daily, this positive association remained robust (B = 7.27, 95%CI 1.54 to 13.00). In sub-dimensional analyses, hyperbeneficial content exposure was positively associated with general diet (B = 1.51, 95%CI 0.54 to 2.49), and blood-glucose testing (B = 1.31, 95%CI 0.25 to 2.38), respectively.

Conclusions: Social media exposure had two-sided effects on self-management of older adults with type 2 diabetes mellitus. The self-management declined when the daily time spent on social media exceeded 139.8 minutes. However, exposure to hyperbeneficial content contributed to better self-management of individuals, regardless of excessive time spent on social media. It is important to explore the potential of social media in empowering the self-management of older adults with type 2 diabetes mellitus.

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Abstract

Background: Self-management is critical for older adults with type 2 diabetes mellitus, but the practice of the self-management remains suboptimal. Social media has become an accessible and effective stimulus source for the public which has the potential to promote health behaviors, but its effect on self-management of older adults with type 2 diabetes mellitus remains unknown.
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Conclusions: Social media exposure had two-sided effects on self-management of older adults with type 2 diabetes mellitus. The self-management declined when the daily time spent on social media exceeded 139.8 minutes. However, exposure to hyperbeneficial content contributed to better self-management of individuals, regardless of excessive time spent on social media. It is important to explore the potential of social media in empowering the self-management of older adults with type 2

diabetes mellitus.

Keywords: Social media; Type 2 diabetes mellitus; Self-management; Older adults

Introduction

Type 2 diabetes mellitus (T2DM) imposes a substantial burden on healthcare systems worldwide. The total number of people living with diabetes reached 573 million in 2021 and is projected to increase to 783 million by 2045, with over 90% of them having T2DM [1]. Older adults now make up over half of all adults diagnosed with T2DM [2].

Self-management is crucial for individuals with T2DM. Without satisfactory self-management, older adults with T2DM are more likely to experience diabetes-associated complications, functional disability, and premature mortality [3]. Self-management is influenced by output information from external stimuli [4]. The lifestyle interventions are taken as the focal stimulus and function through providing reliable knowledge, regulated guidance and interpersonal support theoretically[5]. But in practice, the reliance on manpower and financial resource for diabetes self-management interventions compromised their implementation and hindered their effectiveness due to low participants' adherence and lack of perseverance [6,7]. Therefore, searching for other optional and effective stimulus source among older adults with T2DM is warranted.

Social media, which is abundant in disease-related information, can serve as the stimulus source for older adults with T2DM who frequently utilize these platforms to seek information about their condition. [8]. Efforts from the government and businesses to bridge the digital divide caused social media to explode in popularity among the older population. In the US, 45% of individuals over the age of 65 were active users of social media [9], while in China, older users make up 11.7% of all short-form video app users [10]. Instead of using text- or image-based platform like Twitter, most older adults prefer short-form video apps [11]. Social media is a powerful medium to promote health behaviors [12]. Supported by the cultivation theory [13] and empirical evidence, individuals' behavior may be influenced by the content they are exposed to on social media. Research demonstrated that exposure to COVID-19-related information on social media was associated with individuals' better practice of hand sanitation [14]. Ngqangashe and Backer [15] found that exposing to culinary videos on social media were associated with food choice behaviors of middle school children. In addition, as an important dimension of social media exposure, the duration of time exposed on social media would also impact individuals' health behaviors. Zhang et. al [16] found that women who reported excessive media use (>3 hours/day) were more likely to have unhealthy lifestyles, including reduced physical activity, inadequate dietary diversity, and poorer sleep quality. Wu et. al [17] found that the longer duration of short-form video exposure was associated with decreased steps and time spent in physical activity in older women. However, multiple pitfalls in the literature compromised the soundness of existing findings. First, researchers often assume social media exposure as a single-dimensional variable and therefore measure it as content exposure or time exposure. Second, the content individuals exposed to on social media is abundant, but researchers often collected a specific content through a yes/no question. Such practice failed to capture the full range of content individuals exposed to on social media [18]. Third, content exposure and time exposure were often evaluated in studies with self-reported questions without taking account of the potential recall bias. Lastly, the potential of social media to elicit self-management of older adults with T2DM hasn't been clarified.

To explore the role of social media as a source of stimuli in promoting self-management among older adults with T2DM, this exploratory study aimed to investigate the associations between social media

exposure (both content exposure and time exposure) on short-form video platforms and self-management of older adults with T2DM using both subjective and objective measures.

Methods

Ethical Considerations

The ethical oversight of this cross-sectional study was provided by the university (#2023-R-017). All eligible adults provided permission to access their short-form Apps usage records including time spent on each apps, following, liking, bookmarking and browsing history, agreed to provide de-identified individual information for research, and signed a written consent form before participating. The standardized monetary incentive (gift) was provided to encourage participation. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

Recruitment

From February to June 2023, we launched a cross-sectional study named Media on Diabetes (MED). Upon the director's approval of the five community health centers, data was collected at community health centers in Jinan, Shandong Province, China. Older people with T2DM were recruited during their routine visits for physical examination. The inclusion criteria of MED were set as being 60 years and older, having been diagnosed with T2DM for at least one year, and using short-form video Apps of Douyin/Tik Tok, Kuaishou, Haokan, and Toutiao on the smartphone. Adults were excluded if they been diagnosed with acute diabetes complications or physical disorders that could additionally affect their self-management including cerebral ischemia, NYHA class III and IV, otoliths, gout, severe asth.ma, chronic kidney disease at stage III or above, chronic obstructive pulmonary disease GOLD III and IV, or moderate or severe swallowing disorders. We also excluded adults who were unable to walk independently even with walking aids, diagnosed with mental or conscious disorders, diagnosed with hearing impairment and not wearing a hearing aid, or without diagnosed hearing impairment but failing to hear when called aloud. The principal investigator and two trained research assistants collected data in the field. Adults filled in the questionnaires by themselves, and if they had inadequate reading capacity, the investigators would assist to read questions.

Sample Size

We used the formula of $N=\frac{Z^2_{\alpha/2}s^2}{d^2}$ to calculate the sample size for this study [19]. The mean and standard deviation (SD) of the sum score of self-management in the previous study was 37.5 (14.0) [20], we therefore took the values of $Z_{\alpha/2} = 1.96$, $s = 14.0$, and d = mean×5% = 1.875. By adding 10% of adults to account for any withdrawal (e.g. time conflicts, lose interest, or privacy concern) the minimal sample size for this study was calculated to be 235.

Measures

Social Media Exposure Assessment

Variables on the usage of social media included social media exposure duration, exposure to multi-platforms, the feature of exposure, subjective time exposure, objective time exposure, and diabetes-related content exposure. Subjective time exposure was accessed through a self-reported question, and objective time exposure was recorded using data from the short-form video apps to account for potential recall bias. Participants were asked to indicate the types of content they watched from a list of 47 options (e.g. Healthcare, Current affairs and Sport events) derived from previous investigation on older adults [17], with space for additional comments. In addition, participants' interactions such

as liking, bookmarking, and browsing history on the short-form video apps were gathered to supplement their self-reported data. Details of these variables are depicted in Table S1 in Multimedia Appendix 1.

Self-management Assessment

Diabetes self-management was assessed with the Chinese version of The Summary of Diabetes Self-care Activities (SDSCA) which was well adapted in Chinese culture [21]. It assessed six domains of self-management including general diet, specific diet, exercise, blood-glucose testing, foot care and medication taking of adults with T2DM. Each item was graded on 0 to 7, except the item of high fat food eating within the specific diet dimension which should be scored reversely. The sum score of SDSCA ranged from 0 to 77, with higher scores demonstrating better self-management.

Covariates Assessment

By reviewing the literature on factors influencing diabetes self-management, covariates considered in analyses included social demographic variables of sex, age, educational background, living status, marital status, working status, and monthly household income per capita; health-related variables of body mass index (BMI), pain, diabetes duration, medication related to diabetes, complications of diabetes, multimorbidity, smoking history, and sleep duration; and psychological variables of self-efficacy, perceived stress, and social support. We also considered variables of daily smartphone use time and traditional media usage variables of self-reported traditional media exposure and health-related content exposure on traditional media. Coding and grading on the variables are shown in Tables S2 and 3 in Multimedia Appendix 1.

Statistical Analysis

To handle the missing data issue for the continuous variables of social media exposure duration (0.8%), self-efficacy (1.6%), perceived stress (1.2%), and social support (1.2%), the mean imputation approach was used. We used Q-methodology [22] to transform the text-based content adults exposed to on social media into a categorical variable named diabetes-related content exposure, the procedures are shown in Figure S1 in Multimedia Appendix 1. Participants exposed to irrelevant content only were coded as irrelevant content exposure, exposed to harmful with or without irrelevant content were coded as harmful content exposure, exposed to beneficial content with a relevant score between 1 and 3 were coded as hypobeneficial content exposure, and exposed to beneficial content with a relevant score of 4 or 5 were coded as hyperbeneficial content exposure.

The Kolmogorov-Smirnov Goodness of Fit Test was used to assess the normality of continuous variables, and continuous variables were described as mean and SD or median and interquartile range (IQR) as appropriate. Categorical variables were described as frequency and percentage. The sum score of self-management was normally distributed and as appropriate, the associations were calculated with Pearson or Spearman's correlation for continuous variables, and two-sample *t* test or ANOVA for categorical variables. Scores of self-management dimensions were not normally distributed, and we then used Spearman's correlation, Mann-Whitney U test, and Kruskal-Wallis H test to test their associations with continuous and categorical variables. As such, covariates of the sum score of self-management and each score of self-management dimensions were selected a priori. We used Spearman's correlation to test the association between subjective time exposure and objective time exposure, and the correlation coefficient was 0.91 ($P < .001$), indicating the recall bias was marginal. We therefore used subjective time exposure instead of objective time exposure for subsequent statistical inference because it was more feasible to collect in practice.

A scatter plot diagram was used to depict the relationship between time exposure and the sum score

of self-management, and a nonlinear relationship was found. Therefore, the nonlinear relationship was estimated using a restricted cubic spline with the estimator of the ordinary least square [23], while controlling significant covariates. We repeated the steps to test the relationships between time exposure and each score of self-management dimensions. *P* for an overall < .05 indicates the relationship between time exposure and self-management is statistically significant, and *P* for a nonlinear < .05 indicates the relationship is significant nonlinear.

Multiple linear regression models were used to test the relationships between diabetes-related content exposure and the sum score of self-management; generalized linear models were used to evaluate the correlations between diabetes-related content exposure and scores of the self-management dimensions. If the nonlinear relationships between time exposure and scores of the self-management were found, we would use the same modeling strategies to evaluate the associations between diabetes-related content exposure and scores of the self-management in subgroups based on time exposure, as appropriate.

All the analyses were performed with R, version 4.3.1 (R Program for Statistical Computing), and 95% confidence intervals (95%CIs) for estimates of models were reported. A two-sided $P < 0.05$ was considered statistically significant. For diabetes-related content exposure as an independent variable, Bonferroni adjustment was applied due to multiple comparisons, and the threshold for statistical significance was adjusted to $P < .017$ (0.05/3 = .017). Data were analyzed from July 2023, to May 2024.

Results

Participants Characteristics

Of the 257 participants, 137 (53.3%) were women, the median (IQR) age was 69 (65-72) years, the median (IQR) diabetes duration was 7 (2-13) years (Table 1**)**. The mean (SD) sum score of self-management of participants was 35.7 (10.4). The median (IQR) subjective time exposure of participants was 120 (60-180) minutes per day, the median (IQR) social media exposure duration was 3 (1-5) years, and 173 (67.3%) exposed to multi-platforms (Table 2).

Table 1. Participants characteristics and their associations with self-management.

Characteristics	All participants (N = 257)	t/F/r	*P* value
Social demographic variables			
Sex			
Male	120 (46.7)	1.239	.22
Female	137 (53.3)		
Age, median (IQR), y	69 (65-72)	-0.045	.47
Educational background			
Elementary school or below	37 (14.4)	1.208	.31
Middle school	79 (30.7)		
High school	95 (37.0)		
College or above	46 (17.9)		
Living status			
Living alone	21 (8.2)	0.397	.69
Living with family, relatives or friends	236 (91.8)		
Marital Status			
Married	232 (90.3)	-0.435	.66
Unmarried/Divorced/Widowed	25 (9.7)		
Working status			

Retired	234 (91.1)	-2.705	.007
Still working	23 (8.9)		
Monthly household income per capita, CNY			
<2000	30 (11.7)	2.473	.09
2000-4000	118 (45.9)		
>4000	109 (42.4)		
Health-related variables			
BMI			
<24.0	103(40.1)	2.469	.09
24.0–28.0	109(42.4)		
≥ 28.0	45(17.5)		
Pain			
No	129 (50.2)	2.939	.004
Yes	128 (49.8)		
Diabetes duration, median (IQR), y	7 (2-13)	0.258	<.001
Medication related to diabetes			
None	56 (21.8)	22.693	<.001
Oral medicine	162 (63.0)		
Insulin	39 (15.1)		
Complications of diabetes			
No	187 (72.8)	-0.158	.88
Yes	70 (27.2)		
Multimorbidity			
No	27 (10.5)	-0.017	.99
Yes	230 (89.5)		
Smoking history			
Be smoking	31 (12.1)	2.043	.13
Quit smoking	19 (7.4)		
Non-smoker	207 (80.5)		
Sleep duration, median (IQR), h	6 (6-7)	0.024	.70
Psychological variables			
Self-efficacy, median (IQR)	29 (25-34)	0.249	<.001
Perceived stress, median (IQR)	15 (9-20.5)	-0.157	.01
Social support, mean (SD)	39.54 ± 7.16	0.138	.03

P values from univariate analyses for the sum score of self-management. Data are presented as median (IQR), mean ± SD or n (%).

Table 2. Characteristics of media exposure and their associations with self-management in 257 older adults with type 2 diabetes mellitus.

Characteristics	All participants (N = 257)	t/r	*P* value
Traditional media exposure			
Traditional media exposure			
No	75 (29.2)	0.980	.33
Yes	182 (70.8)		
Health-related content exposure on traditional media			
No	220 (85.6)	-1.210	.23
Yes	37 (14.4)		
Daily smartphone time use, median (IQR), min	120 (60-240)	0.041	.57
Social media exposure			
Social media exposure duration, median (IQR), y	3 (1-5)	0.174	.005
Exposure to multi-platforms			
No	84 (32.7)	-0.135	.89
Yes	173 (67.3)		
The feature of exposure			

Video-based	113 (44.0)	-0.906	.37
Video- and Text-based	144 (56.0)		

P from univariate analyses for the sum score of self-management. Data are presented as median (IQR), mean ± SD or n (%).

Of the diabetes-related content exposure variable, the hyperbeneficial content included diabetes-related management information such as diabetes diet and blood glucose testing; hypobeneficial content included information on diabetes-related chronic diseases, inspirational stories sharing, etc.. Detailed descriptions on this variable are presented in Table S4 in Multimedia Appendix 1. There were 64 participants (24.9%) fell into the category of irrelevant content exposure, 1 (0.4%) fell into the category of harmful content exposure, 35 (13.6%) fell into the category of hypobeneficial content exposure, and 157 (61.1%) fell into the category of hyperbeneficial content exposure.

For univariate analyses presented in Table 1, the associations of working status, pain, diabetes duration, medication related to diabetes, self-efficacy, perceived stress, social support and social media exposure duration with the sum score of self-management were found to be statistically significant. The univariate analyses between covariates and each score of self-management dimensions are presented in Table S5 in Multimedia Appendix 1.

Associations Between Time Exposure and Self-management

As shown in Figure 1, time exposure and the sum score of self-management followed an approximate L-shaped dextrorotatory trend (*P* for nonlinear = .03). The trend started with a marginal and almost linear increase between 10 minutes and 139.8 minutes, followed by a sharp and almost linear decline until 600 minutes. The sample was then divided into the ≤139.8 minutes group and the >139.8 minutes group for further analyses. The nonlinear relationship between time exposure and the score of general diet was statistically significant (*P* for nonlinear = .004).

Figure 1. Associations between time exposure and the self-management dimensions.
General diet adjustments include marital status, health-related content exposure on traditional media and self-efficacy. Blood-glucose testing adjustments include diabetes duration, medication related to diabetes and self-efficacy. Foot care adjustments include diabetes duration, medication related to diabetes, complications of diabetes and self-efficacy. Fruit eating adjustments include educational background, working status, monthly household income per capita, exposure to multi-platforms and social support. High fat food eating adjustments include daily smartphone use time and traditional media exposure. Exercise adjustments include sex, pain, complications of diabetes, self-efficacy, social support, perceived stress, and social media exposure duration. Medication taking adjustments include sex, diabetes duration, medication related to diabetes, and complications of diabetes.

Associations Between Diabetes-related Content Exposure and Self-management

One participant who fell into the category of harmful content exposure was not representative and was therefore excluded from the following analyses. Compared with irrelevant content exposure, the positive relationship between hyperbeneficial content exposure and the sum score of self-management was found in the full sample (B = 3.46, 95%CI 0.71 to 6.21); among participants spent more than 139.8 minutes per day, the significant association remained robust (B = 7.27, 95%CI 1.54 to 13.00). The relationship between hypobeneficial content exposure and the sum score of self-management was positive but not statistically significant (B = 0.17, 95%CI -3.54 to 3.88) (Table 3). In sub-dimensional analyses, hyperbeneficial content exposure was positively associated with the score of general diet (B = 1.51, 95%CI 0.54 to 2.49), and the score of blood-glucose testing (B = 1.31, 95%CI 0.25 to 2.38), respectively. The association between hyperbeneficial content exposure

and the score of foot care was not statistically significant (B = 0.75, 95%CI -0.10 to 1.52) (Table 4). Among participants with excessive time spent on social media, hyperbeneficial content exposure versus irrelevant content exposure was not significantly associated with the score of general diet at the Bonferroni-adjusted level (B = 2.38, 95%CI 0.36 to 4.40) (Table S6 in Multimedia Appendix 1).

Table 3. Associations between diabetes-related content exposure and the sum score of self-management.

	B	SE	95% CI	*P*
Full sample (N = 256[a])				
Diabetes-related content exposure (ref. Irrelevant)				
Hypobeneficial	0.49	1.91	(-3.26 to 4.25)	.80
Hyperbeneficial	3.46	1.40	(0.71 to 6.21)	*.01*
The ≤139.8 minutes group (*n* = 147)				
Diabetes-related content exposure (ref. Irrelevant)				
Hypobeneficial	-0.62	2.26	(-5.09 to 3.85)	.77
Hyperbeneficial	2.22	1.73	(-1.20 to 5.64)	.18
The >139.8 minutes group (*n* = 109)				
Diabetes-related content exposure (ref. Irrelevant)				
Hypobeneficial	5.38	3.76	(-2.10 to 12.85)	.16
Hyperbeneficial	7.27	2.89	(1.54 to 13.00)	*.01*

[a]One case with harmful exposure were excluded. Covariates adjusted include working status, diabetes duration, pain, medication related to diabetes, self-efficacy, perceived stress, social support and social media exposure duration. Italics font indicates *P* values less than the Bonferroni-corrected level of significance of <.017.

Table 4. Associations between diabetes-related content exposure and scores of the self-management dimension in 256 older adults with type 2 diabetes mellitus.

	Diabetes-related content exposure (ref. irrelevant)	B	SE	95%CI	*P*
General diet[a]	Hypobeneficial	0.14	0.69	(-1.20 to 1.49)	.84
	Hyperbeneficial	1.51	0.50	(0.54 to 2.49)	*.002*
Blood-glucose testing[b]	Hypobeneficial	-0.15	0.76	(-1.63 to 1.33)	.84
	Hyperbeneficial	1.31	0.55	(0.25 to 2.38)	*.016*
Foot care[c]	Hypobeneficial	-0.15	0.54	(-1.21 to 0.91)	.17
	Hyperbeneficial	0.75	0.39	(-0.10 to 1.52)	.05
Fruit eating[d]	Hypobeneficial	0.12	0.32	(-0.51 to 0.76)	.71
	Hyperbeneficial	0.22	0.24	(-0.26 to 0.69)	.38
High fat food eating[e]	Hypobeneficial	-0.19	0.32	(-0.81 to 0.43)	.55
	Hyperbeneficial	0.13	0.23	(-0.31 to 0.58)	.56
Exercise[f]	Hypobeneficial	0.91	0.72	(-0.51 to 2.33)	.21
	Hyperbeneficial	1.04	0.52	(0.02 to 2.07)	.05
Medication taking[g]	Hypobeneficial	-0.02	0.33	(-0.65 to 0.64)	.99
	Hyperbeneficial	-0.14	0.23	(-0.60 to 0.32)	.55

[a]General diet adjustments include marital status, health-related content exposure on traditional media and self-efficacy. [b]Blood-glucose testing adjustments include diabetes duration, medication related to diabetes and self-efficacy. [c]Foot care adjustments include diabetes duration, medication related to diabetes, complications of diabetes and self-efficacy. [d]Fruit eating adjustments include educational background, working status, per capita monthly income, exposure to multi-platforms and social support. [e]High fat food eating adjustments include daily smartphone use time and traditional media exposure. [f]Exercise adjustments include sex, pain, complications of diabetes, self-efficacy, social support, perceived stress, and social media exposure duration. [g]Medication taking adjustments include sex, diabetes duration, medication related to diabetes, and complications of diabetes. One case with harmful exposure were excluded. Italics font indicates *P* values less than the Bonferroni-corrected level of significance of <.017.

Discussion

Principal Results

In this study, we reported that time exposure and content exposure on social media were associated with self-management in older adults with T2DM. Specifically, spending less than 139.8 minutes on social media per day was beneficial for self-management, but beyond that, increased time exposure would decrease self-management scores. Exposure to hyperbeneficial content was positively associated with overall self-management in both the full sample and among those using social media for more than 139.8 minutes per day.

Unlike most studies that relied solely on subjective assessments [24,25], we assessed subjective and objective time exposure. By identifying the strong associations between these two variables, we determined to use subjective time exposure in this study because it is feasible to assess. Instead of following the traditional paradigm, i.e., assuming the linear relationships between time exposure and health behaviors [26], we employed the restricted cubic spline and found an approximate L-shaped dextrorotatory trend between time exposure and the overall self-management. This suggests that excessive exposure to social media may compromise the self-management of adults with T2DM. We also found that excessive time exposure would significantly compromise participants' adherence to a diabetes diet. Understanding the mechanism underlying these findings fell out of the scope of this study, but some information in the literature would facilitate unraveling the hidden story in the black box. For example, excessive exposure to social media would reflect individuals' suboptimal executive function [27], and the latter would result in unsatisfactory diabetes self-management [28]. As for the general diet, social media is a popular platform for unhealthy food advertising, and excessive exposure might increase the likelihood of individuals becoming its audience and then being driven away from healthy diets [29,30]. Future studies may corroborate the findings and advance science by adding robust evidence on the mechanisms between time spent on social media and self-management of older adults with T2DM.

By sorting out content exposure gathered through a semi-closed question and records documented on social media, we found that 61.1% had hyperbeneficial content exposure, including information about diabetes diet, complications, and treatment. With the high-resolution data, we found that compared with exposure to irrelevant content, participants exposed to hyperbeneficial content exhibited significantly better performance on overall self-management and sub-dimensions of general diet and blood-glucose testing; the positive effects of hyperbeneficial content exposure on self-management remained robust among those with excessive time exposure. If high-quality cohort studies or interventions confirm the findings in our study, this evidence may support media prescription by healthcare providers in communities. It may also help social media servers optimize user profile capture, for example, by expanding information collection to include illness information and enhancing the recommender systems.

Foot care is often regarded as one of the most challenging practices encountered by healthcare providers. [31,32], Our results showed that only 2.0% of 257 participants reported exposure to foot care content on social media. Empirical evidence showed that foot care information on social media was limited, but the available content were useful and highly reliable [33]. We failed to capture the association between hyperbeneficial content exposure and the practice of foot care, but that may be attributed to the small sample of individuals with foot care information exposure in our study. Gaps between diabetic foot care and other dimensions of self-management should be addressed and we hope that healthcare providers may take their roles in posting high-quality foot care information on social media, getting familiar with and updating the information, and recommending it to older adults with T2DM.

Limitations

Although the findings of this study are strengthened by addressing the methodological pitfalls and content gaps in the literature, some limitations should be considered. First, several novel hypotheses were proposed regarding the relationships between social media exposure and self-management among older adults with T2DM. However, this study is cross-sectional, and the robustness of these findings should be corroborated by stronger evidence in the future. Second, most of the adults in our study had higher educational backgrounds, better economic status, and lived in urban areas. This may limit the external validation of our findings. Third, we operationalized social media exposure as time exposure and content exposure as often assessed in the literature. However, social media exposure may include other parameters, such as online social engagement which reflects the “social” feature of social media exposure. Understanding effects of those features on the self-management could further leveraging the role of social media and a concept analysis of social media exposure should be conducted to lay the methodological foundation for research in this area.

Conclusions

This study reveals due dual effects of social media exposure on the self-management of older adults with T2DM. Self-management was aggravated when daily social media use time exceeded 139.8 minutes. However, exposure to hyperbeneficial content facilitated the self-management, even under excessive time exposure. These findings provide new evidence suggesting that social media has the potential to serve as a valuable source for enhancing the self-management of older adults with T2DM. Further high-quality cohort studies are needed to confirm the findings, and that may contribute to developing strategies to guide appropriate social media exposure of older adults with T2DM to enhance their self-management.

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Conflicts of Interest

None declared.

Abbreviations

T2DM: type 2 diabetes mellitus
MED: Media on Diabetes
SD: standard deviation
BMI: body mass index
IQR: interquartile range

95%CI: 95% confidence interval

Multimedia Appendix 1

Supplemental tables and figures.

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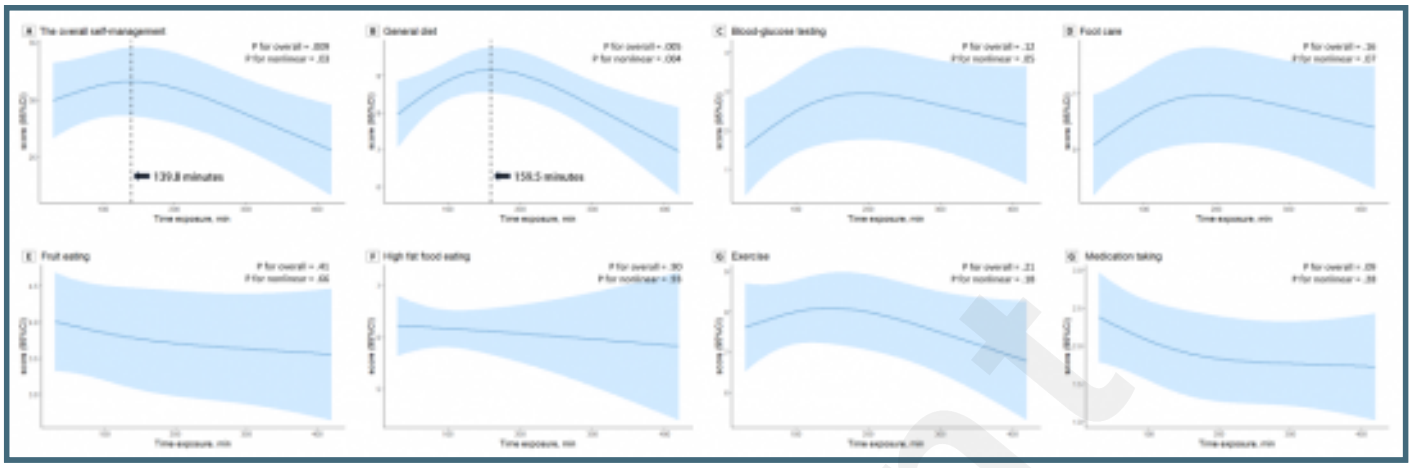
Supplementary Files

Figures

Associations between time exposure and the self-management dimensions.



Multimedia Appendixes

Supplemental tables and figures.
URL: http://asset.jmir.pub/assets/087e2305dd9963c208dca570741b57a1.docx