Impact from a Personalized Nutrition Application in West Virginia: A Feasibility Study

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BACKGROUND

Project Better Health (PBH) is a feasibility study using a personalized, mobile health (mHealth), nutrition application in rural West Virginia. Clinical sites (7) that are partners with the West Virginia Practice-Based Research Network (WVPBRN) and West Virginia Clinical and Translational Science Institute (WVCTSI) were recruited as intervention sites. The Good Measures (GM) application, used here, tracks diet, physical activity, and gives the enrolled user access to Registered Dietitian (RD) services. The GM application records the nutritional content of daily food choices and gives the user a daily Good Measures Index (GMI) score.

OBJECTIVE

To determine the feasibility of an mHealth approach for nutritional services in at-risk individuals in Academic Rural Clinics (AC) and Rural Clinics (RC) and determines their attitudes toward this approach.

METHODS

After a state-wide training webinar about the GM application approach, providers were invited to participate in the Project Better Health intervention. WVU Institutional Review Board approved study protocol and clinical site training was completed.

Participant inclusion criteria:

-BMI greater than or equal to 30, over the age of 18, have access to Internet, willing to complete questionnaires, can comprehend English language.

Participants were incentivized to be physically and behaviorally assessed at baseline, 4 weeks, and 12 weeks.

-Height, weight, blood pressure, attitudes toward GM

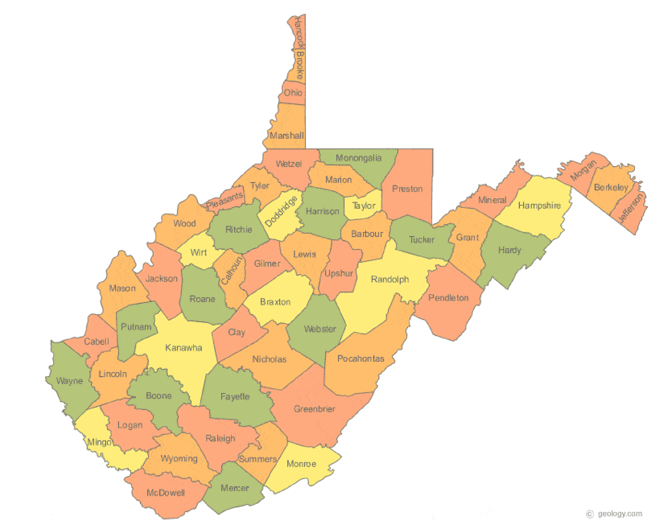
Participants were enrolled and began to log their meals and physical activity into the GM app daily and report in with a GM RD. Logging and communication happened via web, application, email, or phone.

Baseline characteristics were compared using two-sample t-tests for continuous measures or Fisher's exact test for categorical. Linear mixed effects models were employed to determine longitudinal effects for all outcomes. The overall effects of time as well as time by geographical region interaction were estimated adjusting for gender. Baseline weight and systolic blood pressure were calculated using logistic regression at 4 and 12 weeks. GM application interaction and usage were analyzed by a Wilcoxon two-sample test for significance between geographical regions. app

RESULTS

Patients were primarily Caucasian (92.19%) females (76.56%) with an average age of 44.9+12.75 years.

Variable	Total	Peri-urban	Rural	p-value
(N=64)				
Age	44.90+12.75 years (19-63 yr range)	26	38	0.6001
Gender				
Male	15	8	7	
Female	49	18	31	0.3681
Ethnicity				
Caucasian	59	22	37	
African American	2	1	1	
Asian American	2	2	0	
Other	1	1	0	0.1368
Co-morbidities				
Diabetes	17	6	11	0.7746
Hypertension	28	11	17	0.1988
Heart Disease	5	2	3	0.3596
Cancer	1	1	0	0.4063
COPD	4	0	4	0.1397
Sleep apnea	9	2	7	0.2906
Other	11	2	9	0.1757
Health Insurance				
Medicare	9	2	7	
Medicaid	11	2	9	
Blue Cross	17	9	8	
United	0	0	0	
None	1	0	1	
Other	26	13	13	0.165
Technology capabilities				
Internet	63	26	37	1
Smartphone	51	23	28	0.3293
Use Apps	28	13	15	0.6071



Group	N	Variable	Baseline	4 weeks	12 weeks
AC	26	Nutrition important for health	3.35	2.68	2.71
		GM increase access to nutritional	2.46	2.43	2.82
		services*	2.6	2.61	4.10
		GM helps to reach goals*	2.73	2.74	2.73
		GM helps to choose healthy food	6.31	7.35	7.73
		Smartphone is a barrier to using GM	6.69	7.70	7.18
		Internet is a barrier to using GM	2.76	2.23	2.95
		GM is easy to understand*	2.58	2.52	3.23
		GM description made me want to	6.4	5.43	4.68
		use*	3	2.39	2.95
		Daily activities prevent me from			
		using GM*			
		I would recommend GM			
RC	38	Nutrition important for health	2.63	1.96	1.61
		GM increase access to nutritional	2.5	2	1.90
		services	2.24	2	2.97
		GM helps to reach goals*	2.34	2.16	2.25
		GM helps to choose healthy food	5.72	6.19	6.17
		Smartphone is a barrier to using GM	5.41	5.69	6.29
		Internet is a barrier to using GM	2.63	2.10	1.72
		GM is easy to understand	2.43	2.10	1.79
		GM description made me want to	5.87	5.75	5.34
		use	2.57	1.81	1.83
		Daily activities prevent me from			
		using GM			
		I would recommend GM			

*Denotes a decline across time

Primary outcomes show average usage of the GM app below to determine feasibility. No significant differences were found between groups.

Variable	Total	Peri-urban	Rural	P-value
Number of Meals Logged (26 vs 38)	169.5 (155.1)	172.5 (142.3)	167.5 (165.1)	0.8991
Number of Exercise Sessions Logged (26 vs 38)	25.3 (32.1)	23.4 (29.4)	26.6 (34.2)	0.7029
Number of Days logged (26 vs 38)	55.3 (41.4)	57.8 (32.6)	53.5 (46.8)	0.6862
Total RD Interactions (26 vs 38)	20.0 (17.0)	21.6 (17.4)	18.9 (16.8)	0.5385
Initial 5 Day GMI (26 vs 32)	63.7 (11.3)	65.1 (11.1)	62.6 (11.4)	0.4015
Peak 5 day GMI (24 vs 28)	77.1 (10.0)	76.6 (8.2)	77.4 (11.4)	0.7752

Specifically between Academic Rural Clinics and Rural Clinics, larger improvements were identified in the Rural Clinics for the measures of attitudes towards the GM approach.

	Peri-urban	Rural	p-value
Change from Baseline			
Weight week 4	-2.0 (4.4)	-3.6 (5.1)	0.2349
Weight week 12	-2.5 (8.4)	-3.2 (8.0)	0.7833
SBP week 4	-4.3 (11.0)	-0.58 (14.5)	0.298
SBP week 12	-2.1 (13.3)	-3.8 (15.8)	0.7024

Secondary outcomes show changes in weight and SBP indicated a decrease from baseline to 12 weeks, however, this was not statistically significant between groups.

Clinician Feedback

Clinician survey (N=8) identified the training for the intervention and the Good Measures application as being beneficial, straightforward and adequate. They believed that motivated individual's utilized the application more and that if patients could use the application with their family or as a tool to motivate and communicate with others, participants would've enjoyed it more. Clinician's also felt that they had support from researchers and coordinators when they had any questions regarding the program, and all mentioned they would like to work with the GM program again in any future endeavors.

CONCLUSION

Findings from this feasibility study indicate that implementation of a mHealth approach can be achieved in rural populations within West Virginia. Across this 12-week feasibility study, improvements were found in weight, blood pressure, and participant attitudes toward the GM approach. Understanding under-represented populations with a lack of access to nutritional services requires more attention. This study took a creative approach to reaching this population and more creative solutions like this need to be examined.

Acknowledgments:
Funding provided by West Virginia Clinical and Translational Science Institute (WVCTSI) Good Measures, LLC Application for nutritional tracking and Dietitian services