Exploring Nutrition Education in an App-Based Produce Prescription Program

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Objective

To explore the nutrition education utilization and fruit and vegetable (FV) intake of participants in a six-month long mobile-app based produce prescription program (PPR).

Background

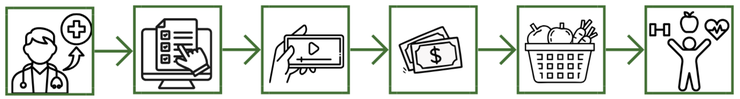
Diabetes is a global and local health crisis. In Iowa:

- Over 10% of adults have diabetes.[1]
- 34.1% are diagnosed with prediabetes.[1]
- The annual direct medical cost of diabetes is $3 billion.[1]

Nutrition is a key consideration for diabetes, yet only 6.7% of Iowans meet the recommended daily intake of fruits and vegetables; this rate drops for low-income populations.[2] This demonstrates the need for proactive approaches for improving Iowans' nutrition and overall health. The Iowa Produce Prescription Program (I-PPP) provides financial incentives for FV paired with nutrition education for low-income patients with prediabetes and diabetes. Produce prescriptions have shown dietary and clinical improvements; I-PPP offers a unique approach to program delivery and nutrition education.

Methods

Participants referred into the I-PPP by a healthcare provider enrolled with a pre-survey and engaged in monthly modules to earn and redeem produce prescriptions for fresh FV.



Modules involved watching a nutrition education video and completing a brief survey. Incentives were then automatically loaded into the app and could be spent at participating retailers. The pilot included two cohorts who received different education curricula: Cohort 1 viewed Iowa State Extension and Outreach Snap-Ed videos and Cohort 2 received redesigned videos grounded in Self-Determination Theory. FV intake was measured at baseline and post-intervention using the Dietary Screener Questionnaire. Post-survey data captured frequency of educational content use. Descriptive statistics and matched paired t-tests were used to evaluate changes in pre-post self-reported outcomes.

Figure 1: *Flow of Iowa Fresh mobile app. Left and center: nutrition education module; right: app wallet function interoperable with retail POS system.*

Results

Twenty-seven participants completed Cohort 1 and thirty-six completed Cohort 2, for a total of sixty-three participants. From baseline to post-intervention, there was a significant increase in fruit intake, vegetable intake, and fruit and vegetable intake together (Table 1).

	Baseline	Post-Intervention	Mean Difference	p-value
Fruit & Vegetable Intake (c)	2.46 ± 0.89	2.97 ± 9,72	0.509	<.001
Fruit Intake (c)	0.92 ± 0.57	1.17 ± 0.47	0.258	0.0005
Vegetable Intake (c)	1.59 ± 0.62	1.77 ± 0.48	0.174	0.045

Table 1: Baseline and Post Intervention Fruit and Vegetable Intake for All IPPP Participants (n=63).

Participants' nutrition education utilization was categorized in high utilization (>2-3 times per week) and low utilization (≤once per week). Of the 27 participants from Cohort 1, 15 (56%) reported high utilization and 12 (44%) reported low utilization. In Cohort 2, 32 (89%) participants reported high utilization, which was a significantly higher proportion of participants than in Cohort 1 (p=0.0032, Figure 2). *Preparing Fruits and Vegetables* was the most-used module across both cohorts, followed by *Shopping for Fruits and Vegetables* for Cohort 1 and *Goal Setting* for Cohort 2 (Figure 3).

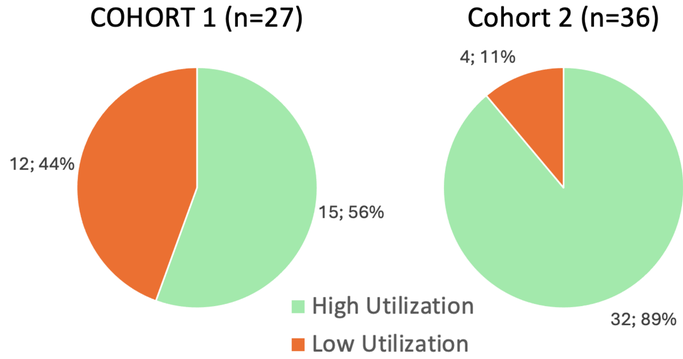


Figure 2: High and Low Nutrition Education Utilization in IPPP Cohort 1 & Cohort 2

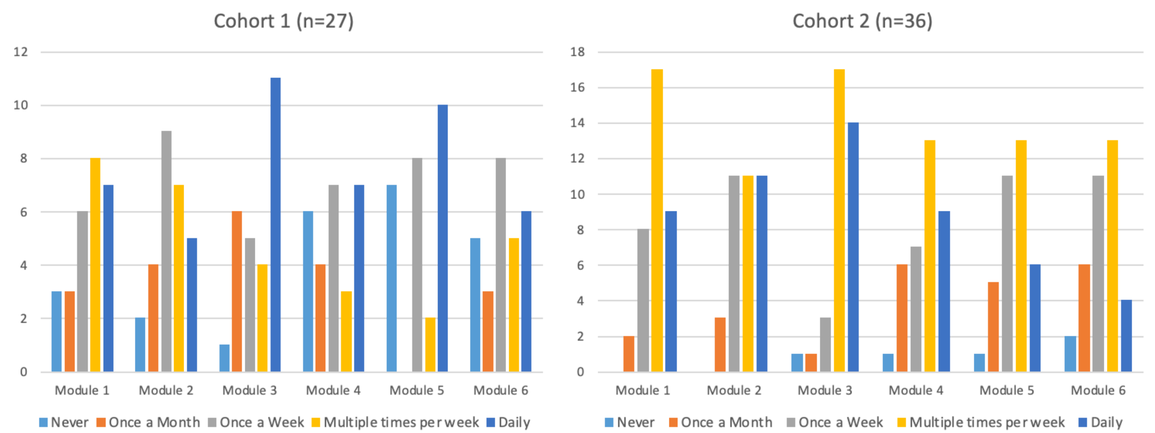


Figure 3: Nutrition Education Utilization by module.
Cohort 1 Nutrition Education Topics: (1) Shopping for Fruits and Vegetables; (2) Storing, Cleaning, and Freezing Produce; (3) Preparing Fruits & Vegetables; (4) Reading Nutrition Labels; (5) Stretching Your Food Dollar; (6) Recipe Videos
Cohort 2 Nutrition Education Topics: (1) Goal Setting; (2) Shopping for Fruits and Vegetables; (3) Preparing Fruits & Vegetables; (4) Reading Nutrition Labels; (5) Stretching Your Food Dollar; (6) Making Healthier Swaps & Additional Recipe Videos

Implications

While a growing body of evidence suggests that PPRs can improve dietary intake, food security, and chronic disease risk management, the I-PPP and its supplemental education curriculum demonstrate potential as a scalable, low-cost intervention to improve nutrition and utilization of nutrition education through a mobile app. Pilot data demonstrates improved fruit and vegetable intake and significantly higher nutrition education utilization in Cohort 2 following the adoption of the updated curriculum, with 89% of participants reporting high utilization. To continue supporting the integration of PPRs into healthcare systems, future research should focus on the incorporation of theory-based educational components into programs. Studies should continue to explore dietary intake, healthcare utilization, and clinical outcomes, but future programs should also consider evaluating theory-driven psychosocial outcomes to better promote long-term behavior changes.

Next Steps

To further explore the theory-based education curriculum, we have designed a 3-arm randomized controlled trial to investigate dietary and biometric impacts of the produce prescription program alone and with the nutrition education curriculum compared to a control group.

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