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## **Understanding Prediabetes Through Facebook: Pilot Study Protocol and Lessons Learned**

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### **ABSTRACT**

Purpose/Background: Type 2 Diabetes is a serious contributor to mortality and morbidity. Rural populations (including those in Mountain West regions) exhibit greater health disparities than their urban counterparts for many conditions, including diabetes. It is therefore vital to address this important health issue, especially among rural populations. One way to address diabetes is with prevention, starting with enhanced detection of prediabetes. According to the CDC, more than 84 millions Americans (one in three adults) has prediabetes, but nine out of ten are not aware of their condition, which hampers prevention efforts. Infodemiology has been used successfully to track health information found on social media. Our project aims to find indicators of prediabetes through Facebook content, with a long-term goal of developing an effective social media screening tool for prediabetes.

Materials & Methods: This study had an exploratory retrospective design (the study protocol has been published; Xu, Litchman, Gee et al., 2018 JMIR Research Protocols). Utilizing electronic medical records from a Mountain West region family medicine clinic, we recruited 17 patients diagnosed with prediabetes who were willing to share their Facebook posts. Participants completed a clinic session where they responded to a number of surveys (e.g., Facebook Intensity Scale, Prediabetes Online Community Engagement Scale, Computer-Mediated Social Support Scale) and provided us with their Facebook account information. We then accessed and coded all Facebook posts for the 6-month period surrounding their prediabetes diagnosis (3-months pre through 3-months post-diagnosis; see Figure 1). Coding included meta-data (e.g., time of post, post type), post text/visuals, social aspects of the post (e.g., comments, reactions, shares), and content of interest (e.g., health, physical symptoms, lifestyle factors, medical experiences, food

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etc.).

Results: Descriptive information about participant demographics and their responses to surveys are provided (see Table 1). We are currently compiling the coded data and will use a mixed-method protocol for analyses. This includes both qualitative content analysis to identify themes as well as a quantitative approach to examine potential differences between the 3-months prediagnosis and the 3-months postdiagnosis for our participants. While we were able to code data for 17 patients, due to unanticipated barriers in recruitment and coding we did not meet our planned goal of 20 patients. To assist those planning on conducting this type of social media research, we will discuss some of these issues including the importance of having a large team of coders who can work simultaneously.

Discussion/Conclusion: Data from this project should provide an initial taxonomy of prediabetes indicators identifiable within a social media context. Future studies, with larger samples, can test the utility of the taxonomy on predicting prediabetes status from Facebook posts. We also hope that our lessons learned information will be helpful to other researchers working on social media health studies. The ultimate goal of our research is to develop an automated method to identify social media users who are likely to have prediabetes. This would be especially helpful for those who are unaware of their health condition, as identification can lead to efforts that can prevent the progression of prediabetes to diabetes.

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Table 1: Demographics and Survey Responses (N=17)

Variables	N (%)
Age, mean (SD)	51.8 (SD 13.0)
Gender, Female	14 (82.4)
Marital Status	
Single	2 (11.8)
Married	10 (58.8)
Divorced	4 (23.5)
Widowed	1 (5.9)
Education Level	
No schooling completed	1 (5.9)
High school graduate (or equivalent)	3 (17.6)
Some college (1-4 years, no degree)	8 (47.1)
Associate's degree (including occupational or academic degrees)	2 (11.8)
Master's degree (MA, MS, MENG, MSW, etc.)	1 (5.9)
Doctorate degree (PhD, EdD, etc.)	2 (11.8)
Income	
Less than \$10,000	4 (23.5)
\$10,000 - \$14,999	2 (11.8)
\$15,000 - \$24,999	3 (17.6)
\$25,000 - \$49,999	3 (17.6)
\$50,000 - \$99,999	5 (29.4)
Employment	
Unemployed	3 (17.6)
Disabled	4 (23.5)
Student	2 (11.8)
Retired	4 (23.5)
Working full-time	4 (23.5)
Health Insurance (n=21, multiple answers)	
Uninsured, private pay	4 (23.5)
Private insurance	8 (47.1)
Medicaid	2 (11.8)
Medicare	3 (17.6)
Medicare Disability	3 (17.6)
Military coverage	1 (5.9)
Race	
Black or African-American	1 (5.9)
White	16 (94.1)
Ethnicity	
Hispanic or Latino	1 (5.9)
Not Hispanic or Latino	15 (88.2)
Unknown	1 (5.9)
Family/Friend History of Diabetes/Prediabetes	
Family History of Diabetes	11 (64.7)
Number of family members with Diabetes	Range 1-8, mean 2.0
Family History of Prediabetes	9 (52.9)
Number of family members with Prediabetes	Range 1-2, mean 1.4
Friend History of Diabetes	11 (64.7)
Number of friends with Diabetes	Range 1-4, mean 2.0
Friend History of Prediabetes	8 (47.1)
Number of friends with Prediabetes	Range 1-4, mean 2.0
Internet Use (n=41, multiple answers)	
Personal laptop	7 (17.1)
Personal Netbook	2 (4.9)
Tablet (iPad, Samsung Galaxy Tab, etc.)	7 (17.1)
E-Reader (Nook, Kindle, etc.)	1 (2.4)
Mobile phone	14 (34.1)
Computer at home	7 (17.1)
Computer at school	1 (2.4)
Computer at work	2 (4.9)
Social Media Use (n=31, multiple answers)	
Facebook	17 (54.8)
Twitter	4 (12.9)
Instagram	3 (9.7)
Pinterest	5 (16.1)
Snapchat	1 (3.2)
Other	1 (3.2)
Social Media Engagement for Prediabetes, mean (SD) (Possible range 0-5)	1.5 (SD 1.6)
Computer Mediated Social Support, mean (SD) (Possible range 15-75)	55 (SD 9.0)
Perceived Informational Support, mean (SD)	-0.1 (SD 0.8)
Perceived Emotional Support, mean (SD)	0.3 (SD 0.7)
Perceived Esteem Support, mean (SD)	-0.2 (SD 0.4)
Quality of Life, mean (SD)	
Total health score (Possible range 12-47)	31.4 (SD 6.9)
Physical health sub-scale score (Possible range 6-20)	13.1 (SD 3.4)
Mental health sub-scale score (Possible range 6-27)	18.3 (SD 3.9)
A1C, mean across two readings (SD)	5.86 (SD 0.44)

